A
STUDY
OF SECONDARY SCHOOLS'
COSTS AND INDICATORS IN THE SUDAN

BY

LEILA TAHA SALIH
B.Sc.; M.P.A.; M.D.P.(Part I)

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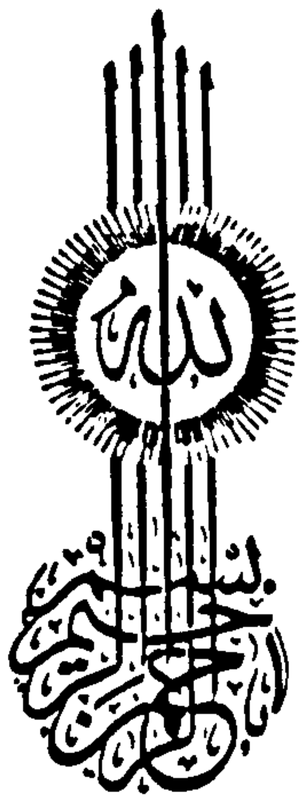
Supervisor: Professor J. R. Hough,
B.A.; Cert. Ed.; M.Sc.; Ph.D.; F.C.I.I.



IN THE NAME OF ALLÄH,
THE MERCIFUL,
THE MERCY GIVING

IN THE NAME OF ALLAH,

THE COMPASSIONATE, THE MERCIFUL.

DEDICATION

TO MY LATE FATHER,

TAHA SALIH BASHIER

RAHMAT ALLAH ALAYHI

AND MY MOTHER,

OMAHANI OMER ABU SHAMMA

ATAL ALLAH OMRAHA.

وَقُلْ رَبِّ زِدْنِي عِلْمًا ○

say, "O My Lord! Advance Me In Knowledge"

ABSTRACT

Comprehensive educational planning has been adopted in Sudan since independence in 1956. The inadequate projection of resources for the plans' implementation has bedevilled the full achievement of their targets and led to frustration with the planning process. Relevant cost data for unit costs analysis, which gives a quantified framework within which it is possible to estimate in advance the financial and economic implications of structural changes and educational programmes and projects at the micro or macro levels and hence lead to more informed decision-making, are not available on a systematic basis at any level of aggregation. In the last decade as the adverse economic conditions have continued and financial stringency tightened, the need for reliable costs analysis based on more accurate relevant costs data has become even more urgent.

This thesis is an attempt in this direction. It is based on a representative random sample of 48 academic secondary schools out of 203 public schools in northern Sudan, in the academic year 1988/89. It analyses the unit expenditure of secondary schools and its constituents, identifies the factors that influence their variations among educational institutions and between regions, and examines the utilization of resources at the school level. The per pupil costs, components and cost indicators are investigated by size, location, type and kind of school as well as the teacher profile of academic qualifications, types of training and levels of experience; per boarder costs are discussed separately. Pearson correlation has been employed to estimate the type and strength of the relationships between the unit costs and their constituents on one hand and the cost indicators on the other. The sample data are tested for economies of size and the results of the final public examination, the Sudan School Certificate, are related to the size of school and to per pupil expenditure and other cost indicators using linear and multiple regression analysis.

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CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 General Background:

Ever since independence the Sudan, as in developing countries elsewhere, has been continuously striving to achieve overall development to raise its people's standard of living, eradicate the grave causes and effects of socio-economic backwardness and poverty that tighten their grip on the poor and their children, break the fetters of ignorance and achieve social justice and fair income distribution. Throughout this endeavour even political and social systems that were accused of perpetuating their squalor, misery and stagnation were overthrown. Hence, the target has been not only economic growth (as measured by the increase over time in per capita output of material goods, per capita GNP or income) but sustained development, whatever the concomitant difficulties and dangers. This notion of development relates to growth and change in the whole spectrum of economic and socio-cultural spheres. It is initiated by the people for the people; the driving force being to improve the social and living conditions of the toiling millions who bear the burden of this growth. In this sense it is the type of development described by Cockroft, Frank and Johnson (1972) as "Real development (that) involves a structural transformation of the economy, society, policy and culture ... that permits the self-generating and self-perpetuating use and development of the people's potential".

The role of education in this multidimensional endeavour towards progress and social welfare cannot be over-emphasized. Todaro (1977) noted that, "Most economists would probably agree that it is the human resources of a nation, not its capital nor its material resources, that ultimately determine the character and pace of its economic and social development". Recently, it has been widely accepted by policy makers, planners and administrators that

education is a crucial factor that contributes, in several ways, to foster the development process. Formal education trains and qualifies the skilled manpower required to initiate such development and further sustains it. Meanwhile it can enhance the ability to learn more and prepare individuals to adjust readily and rapidly to unforeseen changes in the manpower needs and conditions of today's world of work. It can transfer technical innovation, contribute to and encourage its development. The choice of the kind of education that can accelerate this transfer process is crucial for achieving that important stage of self sustaining growth. Furthermore, education is well known to create a culture that stimulates a wide range of modes of behaviour and attitudes that can favour development. The relevant content of education may strengthen the will to achieve and mould attitudes toward work and change, thus developing entrepreneurial and administrative abilities - scarce factors in a developing country, though vital for the efficient operation of the public and private sectors. In the specific situation of the Sudan education can socialise students with a shared set of values and attitudes that develops a common national identity, contributing to political stability, nation-building and development.

In developed countries, Coleman et al. (1966) emphasized the family background and socio-economic status as the sole determinants of children's adulthood future. Yet research evidence asserts that, in developing countries, education can promote social mobility and affect income distribution, especially if biased towards basic and primary education, which contribute to the productivity of rural areas and raise agricultural yields. In the developed industrialized countries, "the grand myths of education as a motor for development and a great leveller in society have waned" (Caillods, 1989b). "The evidence suggests, however, that the impact of education is somewhat larger in developing countries, because of its relative scarcity there" (World Bank, 1988). Hence, it was highly recommended

that education should not be considered "only as a 'sector' of development - parallel, for example, to agriculture or industry - but as a pervasive element that must be integrated - horizontally and vertically - into all development effort" (World Bank Education Sector Policy, 1980). Adopting this viewpoint, which considers education a basic necessity for long term social and economic development, the Sudan had been investing heavily in expanding the educational system. The logic for this rested on such notions as "to explore, exploit and manage the natural resources that the Sudan possesses, it is imperative that the Country be equipped with better skilled and motivated human resources" (Sanyal, 1986). The Sudan, as in other developing countries, has been faced with a scarcity of financial resources leaving only a limited amount of money available for investment in education. Educational planning was employed to arrive at a criteria for the efficient deployment of the existing meagre resources to ensure their best utilization, so that education as a system makes the optimum contribution to social and economic development. Three educational plans, integrated as part of overall national socio-economic development plans, were adopted but none was fully implemented. As these Plans were not based on accurate information on cost data, they were not feasible. Cost analysis was not used to estimate accurately the costs of the plans, to diagnose utilization of existing resources, to check for excess capacity or to tap informed choice of alternative policies or programmes. Lack of relevant cost data led to adoption of targets that could not be implemented such as universal primary education (U.P.E) and the reversal of enrolment ratio in academic and technical education from 85% : 15% in the long-run. The universalisation of primary education, which was supposed to be achieved by 1980, has been postponed to 1990 and then to the year 2000; even this possibility is remote. On the other hand, the short-run target of 40% technical education intake by 1980 was not achieved; technical enrolment was only 9.2% in 1989. The recent economic crisis and financial

stringency resulted in severe cuts in the education budget because the government is the main financier of education. The prevailing situation indicates that "no longer does he (the planner) know by how much the system must expand, he has to work out by how much the country can afford to expand the system" (Bennett, 1972b). Hence, accurate costing becomes much more important; the more recurrent unit costs can be reduced the more the system is able to expand. The need for cost awareness and incorporation of cost analysis in any and all decision making processes is urgent.

1.2. Statement of the Problem:

Secondary education plays an important role in determining the professional orientation of its clientele as it inculcates the intellectual skills necessary for further education at higher levels and those required for success in the labour market and the world of work. In the Sudan the social demand for academic secondary education is extensive. For historic reasons this type acquired more popularity because it is a "passport" to higher education and a one way street to the prestigious "white collar" employment. Consequently, and as a result of the increase in enrolment at the primary level aiming at universal primary education, it is expanding beyond what was planned. Government policy that encourages popular effort to build and furnish schools not only widens the disparity between and within regions as more facilities are built in the more affluent areas but, more importantly, increases the financial burden of the operating costs. The present economic crisis and the financial squeeze that stagnated the education budget not only combat expansion but adversely affected the consolidation of the existing system, not to mention its influence on quality. Commitment of more resources for this level raises serious concern. It may endanger the slim chance of achieving the planned goal of U.P.E. by the year 2000. Considering the pressure from high social demand, attempts to improve the relevance and content of the present curicula at all levels would be jeopardized. Moreover, it

can restrain the expansion of equally important forms of education for socio-economic development; adult literacy programmes and vocational training for the annual exodus of thousands of unskilled school leavers, who lack any preparation for the world of work. Hence the need for efficient utilization and management of the limited amount of human and physical resources available is urgent if the programme of expansion is to be achieved without repressing other crucial levels and/or forms of education services.

1.3. The Objectives of the Study:

The primary goal of the present study is to understand the learning process, the organisation of teaching, the norms and regulations in force and how these factors affect the utilisation of resources (both human and material) at the school level, in an attempt to control the rising cost of education and to reallocate expenditure into inputs that are most cost-effective in improving education output.

Within this framework, the study endeavours to achieve the following complementary objectives:

1) to compute and analyse the recurrent unit costs and their components in academic secondary education and delineate their determinants;

2) to establish the extent of disparities in unit costs and their components among institutions between and within regions according to a set of exogenous factors;

3) to diagnose the characteristics of the teaching force; that is imperative because of their economic and pedagogic implications;

4) to delineate the different sources of financing per unit costs and the magnitude of each;

5) to examine the data for economies of size and identify the factors that influence the unit costs and those that determine the school output.

1.4. The Need for the Study:

The tremendous quantitative expansion of academic secondary education, in the Sudan, has been achieved at the

expense of the qualitative aspect. Both planners and educators believe that under-investment in this level of education led to the erosion of its quality and adversely influenced its output. This attitude emphasized the need for more resources and extra funds rather than more efficient utilization of those available. In this atmosphere cost analysis is ignored and lacks the attention that it deserves. Research findings, however, revealed that "throwing more money" at schools would not improve student learning, but implied that it all depends primarily on how funds were used and whether schools were aware of resource reallocation strategies to improve output. Furthermore, estimates of unit costs have relied mainly on allocated budgets, which is rarely the actual expenditure. As is the case in many developing countries, the support of other sources of finance does not show in the public accounts, thus rendering expenditure on education incomplete. This creates a great need for cost analysis at the micro level to obtain a more accurate estimate of resources. A thorough cost analysis facilitates the formulation of realistic educational development plans and identification of feasible educational projects. The adoption of non-feasible targets and unimplementable plans in the past were the result of lack of relevant cost data that bedevilled any cost analysis study. In the absence of awareness about resource reallocation strategies, lack of feedback and information on use of resources, as well as accurate, complete and adequate cost data in the Sudan, the importance of this study can be posited as both short and long-run. In the short-run it would quantify the overall recurrent per pupil costs and delineate the magnitude of each of its components, as well as pin-pointing the educational cost indicators; which are good indices of resource use. The diagnosis of the extent of regional variations in unit costs would help planners' efforts to reduce regional disparities and address its causes with the urgency and efficiency it deserves.

In the long-run unit costs provide policy makers and planners with a standard yardstick (benchmark) to estimate

the financial implications, in advance, of educational plans and specific programmes. This study would be the first step in accumulating knowledge on costs of secondary education and its sources of finance; hence it reveals how resources allocation and management determine the differences observed in unit costs. Its most significant contribution would be the employment of rigorous statistical techniques, for the first time in the Sudan, to identify the determinant of unit costs and those that influence the school output. Such scientific diagnosis would enable educational planners to control the rising unit costs and improve pupils' achievement without sacrificing the qualitative aspect of education. It would replace uninformed guess-work about how costs can be reduced with a statistical technical procedure that can identify the determinants of educational costs, their magnitudes and, hence, allow for scientific estimation of per pupil costs without impairing the quality of the learning process. It would guide educational planners in projecting the required resources for educational expansion and/or structural change. Using statistical techniques the cost of education can be controlled, effectively, through the most important factors that proved to be influencing the unit costs. Similarly, knowing the determinants of education output, would allow resources to be reallocated in order to spend more on those inputs that most increase pupils'achievement or, at least, to protect expenditure on them against ad hoc axing and severe cuts.

1.5 Limitation of The Study:

This study covers, geographically, Northern Sudan. The civil war in the South brought all services to a standstill and security problems also affected Darfur Region. As such, it is legitimate to refer to the overall averages of the sample schools as "the national averages". Pedagogically it focuses on the second stage of the second educational level - the academic secondary schools. Similar to most research of its kind it has limits - time, financial and scope. Moreover, it has the following specific limitations:

1 - Total unit expenditure or costs (as they are used interchangeably) represents only the recurrent, operating costs of secondary schools. Capital costs are not included. The problem is that capital cost data are difficult to obtain. In most countries capital invested in school buildings and equipment is 'capital expenditure'. As such an 'annualisation factor', which depends on the social rate of discount (opportunity cost of capital or interest foregone), the lifetime of the capital and the original cost of the capital, has to be calculated. This was regarded as extremely problematic in both developed and developing countries as would be discussed later.

The construction of educational buildings in the Sudan was the responsibility of the 'School Building Unit' in the Ministry of Education. In the earlier 1970s it was merged - most probably to gain economies of scale - into the 'Ministry of Public Works', which is entrusted with all public construction works. However, most of all the secondary school expansion was achieved in this latter period, in which case it is almost impossible to apportion school-by-school construction costs (included with other public building costs) from the records in this Ministry. Even for those schools which were built earlier, given the primitive state of technology for retaining information or records, it might not be feasible to locate where those individual school files are kept at the moment. Moreover, in many cases where dormitories were converted into classrooms, or an extension was added to a school through self-help in kind and labour, it is not possible to calculate its monetary equivalent for the different regions in different locations. However, economists consider capital costs "sunk" costs and should be ignored unless one is considering the opportunity costs of new capital development. Nevertheless, all real resources for example school buildings, equipment and furniture as well as teaching and non-teaching staff used in education do have alternative uses and, to that extent, they have opportunity costs that is expensive to compute.

2 - The study focuses on public recurrent costs; private direct, visible costs are not computed. The private direct costs represent the expenses incurred by the pupil and their families. In spite of their importance, private direct costs are not taken into account for planning educational expansion in many developing countries and information on them is lacking. Tan (1985) found that, regardless of their background, families' school related expenditures in Tanzania were quite substantial in the free state schools and in private institutions; girls' public and private schools expenditures exceeded that of boys'. Tilak (1988) acknowledged the large contribution of maintenance and opportunity costs to the education sector; twice the education share of the GNP in 1979-80. As expected, in developing countries the total opportunity costs are higher for secondary and primary education than for tertiary level. He advocated that a thorough knowledge of households' capabilities to invest in education was essential to state planners; "private cost is not trivial in size and needed to be studied in depth". In Sudan, it is taken for granted that once the decision to expand education is taken the planned enrolment would be equal to the actual; that may be very costly for the public purse. Tilak claimed that a substantial part of the problems of non-attendance and dropout in school education in developing countries could be attributed to ignoring these aspects of private costs, including opportunity cost, in resource planning. Majumdar (1983) rightly warned that "unless the two kinds of investments (public and private) match there can be only empty or overcrowded classrooms".

3 - The study calculated budgetary and non-budgetary expenses, invisible private indirect costs are not included. These represent student time or earnings foregone in order to attend schools. The inclusion of student time as an input in education has been, for a long time, a matter of dispute between two leading authorities in the field of economics of education in the early 1970s. However, Wagner, et al. (1977) admitted the difficulty of giving the

opportunity cost a money value even where financial costs were an inadequate guide and it was necessary to calculate shadow prices. In developing countries where education, even at the primary level, is not compulsory, and where child labour is needed at the early age of seven, students at all levels "forego" present income in the hope of receiving a higher income in the future. Hence, the inclusion of student time in education is important and its treatment as an education input can be justified, but the calculations of the income foregone are difficult and expensive to compute. Nevertheless, the concept of alternative uses of resources and student time indicate that the costs which are normally considered by planners and administrators give only a rough idea of the real cost of education.

3. - The study deals with the 'normal unit costs' known as the costs per pupil enrolled; per graduate costs are not calculated. Research studies found that the actual cost per graduate was considerably higher than normal costs as they cater for costs due to repetition and dropouts. However, it is arguable that those in the latter grades of primary school and in the post-primary levels who do not pass the selective examinations between levels do not benefit from their education experience. Empirical evidence shows that students make incremental gains in learning which should be taken into account even if they fail the inter-level exams or failed to enter the subsequent level. Nevertheless, in developing countries, where number of student places are limited, all types of educational wastage are extremely costly.

1.6 Organisation of The Study:

This study is organised in twelve chapters.

Chapter one offers introductory information about the thesis - statement of the problem, its aims, importance and limitations.

Chapter Two describes the physical geography of the Sudan and portrays the socio-cultural, socio-political and

socio-economic contexts within which the educational system developed up to 1989.

Chapter Three deals with the historical evolution of the educational system and how the economic setting affected its recent development up to 1989.

Chapter Four deals with the review of previous literature and related research studies in the field of educational costs.

Chapter five examines the relevance of the concept of costs, in economic theory, for application to educational costs.

Chapter Six considers the research design, the methodology of data collection and the techniques of data analysis.

Chapter Seven investigates the inter and intra-regional variations in total unit expenditure and its main components.

Chapter Eight examines the relationship between the disparities in two selected components of unit costs and the variations in educational costs indicators.

Chapter Nine discusses the discrepancies in teachers qualifications, types of training and years of teaching experience and how these attributes influence the level of the respective average teacher salary.

Chapter Ten deals with the unit expenditure on boarding, its components and sources of finance and determinants.

Chapter Eleven discuses previous evidence of economies of size in education and investigates its existence in the operations of the sample schools. It also considers the determinants of unit expenditure and the factors that increase student achievement in the literature and verifies the respective factors in the sample schools.

Chapter Twelve provides a general summary, conclusions and recommendations.

CHAPTER TWO

THE SUDAN:
SOCIO-ECONOMIC BACKGROUND

2.1. Introduction:

Education is part and parcel of the socio-political and socio-economic conditions in any given country it serves. As such, it is important to describe the 'context' or 'stage' where the educational activities take place. In this respect a brief outline of the historical, geographical, social and economic conditions of the Sudan is given to put this study into its perspective.

2.2. The History of Sudan From Earlier Times:

"Bilad al Sudan; 'the land of the Blacks' was the name given by the Medieval Muslim geographers to the belt of African territory lying south of the Sahara Desert ... in a more strict sense southwards of Egypt" (Holt, 1963). In this land, settled agricultural communities flourished from at least 2500 B.C. along the banks of the River Nile. "The Sudan has a known history which goes as far back as the periods of the independent kingdoms of 'Nabata' (750-300 B.C.) and 'Merowe' (300 B.C. - A.D.350)" (Shebieka, 1964). During these periods flourished a civilization "socially and culturally autonomous, but greatly shaped by intercourse and, periodically, rivalry with Pharaonic Egypt; for a time imposing a dynasty over Egypt" (O'Neill and O'Brien, 1988). In the 6th century Christianity spread in Northern Sudan, through Upper Egypt, followed by an Arab Islamic civilization (beginning in the 9th century) which affected the vast majority of the population and gave the country its distinctive character (Hassan, 1975). Two Islamic states, the Funj and the Fur, and the kingdoms and princedoms over which they held sway dominated between them the rule of the country between the 16th and 19th centuries. "The rise and prosperity of these states, as with most of their

predecessors, were intimately bound up with the long distance trade linking Egypt, the Mediterranean and Asia with central Africa" (O'Neill and O'Brien, 1988). Eventually, the struggle for power within and between these sultanates led to fragmentation which facilitated the first modern foreign conquest of the Sudan by Mohammed Ali Pasha, ruler of Egypt, making it part of the Turkish Empire by 1821. The main objectives of Mohammed Ali was to find the "legendary" gold mines and to control the slave-trade and recruit strong men for his wars; taxes were initially demanded in the form of slaves. However, the Turco-Egyptian Rule unified the country for the first time under one central government. A modern system of administration was established, medical services spread and plans to develop agriculture and communications were introduced. All these initiatives had ceased when the Sudanese revolted against the dominance of foreign rule and under the leadership of Al Mahdi (literally 'saviour') defeated the Turks and established a national and religious rule in 1885. The Mahdia "rejected mystical traditions which had been superimposed in former periods and encouraged a return to the Holy Koran and the Prophet system" (Shebieka, 1964). The administration of the country followed the steps of the early Islamic rule in all walks of life. Beshir (1969) observed that "the Mahdist state was a continuation of that tradition of Sudanese national states which had existed in the Sudan since the days of Meroe and was only disrupted during the sixty years of Turco-Egyptian rule". However, throughout its short life, the Mahadist state was preoccupied with wars and internal conflicts; drought, famine and disease epidemics curtailed economic growth and accumulation. Hence, it was defeated by the superior power of the Anglo-Egyptian army at Omdurman, in 1898. The Anglo-Egyptian re-conquest was motivated by the 'partition of Africa' which dominated the closing decades of the 19th century. The British government was convinced that "in order to safeguard Britain's interests in Egypt and to ward off the Italians, the Belgians and, above all, the French

from the upper reaches of the Nile, it was necessary to bring the Sudan under British control" (Abdel Rahim, 1992). The re-conquest was carried out in the name of the Khedive and Egypt to avoid conflict with France and other European powers. The Condominium Agreement of 1899 nominally placed Sudan under the joint Anglo-Egyptian rule but actually accorded Britain political domination. At the beginning, the resources of the country were limited and much of those available had to be spent on military expenditure to keep law and order and to establish good administration. Hence, "resources for development and for expenditure on social services, including education, were limited by what the government could raise from local taxation, and contributions from Egypt; Britain was not prepared to give funds as it was held that the Sudan was conquered for the benefit of Egypt" (Beshir, 1969). However, by 1924, the revival of militant Egyptian nationalism which coincided with and stimulated the beginning of Sudanese nationalism and gave them support, was of great concern for the British administration. The departure of the Egyptian forces and civilians, after the assassination of the governor general of Sudan in Cairo later prompted the British to introduce 'Indirect Rule', or native administration, after 1927 in the North, through the agency of tribal chiefs and sheikhs. Meanwhile, in the South, the government launched a new 'Southern Policy' and issued the 'Closed Districts Ordinance' to keep Northerners and others out. This policy nurtured the mistrust that dates back to the Turco-Egyptian era; one of the main objectives of the conquest was to recruit strong slaves, provided by the Turkish administrators and their Northern Sudanese agents, in the army. However, the British aimed "to prevent nationalistic fervour, which had already taken root in Egypt, from spreading across the Northern Sudan to the South and to other east African 'possessions'; and to separate the three Southern provinces from the rest of the country with the view to their eventual assimilation into a great East African Federation under British control" (Abdel Rahim,

1992). Both policies, for the North and the South, were unpopular among the nationalists who were organized at the time. In 1942 the 'Graduates' Congress, representing the elite of the country, submitted a famous memorandum to the government which demanded the abolition of the Closed Districts, unification of school syllabuses in the North and the South, an increased participation of the Sudanese in the administration of their country and a declaration to grant the Sudan the right of self government by the end of the War. The government gradually transferred the native administration to a system of local government and launched an 'Advisory Council' for Northern Sudan in 1943, which was replaced later on by a Legislative Assembly for the whole country in 1948. The latter was not supported by the entire Congress membership which split into two over the strategy for independence. A group led by the Umma (People's) Party (UP), supported by the Mahadist, whose slogan was 'Sudan for the Sudanese', felt that independence could be achieved by co-operating with the government. The other group, led by Khatmiya, later the National Unionist Party (NUP), called for the 'Unity of the Nile Valley', distrusted the British and advocated independence with the co-operation of Egypt. However, the Egyptian revolution of 1952, which deposed the monarchy, declared its support for Sudanese autonomy and accordingly signed an Anglo-Egyptian agreement in 1953. In 1954 the first Sudanese Prime Minister was elected. After undertaking that the request of the Southern members of Parliament for a federal form of government would be given full consideration, the Parliament unanimously declared Sudan an independent republic on the 19th December 1955, though Independence Day was formally celebrated on the 1st of January 1956. Nevertheless, the British Southern Policy (Closed District Ordinance) of isolating the Southerner increased enmity and suspicion which sadly, haunted North - South relationships throughout the recent history of the Sudan and bedevilled all attempts to forge national unity up to this date. These hard feelings culminated earlier in the mutiny of the Southern Battalion in 1955, just before

independence, in which Northern Officers were murdered by their Southern soldiers*.

Since Independence the Sudan has had seven regimes. The first civilian parliamentary government was, most of the time, a coalition between UP and PDP (People's Democratic Party, the political organ of the Khatmyia). It was strained by political differences between the ruling factions of the coalition and a deteriorating financial and economic situation due to economic dependence on cotton "whose sharply declining prices on the world market in the years immediately following independence were to curtail government revenue severely" (O'Neill, 1988). Owing to the shortfall in reserves, the government imposed severe and unpopular restrictions and sought foreign aid. As a result an army coup, headed by General Abboud, took over in November 1958. Although the regime's policy was to encourage economic diversification, the country remained dependent for its surplus revenue on cotton. Foreign aid from international institutions, the USA and USSR, contributed to the construction of Roseires dam on the Blue Nile and Khashm al-Girba on the Atbara as well as import substitution industries. However, by 1964 the accumulated balance of payments deficit and the rising inflation, exacerbated by the cost of the fighting in the South, led to a civil revolution which overthrew the regime in October of that year. A transitional government of all the political parties and representatives of Trade Unions took over and a conference for the solution of the Southern problem was held, though no agreement on the Constitutional future of the country was reached. General Elections were held in June 1965 and the new government was formed from a coalition of UP and NUP. At the beginning considerable progress had been made towards the settlement of the Southern Problem on the basis of regional government. But

* For more details refer to Beshir (1968) and Wai (1972).

eventually the instability of the coalition governments, the economic and financial deterioration caused by dependence on cotton, the large amount of foreign debt and the incessant drain on resources due to the fighting in the South led to a military takeover in May 1969 by Colonel Nimeri. At first the new regime adopted a socialist outlook and a close relationship was forged with the USSR and the East European countries. Traditional political parties were banned and that resulted in armed confrontation with their members. The regime declared a policy of regional administrative autonomy and a socialist trend in socio-economic development to solve the Southern Problem; a ministry for Southern Affairs was created. Foreign banks and companies were nationalized; 70% of Sudan's banking system and foreign trade were controlled by foreign capital. This policy was completely abandoned when an attempted coup was suspected to be supported by the Communist countries. Relations with the West were improved, and an agreement with the Southern Region, the 'Addis Ababa Agreement', was signed in 1972. This encouraged massive foreign capital from the West and oil-producing Arab countries for financing development projects; Sudan was seen, at that time, as the granary of the Middle East. Later in 1977 a 'National Reconciliation' with the opposition parties, which had attempted several times to depose the regime by force, was reached. Unfortunately, that did not continue for long as the regime's changing affiliations in the region, tuned by the need for more loans and grants as the economic situation deteriorated, antagonised the traditional parties which resorted to opposition again. The imposition of adverse measures which increased the price of basic necessities including staple food and medicine led to numerous strikes and demonstrations in the North in the early 1980s. On the other hand the internal conflict among the Southern elites that led to the sub-division of the Southern Region into three regions, though supported by election results, led to widespread resentment and suspicion. That was further accentuated by the decision to refine the crude oil, newly

discovered in the borders between the western and southern regions, further north in Kosti and to construct the Jonguli Canal which, it was feared, would adversely affect the local tribes and transform their mode of living that depended on livestock. Nevertheless, the major factor which led to the crisis in the North-South relations was "... the formal and dramatic adoption ... after September 1983, of certain aspects of Islamic Shari'a law, combined, after April 1984, with martial law" (Abdel Rahim, 1992). As implementation of these policies revealed the 'gross distortion of Islamic principles', opposition came even from those who supported the revitalization of Islamic values and norms in society. The adverse economic conditions of the early 1970s became an economic crisis by the late 1970s and the early 1980s: a mounting foreign debt of 9 billion dollars, frequent devaluation of the currency and an escalating inflation. The failure of the regime to deal with the economic crisis, the influx of refugees from neighbouring countries, the effects of the drought, the high cost of the civil war (estimated at half a million dollars per day) and the continuous increase in food and fuel prices alienated popular support and culminated in a general strike in March 1985. By the 6th of April, owing to the deteriorating security conditions, a transitional military council was appointed after a bloodless coup. Although the Southern rebels declared a cease-fire, hostilities, despite various concessions from the new government, were later resumed. In April 1986 a general election was held and a coalition government was formed as no party had an overall majority. Several attempts to convene a constitutional conference between the Southern fighting factions and the Northern political parties and trade unions failed. The political instability created by frequent changing of the coalition factions, the economic crisis and the expensive civil war led to frustration and despair and eventually to a military take over in June 1989. This thesis discusses the situation up to 1989 for which the researcher has the necessary data.

Since independence (1956) the "successive governments under all... regimes have been faced, above all, by three major problems: that arising from the country's dependence on one cash crop, cotton; the problem of the Southern Sudan ...; and the search for a permanent constitution acceptable to all sections of Sudanese society" (Abdel Rahim, 1992). The country's economic dependence on its surplus revenue on cotton began during the colonial rule; "from 1925 to 1956 cotton exports represented about 70% of Sudan's exports earnings, over 80% of which came from Gezira" (O'Neill, 1988). The dependence on cotton has continued though the fluctuating prices dictated by the vicissitudes of the world market have severely curtailed the revenue of successive post-independence governments from this source. The failure to negotiate an acceptable permanent constitution to solve the Southern problem led to continual civil unrest which complicated the difficulties of an already weak economy. However, "the role played by political instability in the Sudan's economic fortunes is so overwhelming, and has become increasingly more so in recent years, that it is impossible to avoid mentioning it, if the economic analysis is to be placed in a proper context" (World Bank, 1990).

2.3. Physical Geography:

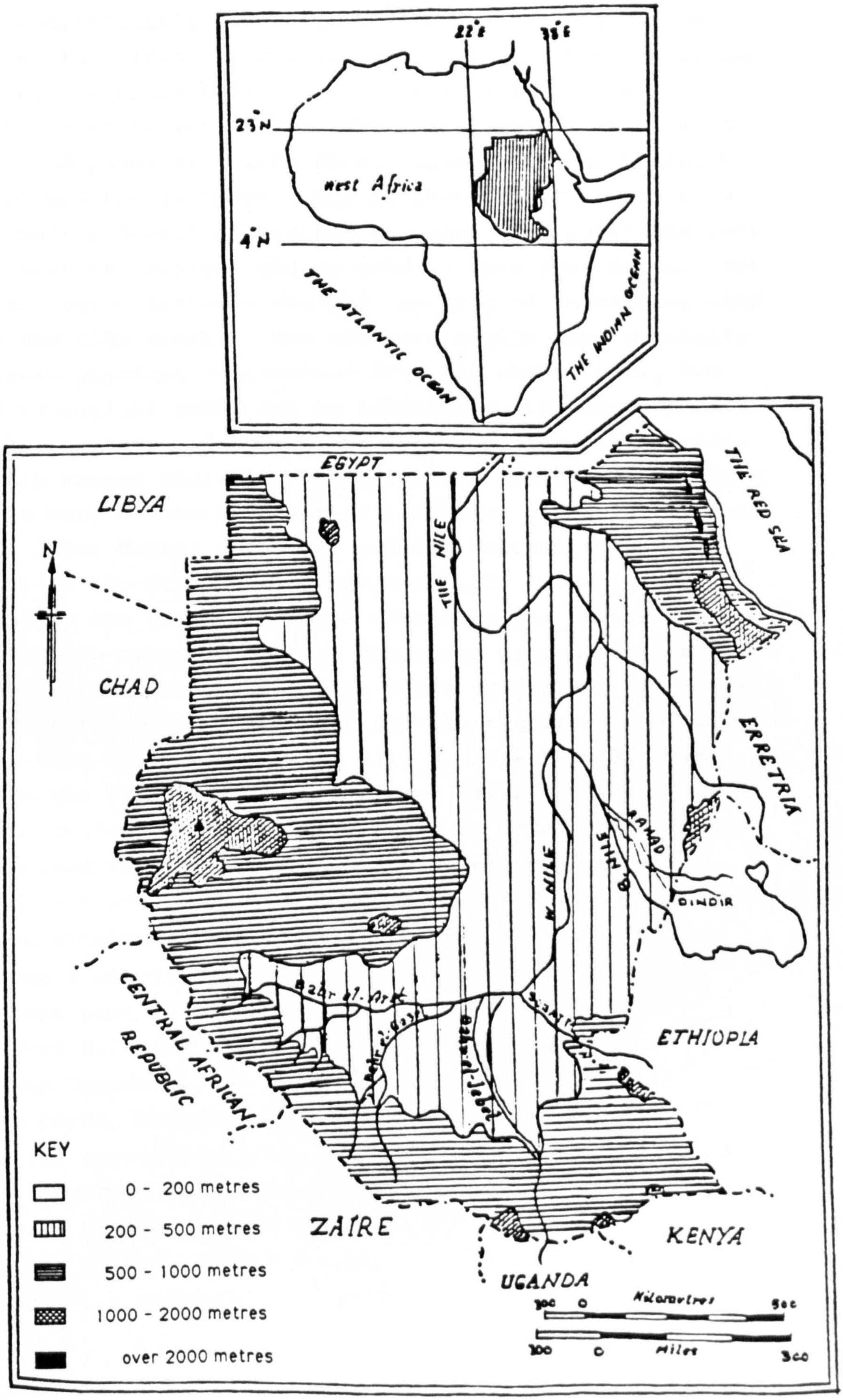
2.3.1. Area and Location

Holt (1963) noted that "the area of the present-day Sudan is very nearly one million square miles - about one quarter the size of Europe". Saghayroun et al.(1987) described the Sudan as a sub-continent; "nearly equal to India in its area". To appreciate the size of the Sudan, Hall and Ismail (1981), "liken it to the area of the Common Market countries and Norway and Sweden combined". But the World Atlas (1990/91) estimated its area to be slightly more than one quarter the size of the U.S.A. However, the Republic of Sudan, the largest nation state in Africa and among the members of the Arab League, has an area of 967,500 square miles (2.5 million square kilometers): 8.3% of the

African land mass (Sudan Almanac, 1956). Its location, geography and climate have been of great significance in its history, and contribute to its economic potential. The Sudan is situated on the north eastern part of Africa, between latitudes 4° and 23° north, and longitudes 22° and 38° east as the inset in Map (2.1) displays. It stretches about 2,100 kilometers from north to south, and some 1,800 kilometers east to west (Department of Statistics, 1989). Sudan shares borders with eight African countries, namely Egypt in the north, Libya in the north west, Chad and Central African Republic in the west, Zaire in the south west, Uganda in the south, Kenya in the south east and Ethiopia and the Red Sea in the east (Map 2.1). A significant factor in the physical geography of the Sudan is that its boundaries with its neighbours are very long and varied, and mostly lack natural barriers. In some parts they have been carefully surveyed and demarcated; in others they lie in wholly unsurveyed regions. In some instances they pass through unpopulated or desert areas; in others they traverse territories occupied by individual tribes and have very little significance for the peoples who live beside them. As a result, over a long period of time, waves of immigrants have spread into the country across many of them, including the Red Sea. Throughout history this migration has brought development and new civilizations as well as invasions and war and recently, emigrants escaping from drought, desertification and political instability. However, the country's only commercial seaports are Port Sudan, 784 km from Khartoum, and Suakin on the Red Sea. Being the single major outlet, Port Sudan's continual congestion (leading to slow movement of capital and consumers goods) has delayed the implementation of crucial development projects and inflated the prices of basic necessities such as foodstuffs and medicines. Delays also considerably increase the costs of education to the central and regional governments and to the families who struggle to keep their children in schools.

MAP 2.1

Sudan: Location, Relief and Principal Drainage.



2.3.2. Terrain

Geographically the largest part of the Sudan is an immense plain land and plateau country, "... holding ground water bodies which have, or will have, agricultural significance" (Allan, 1992). This extremely flat area can be divided physically into three regions: the northern, the central and the southern. The northern region is an arid area, mainly desert of pebbles and sand with scattered rocks at or near the surface and covered by thin poor soils. The central region includes the Qoz, an area of undulating sand dunes and clay plains. The southern region has a totally different physical environment from the above: here, two broad ecological zones can be identified, the flood plains and the ironstone plateau. However, a number of important mountain ranges encircle this extensive plain. The Imatong and the Nuba Mountains (over 1500 metres) are found in the south, Jebel Marra, a largely extinct volcano (over 3000 metres) in the west and the Red Sea Hills Range (over 2000 metres) in the northeast which overlooks the narrow coastal line and the extension of the Ethiopian plateau in the southeast (Map 2.1). This huge plain is drained by the Nile and its tributaries. The most fertile regions are enclosed in the area between the White Nile and the Blue Nile and between the Blue Nile and the Atbara river. The White Nile and its tributaries, Sobat and Bahar al Jabal, are covered with masses of floating vegetation which often block navigable routes. At the junction of the Blue and the White Nile is situated Khartoum, the capital city. The Sudan achieves a significant hydro-unity from being a large and important part of the Nile Basin. The 9000 kilometers of the River Nile and its tributaries (Baritsch, 1988), which run from Uganda in the South to Egypt and the Mediterranean in the north, traverse the country and provide extensive scope for agricultural and commercial development. Allan (1992) observed that "the River Nile and its tributaries are the basis of much of the present economic activity of the Sudan and of most of the future activity that is currently envisaged". Actually, the River Nile is "the single, most

important, and dominant geographical feature of the country, influencing its social, cultural, and political conditions" (Unesco, 1988).

2.3.3. The Climate

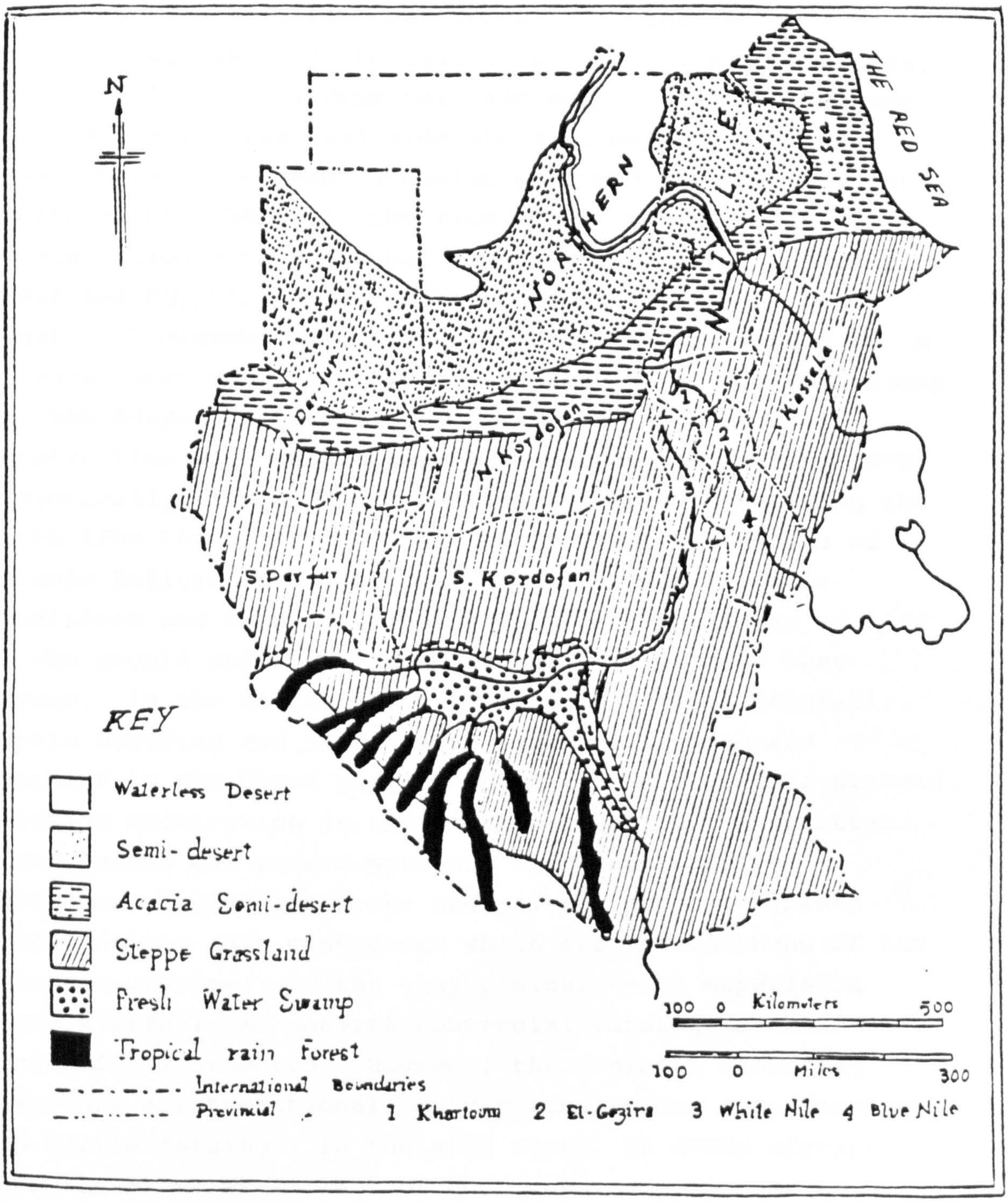
The unique location of the Sudan creates varying climatic conditions. The far north is an arid area, ranging from hot desert to semi desert southwards, with negligible rainfall. Along the Red Sea coast on the eastern border, the area is characterized by a Mediterranean type of climate with a winter rainfall which hardly exceeds 80 mm per year. Apart from the coastal line, the Sudanese climate is very hot; a maximum of over 100^0 F is experienced in almost every part of the country during several months of the year and in some parts all the year round. The climate of Northern Sudan is tempered by "haboub"; a series of dust storms which occur during the autumn season. The central part, south of Khartoum, experiences summer rainfall of varying intensity and duration. The extreme south has an almost equatorial type of climate where the dry season is very short. The absence of any mountain barriers results in a gradual change of conditions with latitude, and it is not easy to indicate obvious divisions between one type of climatic region and another. However, "climatically much of the country is part of the savannah belt which stretches across Sub Saharan Africa - a large part being characterized by problems of inadequate water supply, due to unreliable and erratic rainfall" (O'Neill and O'Brien, 1988).

2.3.4. Natural Vegetation:

The natural vegetation is largely influenced by the variations in climatic zones. From North to South the rainy season varies from one to ten months and the annual average rainfall from less than one inch to about 60 inches. Hence, with an annual rainfall of less than one inch, the north has a gradation from desert through to semi desert. This scanty rainfall supports poor vegetation, mainly in the empty watercourses (Map 2.2). The south east is dominated by

MAP 2.2

Sudan: Natural Vegetation and Northern Regions.



wooded grassland, which gradually merges northwards in Kordufan and Darfur (in the west) and the Blue Nile area (in the centre) into a low woodland savannah, dominated by acacia and very large areas of short grassland. In 1984 the limited amount of rain in the west and north western parts of the country led to disastrous drought and thousands of people faced starvation, particularly in the Darfur and Kordufan Regions. In the uplands of the extreme south the rainfall of 1000 - 1500mm per year supports equatorial and tropical rain forest and wide areas of marshes. The Sudd area, where large swamp grasslands extend for thousands of square miles, obstructs the flow of the river and communication with the upper waters of the Nile. However, Sudan and Egypt's joint effort to construct the Jonglei Canal to "conserve some 4,000m. cu. m. of the 33,000m cu. m. of water lost annually through evaporation in the Sudd swamp ... was suspended, in 1984, following attacks on construction workers by guerrilla insurgents" (Allan, 1992). Historically, the Sudd was a natural barrier separating the north from the south, and the latter from the advance of Islamic Religion and culture. These various climatic conditions and types of vegetation affect the modes of life of the people and the kind of economic activities they pursue. In the south, which has a much heavier rainfall, cattle breeding and traditional types of farming are dominant in the flood plains, while in the ironstone plateau shifting cultivation is the major occupation. In central Sudan, along the rivers systems, there are massive government irrigation works and private pumping schemes producing the main cash crops which are the backbone of the Sudanese economy. In the clay plains, which experience heavy rainfall, mechanized commercial farming has been successfully promoted. However, the dominant economies elsewhere are traditional; mainly subsistence type farming and cattle raising. In the arid north, in areas distant from the Nile, where lack of good water supplies is general, life is based on raising livestock and nomadism. But along

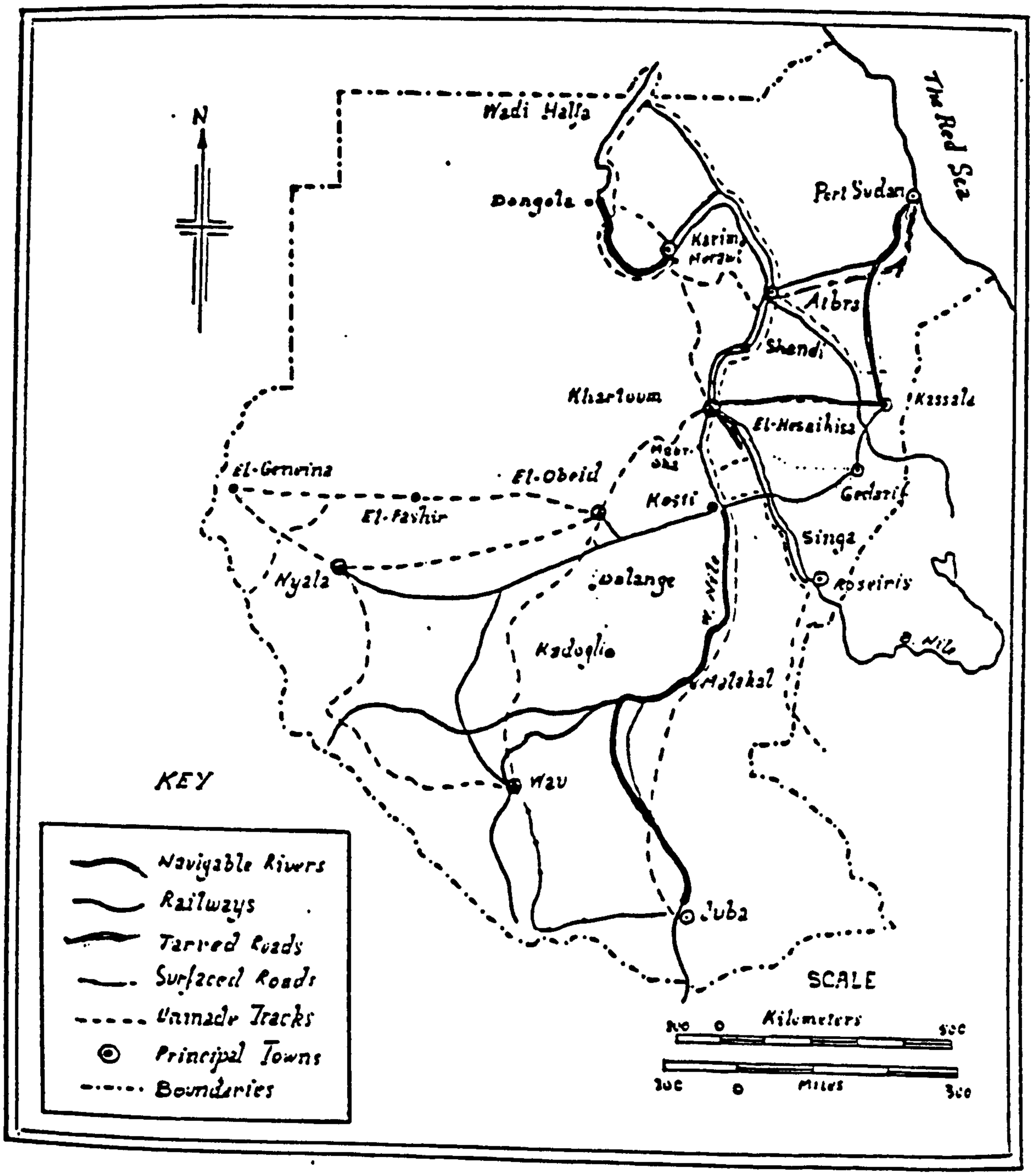
the River Nile, the inhabitants are mainly sedentary and practice traditional farming.

2.4. Transport and Communication:

One of the major problems of the Sudan is the system of transport and communication. "Infrastructure facilities such as roads, railways, transport and power supply have deteriorated badly, affecting production and marketing of industrial products" (The Sudan Government, 1990). The railway network, a total of 5,500 km (World Atlas, 1990/91) is a single track narrow gauge which does not allow rapid links to neighbouring countries with international lines (Map 2.3). Locally the railways are the cheapest means of transport in this vast country but delays caused by seasonal floods washing away parts of the track are commonplace. Highways connecting Khartoum, the capital, to Port Sudan and to the different regions total 20,000 km; "1,600 km are bituminous treated, 3,700 km are gravel, 2,301 km improved earth, but 12,399 km are unimproved earth and track" (World Atlas, 1990/91). Apart from the tarred roads, most of the unmade tracks are seasonal and are not accessible during the rainy season; in western Sudan flanking dunes make tracks impassable. This has been one of the main reasons for delaying the distribution of textbooks and essential educational equipment and even the arrival of transferred teachers. However, lack of maintenance also affects roads within the large cities; a rainy day is always a day off school and work. "The sinuous course of the middle Nile, the cataracts north of Khartoum and the masses of floating vegetation in the South have always limited the use of rivers as a cheap waterway except locally" (Kadouk, 1982); total navigable routes are 5,310 km (Map 2.3). The White Nile from Khartoum to Juba is navigable in almost all seasons; and so is the River Nile between Karima and Dongula in the North.

MAP 2.3

Sudan: Transport and Principal Towns.



2.5.Demographic Characteristics and Labour Force:

2.5.1. Population:

In the first population census of 1955/56, conducted after independence, the population was estimated at 10.26 million, divided almost evenly between males and females. According to the latest census of 1983, the count is 21,592,583, and its rate of growth is 2.8%. If this high rate remains constant, it will be doubled in 25 years' time, which would have adverse effects on educational development. Certainly, more resources would be needed to: a) to maintain the present level of provision and b) to increase the level of educational services. "The problem of educational provision is made the more acute because the present population of the Sudan is very young with about 47% under the age of 15 years, and because of the magnitude of annual migratory movements and rapid" (Abbas, et al., 1985). The latest census revealed that urban growth increased from 8.3% in 1956 to 23% in 1983. As mentioned above, the Sudan is the largest country in Africa, but the density of its population is one of the lowest in the continent. Although "the country has enormous potentialities for expansion of agricultural and industrial development and it may appear that the growth of population should present no serious problem either in the short term or in the distant future, certain features of the population and its growth pattern are matters of serious concern to manpower planners" (Abusin, 1976). Table (2.1) shows a summary of the latest population census by region, location, density and rate of growth. As this table explains, there is an uneven distribution of population within the country, almost one third of the people, those in Khartoum and the adjacent irrigated agricultural areas of the Central Region, in 7% of the total area. The higher densities occur in Khartoum (85.8 per Km^2), between the White and Blue Nile in the Central Region (29.5), in parts of Bahr al Ghazal in the south (10.58), Kordufan (8.11) and the Nuba Mountains and Darfur (8.21). However, in spite of the vast size of the

Table 2.1

A Summary of the Third Population Census February 1983, by Region, Location, Density per sq. Km and Annual Rate of Growth

Region	Population				Rate of Gr.	Density Per Km²
	Urban	Rural	Nomads	Total		
Khartoum	1343651	370648	88000	1802299	4.5	85.9
Northern	230341	802414	50269	1083024	0.8	2.3
Central	825064	825064	244233	4012543	2.5	28.3
Eastern	638833	1010700	558676	2208209	3.2	6.5
Kordufan	388539	1923716	781039	3093294	2.1	8.1
Darfur	316152	2307803	469744	3093699	3.2	6.3
Upper-Nile	52560	1547095	-	1599605	2.2	6.8
BahralGazal	181925	2083585	-	2265510	3.1	10.6
Equatoria	176544	1229637		1406181	1.7	7.1
SUDAN	4153559	14218844	2191961	21599582	2.8	9.0

Source: Department of Statistics, Ministry of Finance and Economic Planning, 1985. Khartoum, Sudan.

country, the high growth rate of population, faster than that of food production, poses a real problem for economic development. About 69.1% of the population live in settled rural areas, 20.2% are urban and 10.7% are nomads (Table 2.1). But various estimates suggest that "up to 40% of the Sudan's population may be on the move during at least part of the year, for, in addition to purely nomadic groups there are large numbers of pastorales whose periodic movements are dictated by the availability of water and pasture, or take the form of seasonal migrant labour" (El Tay, et al., 1987). This mode of living poses a serious challenge to the goal of universal primary education. Most of the urban population live in 38 centres, each exceeding 20,000 inhabitants. "The whole urban spectrum is dominated by the 'Three Towns' of the Khartoum conurbation (Khartoum, Omdurman and Khartoum North) ... where 1.8 million live, representing 44% of the country's urban dwellers" (El Tay, et al., 1987). In 1983 the overall sex ratio was 103 males per 100 females, being 113 in urban areas, 124 in metropolitan Khartoum and 99 in

rural areas. However, under reporting of females is frequent in Moslem countries and these ratios ought to be cautiously interpreted by educators when planning for equity of access for girls. These disparities have important implications for educational expansion as all schools are single sex. Another important characteristic of the population is the "very high and increasing proportion of the population below the age of 15 years" (El Tay, Saghayroun and Mills, 1987). According to 1973 and 1983 counts, the central parts of Sudan have the highest population. This was attributed to the migration of labour to the Gezira Scheme, the largest irrigated scheme under one administration in tropical Africa. The proportion, however, was reduced in the 1983 census as some labourers were attracted to other newly erected projects and some shifted to other occupations rather than agriculture. As Table (2.2) demonstrates, the population of metropolitan Khartoum more than tripled between the 1956 count and 1983. This abnormal increase, though normally attributed to a fall in death rate, was here due to an increased annual rate of growth and high rates of immigration from rural areas and

Table 2.2

Geographical Distribution of Population According to 1956,73,83 (In Thousands)

Region	Population 1956	Population 1973	Population 1983	Distribution 1956	Distribution 1973	Distribution 1983	%Change 73-83
Khartoum	505	1150	1802	4.92	7.76	8.76	26.6
Northern	873	964	1083	8.50	6.50	5.26	12.3
Eastern	941	1572	2208	9.16	10.60	11.73	40.4
Central	2070	3804	4012	20.16	25.66	19.50	5.4
Kordufan	1762	2203	3093	17.16	14.86	15.04	40.3
Darfur	1329	2181	3093	12.94	14.71	15.04	41.8
Equatoria	903	758	1406	8.76	5.11	6.83	85.4
Bahr Ghazal	991	1388	2265	9.65	9.36	11.00	63.1
Upper Nile	889	799	1599	8.66	5.36	8.00	100.1
SUDAN	10263	14819	20564				

Source: Department of Statistics, 1986. Khartoum, Sudan.

neighbouring countries. The rapid growth rate has had a negative effect on services, mainly education and health, as well as housing and security. It has made it difficult for the government, with its limited resources, to cater reasonably even for feeding the population let alone for improving essential services such as clean water and electricity. Although migration of the educated and skilled labour to oil-rich Arab countries drains the country of a large number of its qualified personnel, the continuous influx of migrants from countries, like Ethiopia and Chad which are ridden by civil war drains the scarce and limited resources available. Being more than two millions, migrants from neighbouring countries pose very serious social and economic problems. The Northern Region shows a reduced share of population in 1983 compared with previous counts, as it is the most deprived region. Meanwhile, the three provinces which constitute the southern part of the country showed a reduced proportion in 1973, compared with 1956. This could be explained by the armed mutiny which took place after independence and continued to 1972, when the 'Self-Government Agreement' was signed. The 1983 count reveals a considerable increase in their population, which was the result of the relative stability felt after having a regional government.

2.5.2. Labour Force:

Table (2.3) shows the estimates of the economically active population in 1955/56 and 1983. It suggests that the crude activity ratio of the population of the Sudan in 1955/56 was 33.3% and in 1983 was 30.8%. This ratio, as well as the net activity ratio, dropped in the period between the two censuses for both the males and females. It can be explained by the relative increase in education opportunities, the limited job opportunities available and the low participation rate of women in economic activity; a characteristic feature of most Moslem countries. Table (2.4) confirms the lower participation rate of women, compared to men of the same age group in urban and rural

Table 2.3

Labour Force Estimates and Rate of Economic Activity and Growth in 1955/56 and 1983 Population Censuses (Thousands)

Pop.	Date	Total Pop.	Age Group (15-60)	Eco. Active Pop.	% Crude Eco. Act.	% Net Eco. Act.	% inc. Labour Force
Total	55/56	10,263	5,560	3,497	33.3	61.5	
	1983	21,593	11,517	6,653	30.8	57.8	2.4
Males	55/56	5,311	2,845	2,748	15.7	96.6	
	1983	10,964	5,778	5,157	14.7	89.5	2.4
Females	55/56	5,196	2,815	749	14.4	26.6	
	1983	10,628	5,740	1,496	14.1	26.1	2.6

Source: Department of Labour Statistics (in Arabic), 1986. Khartoum, Sudan.

Table 2.4

Ratio of Economically Active Population According to Age Group and Location in Sudan in 1983 Census.

Age Group	Urban		Rural	
	Male	Female	Male	Female
10-14	46.2	6.2	67.7	18.9
15-24	65.6	8.6	78.4	19.9
25-44	97.3	11.1	98.2	25.4
45-49	96.5	14.2	97.7	31.8
60+	73.6	10.9	80.8	25.5

Source: Department of Statistics Reports (in Arabic), 1986. Khartoum, Sudan.

areas, though it is relatively better in rural areas. That is because female work is concentrated in agriculture in Central Sudan and in the subsistence economies of the southern and western parts where women are economically much more active than in the north and east. Urban women's main

occupations, beside household duties, are in textile manufacturing, cottage industry, nursing, teaching, clerical work and a small percentage in highly skilled specialisation.

2.5.3. Unemployment:

As Table (2.5) illustrates those registered unemployed, according to the 1983 census, were 663 thousand, constituting 10.5% of the total labour force.

Table (2.5)

UNEMPLOYMENT BY AGE AND SEX, SUDAN 1983.

Age Group	TOTAL LABOUR FORCE	UNEMPLOYED		UNEMPLOYMENT RATE	% OF UNEMPLOYED SEEKING WORK FOR THE 1ST. TIME
		TOTAL	SEEKING WORK FOR 1ST.TIME		
10 AND OVER	6,342,981	663,469	592,243	10.5	89.3
MALES	4,499,560	443,213	387,225	9.9	87.4
FEMALES	1,843,421	220,256	205,018	12.0	93.1
15 AND OVER	5,548,809	383,997	315,726	6.9	82.2
MALES	3,999,499	257,489	203,079	6.4	78.9
FEMALES	1,549,310	126,508	112,647	8.2	89.0

SOURCE: DEPARTMENT of STATISTICS, POPULATION OFFICE, 1989. Khartoum, Sudan.

Regrettably, out of those, 279,472 or 42% of the total were 10 to 14 years of age: of upper primary school age. The census data shows that of the total number unemployed 592,243 or 89.3% were seeking work for the first time. Almost half of first time work seekers, 46.7%, were either primary level dropouts or did not attend school at all. However, these figures indicate that "the job creation was not keeping up with the growth of the labour force, and

children were entering the labour force due to lack of educational facilities or to supplement the income of their parents" (Department of Statistics, 1989). The increasing unemployment in urban areas, especially among the educated, is probably the most serious and intractable problem, though reliable information and statistics on urban unemployment is either incomplete or unavailable. "At the very best, new jobs are created at a rate only half that of the increase in national income" (Economic Survey, 1988). The rate of increase in new employment opportunities is limited by the slow growth of the economy. In addition there are several other factors which aggravate the problem of unemployment in urban centres, especially Khartoum. Abusin (1975) included the following:

"1) the relatively high wages in the modern sector, which acts like a magnet, drawing people away from the rural agricultural areas, 2) the primary education attained by rural youth which raises their aspirations and encourages them to escape from the traditional rural sector, 3) the extended family in urban areas which feeds and houses jobless relatives from rural areas for considerable periods, or until they find a job and 4) the education system, which is biased to academic education".

However, the failure of the successive governments to find a radical solution to the problem of the unemployed and their absorption in the public sector (unemployed fund), has continued to swell salaries and wages bills and thus increase public expenditure.

2.6. Socio-Cultural Background:

Since ancient times the people of the northern Sudan had been exposed to cultural influences from Egypt in the north and Arabs in the east. Beshir (1969) stated that "with the spread of Islam in the ninth century a new culture was introduced and established in the north; Islamic ideas and culture failed (due to climatic conditions) to influence the south". At the time of the Turco-Egyptian conquest (1820), Holt (1963) noted that "...the tribal communities of

cultivators and herdsmen ... possessed a vigorous if rudimentary culture, and produced a small literate elite who were in touch with the civilization of the great Islamic world". However, modern Sudan, being a vast country, has many different cultures and ethnic composition, in spite of its obedience to a unified central government for many generations. "Anthropologically, 597 tribes have been identified in the country which are grouped into three main ethnic groups. These are: the people of Arab extraction, Mediterranean tribes and Negroids" (Sudanow, 1983). Hurreiz (1968) stated that "as regards the number of languages and dialects spoken in the Sudan, the population census does not commit itself by giving an exact number. It just states that languages spoken in the Sudan are over one hundred". Sudanese people, with their local heritage, national and regional affiliations, are part of both the Arab and African people. Despite the ethnic diversity, the country can be divided into two distinct cultural entities. The southern Sudan is inhabited mainly by people of African (Negroid) origin, who speak different languages and the majority practise local traditional religions, with small minorities of Moslems and Christians. Northern Sudan has predominantly people from Arab origin, who believe in Islam and speak the Arabic language with small minorities of Christians and believers in African religions. The cultural and ethnic diversity was further intensified during the colonial period. Hall and Ismail (1981) wrote that the "government (British) policy from 1924 was aimed at keeping out all northern Sudanese from the South. The South was declared a closed district and Northerners were unable to live and trade there ... Arab dress, customs and language were discouraged". The citizen is guided in the affairs of his life in general, in the organization of his social relationship and his personal behaviour by the light of Islam, the religion of the majority, whose values the State asserts, while it also asserts the values of Christianity, the religion of a large number of citizens (The Permenant Constitution, 1973). Nevertheless, Nageilah (1971) observed

that "over a wide area, religion and cultural heritage strengthen mutual trust; wiping out differences caused by ethnic origin, uprooting tribal and sectarian partisanship, and developing a spirit of co-operation and co-operative work". Self-help and self-reliance are not new phenomena in this society. They have been practised for generations in the traditional rural communities, when preparing the land for agriculture and farming and during harvest time. Not only that, but the problem solving attitude of the village community has always given rise to intense creative participation reinforcing a feeling of self reliance and a conscious effort towards self-denial and the common interest. Today, as the Sudan Education Sector Review (1977) noted, the Sudanese society faces social and economic challenges which are apparent in the variation in levels of civilization between different parts of the country, in the multiplicity of languages spoken (in different parts) and in the relatively increasing backwardness of rural life as a result of the vast distances and lack of development in transport and communication.

2.7. Status of Women:

At the turn of this century women in the Islamic world were secluded and their participation in public life or productive activities was very limited, especially in the urban centres. Al Zubaidy (1986) noted that in Iraq, as in other Moslem countries, "this strictness shows less in the rural areas and among the tribes, where women work in the fields with their menfolk and usually appear without veils". Generally, as Tinker, et al. (1976) stated, the status of women refers to "the ranking in terms of prestige, power or esteem accorded to women's role in society relative to those of men". In principle, and within this framework, the status of Sudanese women can be examined according to the position they enjoy legally, politically and socially and whether they achieve equality of educational opportunity and hence enhanced participation in the labour force. Interestingly, it has been stated in the Permenant

Constitution (1973) that "men and women are equal in rights and duties". Consequent to that a series of legal measures followed amending all laws and regulations to bring them in line with the Constitution; new laws were also enacted to ensure equality. As a result women have legal status equal to men in work legislation, civil, political and educational rights. In terms of work laws, women gained equality in civil service hiring and promotion based on merit, equal pay for equal work, equal post-service benefits including pension and rights for training and annual and educational leaves. Furthermore women are granted the legal protection for the right of maternity leave for eight weeks, one hour off work per day for lactation, the right to apply for one year of unpaid leave for lactation purposes, the right to apply for four years of unpaid leave for accompanying their husband for purposes of education or work, as well as leave for mourning period, following the death of the husband, for six weeks. Unfortunately such rights increase the staffing costs in girls schools. Nevertheless, despite these rights (and may be as a consequence of them) women are discriminated against, in particular in recruitment to highly specialized and competitive jobs. As the Public Service Recruitment and Selection Board reported, "a number of units tended to practise sex discrimination by refusing female employees chosen by the Board on the grounds that the nature of work was not suitable for women and because females refused transference to the remote provinces". Ahmed, et al. (1987) observed that "the political status of women can be measured by women's participation in the political movements, in organizing themselves and in voluntary public work". Historically women had taken an active part in the national movement for independence, literacy and legal rights campaigns. Recently Sudanese women have always participated in political activities such as protest demonstrations, strikes and coups, especially those that led to the overthrow of military governments. However, experience of other nations suggested that such effort may not be equally rewarding. Kelly (1990) noted

"that during revolutions, women become very active in politics, but that in post revolution society particularly in developing countries, increasing women's role in production rather than their role in the state, becomes the government's over-riding concern". The Permenant Constitution gave women the right to vote and the chance to be elected to the different law and decision-making bodies in 1964; they voted for the first time in general elections in 1968. But although the May Regime reserved 25% of local councils' membership for women, this level was never reached, especially in rural areas. Nevertheless, in Moslem countries "the woman has full membership of the Islamic community ... she has full rights and duties and is entitled to the same reward as a man" (Al Rawaf, 1990). From this notion stems the personal status laws granted by Islam to protect women's rights. These include the right to ask the spouse to allow her to divorce him, "Isma"; the right to claim, at the time of the marriage contract, certain stipulations, e.g. right to work, to education after marriage and to ownership of household property; the right to be supported by the husband (following divorce), for four months and ten days if they have no children but, with children, the support has to be continued until the children become independent. These rights are not widely known and those who know them do not apply them because it is not customary and, more often, it is considered an act of shame to resort to court to effect such rights. On the other hand, in education, which can improve women's socio-economic conditions and help to increase their awareness about their civil rights and personal status laws, gender bias is accumulating throughout the years. Girls' education was neither promoted during the colonial rule nor after independence. In 1987/88, the percentage of girls' school intake to the population aged seven years was 43.3%, against 60.2% for boys'; total enrolment at the primary level was 41.4% for girls against 54.2% for boys. The higher the level the lower the absolute girls' participation: at the intermediate level the ratio of girls was 24.6% and boys

29.3% whereas, at the secondary level, the proportion was even lower: 12.6% against 17.8% respectively of the relevant age group. Surprisingly, even "equality of access to schooling, achieved in much of the world, has very little influence on the work force outcomes of education for women relative to those of men. The influence of increasing education on women's access to power and authority in the political sphere seems similarly minimal" (Kelly, 1990). However, in the Sudan, despite the Constitutional guarantees, legal legislature and civil rights, social and cultural constraints on women limit their awareness of these rights and gender bias reduces the opportunities available for them to improve their status; legal rights may not promote the status of women unless they are educated that these rights exist and they have to be used when necessary. It is important to note that, "the liberation of Sudanese women has been a gentle process which has come about not through agitation or militancy but in the normal course of time as they have become educated and sought an outlet for their talents" (Hall and Ismail, 1981).

2.8 Administration Framework:

The Sudan is divided into eight regions and the national capital, Khartoum Commissariat. These regions are: the Northern, the Eastern, the Central, Kordufan, Darfur, Upper Nile, Equatoria and Bahr El Gazal (Map 2.1). The first five regions constitute what is traditionally known as "Northern Sudan", while the last three are "Southern Sudan". Each region is governed by an appointed regional governor and between three and four service ministers, usually for education, health, housing and social affairs. Khartoum is administered separately, under a different law. Each region is divided into two or three provinces and each province is further divided into local district councils, which in turn are sub divided into town/rural councils; for administrative purposes the latter two are also called people's councils.

2.9. The Economy:

2.9.1.Introduction

In the Sudan, as in other less developed countries, the economy's base is agriculture. Abdel Salam (1987) noted that the leading role of agriculture in the process of development in these countries are based on two premises: 1) that it is difficult to effect a high rate of growth of GDP without achieving such a rate in agriculture because of its sheer size, and 2) that agriculture is not only the sector responsible for feeding the population and providing capital, raw materials and manpower for the development of other sectors but also the market for the products of these sectors.

Sudan is primarily an agricultural and pastoral country; defined to include irrigated, rainfed, livestock, forestry and fishery sub sectors, the agricultural sector is the backbone of the Sudan economy. The proposition repeatedly made by various observers that the Sudan has a huge economic potential mainly refers, until recently, to the resources at the disposal of the agricultural sector only. A brief look at these can be indicative of the central role this sector could play in economic growth and development:

1) Arable Land: Total arable land is estimated at 85.4 million feddans (one feddan =1.038 acres) out of a total land area of approximately 597 million feddans. In 1985/86, only 21.6 million feddans or 25.3% of the arable area are actually under cultivation. The New York Times (1976) reported that "the Sudan... has more arable land than the Arab nations together, but only 10% is under cultivation".

2) Grazing Land: The area classified as grazing land is about 241.8 million feddans; 40% of total land area. "Areas actually grazed are difficult to estimate but it is widely believed that livestock population, measured in terms of animal units, generally exceeds the carrying capacity except in Southern Sudan" (Abdel Salam, 1987). Quite often, incidents of over grazing and deterioration of the

vegetation cover were reported in areas of high animal concentration, near water holes.

3) Water Resources: The net water potential of the country is estimated at 34 milliard cubic meters per year. "Sudan does not yet use all of the 18,500 milliard cubic meters of annual flow agreed with Egypt in 1959 as its share of the total average flow at Aswan of 84,000m" (Allan, 1992). However, annually only 50% of the net reserve is utilized; 17.4 milliard cubic meters. "Underground water is largely untapped and additional water would be conserved by the construction of Jonglei Canal (4,000m) and from the Machar swamps (4,000m)" (Allan, 1992).

4) Forestry: The total area under forests constitutes about 10 percent of the country's land surface; 57.9 million feddans. Only 2.9 million feddans are registered and another 2.2 million are awaiting demarcation and registration.

5) Human Resources: At present 80% of the population depends on agriculture, forestry and related activities for their livelihood (World Atlas, 1990/91). Although the general population density is less than 9 inhabitants per square kilometre, it increases to 15 per sq. km. in arable land.

6) Fisheries: The Sudan has huge fishery resources: inland at the five reservoirs on the River Nile and its tributaries with a total area of 3,000 sq. km and in the swamp areas of southern Sudan with over 17,000 square kilometers, and marine fisheries on the Red Sea along a coastal line of 853 kilometers. Although data on fishery production and potential catch are unreliable or lacking, it is evident that this resource is underdeveloped.

In addition to this huge untapped agricultural potential there are mineral resources. The latest available information confirms that Sudan possesses considerable oil deposits. O'Brien and O'Neill (1988) noted that "there is far more oil in Sudan than has previously been intimated ... the tiny trickle of oil companies wanting a slice of the action soon turned into a small flood - another sure

indication that oil experts have good reasons to suppose that it is there in abundance". The World Atlas (1990/91) reported that the natural resources of Sudan include modest reserves of crude oil, iron ore, copper, chromium ore, zinc, tungsten, mica and silver. In addition to natural gas and condensates in the Suakin Region along the Red Sea, "gold deposits in the Red Sea Hills, which have been known since Pharaonic times, and uranium reserves on the western borders with Chad and the Central African Republic" (Amanor, 1992). Moreover, "big game reserves, in the south (and south east), could become a potential tourist attraction, depending, to a large extent, on future political and economic development of the country as well as the state of security in those parts where these resources are found" (Unesco, 1988).

In addition to these vast natural untapped resources, unparalleled among developing countries, Sudan has, "in comparison to other African countries, the trained manpower to develop a vibrant economy" (World Bank, 1990). All these indicate that "the long term potential for the development of the Sudanese economy is sound by any standards" (Unesco, 1983).

However, the economy constitutes three major sectors, each composed of a number of sub-sectors:
The agricultural sector can be divided into five distinct sub sectors: a) The irrigated sub-sector, which because of its irrigation technology, lies mainly along the banks of the River Nile and its tributaries. In spite of its smaller size of 4 million feddans (16.1% of total acreage) compared to the rainfed sub sector, it produces 48.5% of total production of main export crops. The Gezira Scheme alone produces 11.6% of Sudan's total output of cotton, groundnuts, wheat and dura.
b) the rainfed sub-sector, mainly private sector, can be divided into two sub-systems; mechanized and traditional. The mechanized rainfed subsystem is dominated by the Sudanese private sector although foreign and local companies have been allocated sizeable holdings. It produces sorghum and sesame within an area of 4-6 million feddans in the

eastern and western regions of the country, extending along the savanna belt.

The traditional rainfed subsystem produces millet, sorghum, sesame, ground-nuts and gum-arabic as well as livestock. It covers almost all parts of the country. However, this sub-sector suffers "high seasonal fluctuation of production as a result of wide variation in annual precipitation ranging annually between 450 mm. and 800 mm. mainly from May to October; rainfall distribution is also unsuitable" (Abdel Salam, 1987). Total crop production accounts for 20% of GDP; 11% from the irrigated sub sector, 4% from the mechanized rainfed farming and 5% from the traditional rainfed sector.

c) Livestock: The Livestock population, mainly raised by nomads, is estimated at 20.7 million head of cattle, 18.6 million sheep, 14 million goats and 2.8 million camels. Raising smaller herds as a complementary activity to the cultivation of crops, provides income for many rural inhabitants. This sub-sector "has accounted for about 12% of GDP and 27% of exports over the past five years" (The Sudan Government, 1990) a contribution not commensurate with the size of the animal wealth or human resources and land at its disposal.

d) Forestry: The potential of forestry resources is high; but at present the forestry share is only 3% of GDP. However it is poorly distributed among the regions: 33% in northern Sudan, mainly in southern Kordufan and southern Darfur and 67% in southern Sudan. Apart from gum arabic, the most important forest product, the exploitation of forest is confined to fuel wood. The Sudan is "the world's largest single producer of edible gum, accounting for some 92% of production, ... (it is) the second most important export after cotton, accounting for 22% of total exports" (Amanor, 1992).

e) Fisheries: Both categories of fishery resources, fresh-water and marine, are traditional and underexploited.

Ali (1984) noted that "it is perhaps in recognition of the dominant role of the agricultural sector in the economy

and of its potential as the 'engine of growth' - specially export oriented growth - that successive plans have given it top priority in the public sector investment allocations". In each of the Five-Year and the Six-Year Plans as well as both the Three-Year Programmes 1979/80 - 1981/82 and 1983/84 - 1985/86, agriculture has been allocated the highest percentage of investment; 38%, 27%, 28% and 32% respectively. This recognition was acknowledged even outside the country. The New York Times (1976) noted that "although, (the Sudan) is among the poorest countries, it has been identified by the United Nations as one of three - the others are Canada and Australia - that could help counteract the world food shortage". However, considering the immense potential of the agricultural sector and Sudan's long history of irrigated agriculture, it still remains among the least developed countries. This is due to the major constraints from which the agricultural sector has suffered in the last decade, such as chronic shortages of capital investment, lack of modern technology, reduction in the international level of prices of raw materials, terms of trade, under utilization of land and labour resources and reduction in productivity caused by climatic conditions. "The prolonged drought which began in 1969, reaching catastrophic proportions in 1973, and striking again in 1983/84, accelerated the desertification process which resulted in reduction of food production, loss of livestock and displacement of population (Unesco, 1988). More importantly, agriculture accounts for 95% of exports, which is over 50% of government foreign revenue, and contributes the biggest share to GNP, almost 40% (Economic Survey, 1986/87).

The second sector, the industrial sector, includes mining and quarrying, manufacturing, water and electricity, and construction. Unfortunately, most of the mineral deposits of the Sudan are exported in their crudest form. The manufacturing sub-sector is the most important, employing some 4% of the labour force and contributing 8% to the GDP in 1986/87. The major enterprises, mainly

undertaken by the private sector, are agro-industries concentrating on food processing such as sugar refining, oil seed crushing, flour milling and the production of textiles, shoes, cigarettes and batteries. The significant intermediate goods industries, owned by parastatals, are cement manufacturing and petroleum refining. However, the manufacturing sector has failed to develop into a more dynamic sector because of continued under-utilization of capacity. A survey prepared for the National Economic Conference (1982) revealed that, "... in 1981, 88% of public enterprises and 30% of private industrial enterprises worked at less than 50% of their capacity" (Sudanow, 1983). The Sudan Government (1990) attributed this to several factors, including: a) the scarcity of foreign exchange, which led to the drastic restriction of the imports of intermediate goods and spare parts needed by the industries,
b) deterioration of the infrastructure facilities such as roads, railways, transport and power supply, which affected production and marketing of industrial products and
c) shortage of skilled labour and efficient managers.

The services sector includes commerce and hotels, transport and communication, finance and real estate, as well as government and personal services. Development of transport and communication, the major sub-sector, is closely related to the growth in the agricultural sector. However, this sub-sector experienced a declining trend during the drought period despite the positive influence of the inflow of drought relief and aid on transport. "Nevertheless, it is noticed that the share of the overall services sector in the GDP showed an increasing trend during the last six years" (The Four Year Programme, 1988). However, the imbalance in the growth of the various services sub-sectors has led to the deterioration of basic government services. The Sudan Government (1990) stated that about 21% of the population had access to drinking water, the health service had less financial support, half the school- age children were not yet enroled at the primary level, and the illiteracy rate was at a peak of 70%.

2.9.2. Performance of the Economy:

"In the early 1970s it appeared reasonable to hope that the Sudan would be able greatly to increase production, to expand living standards and lay the foundations for social advance and a more equitable society". (ILO/JASPA Mission Report, 1986). At that time, the agreement of regional autonomy for the Southern provinces was signed in 1972. The relative stability encouraged oil-producing Arab states to promote Sudan as the potential 'bread-basket' of the entire Arab world. "Laws intended to encourage foreign investment were also promulgated and a strategy was launched to marry Western technology and Arab petrodollars with the vast agricultural potential of the Sudan" (Abdel Rahim, 1992). The planned projects concentrated on further expansion of rainfed farming, growing grains and processing of agricultural raw materials, such as textiles, refineries, canning factories, tanneries and tobacco. Amanor (1992) wrote "the willingness of Western and Arab states to channel vast amounts of concessionary and commercial finance into the Sudan, encouraged the government to embark upon a grandiose development programme which emphasized new capital-intensive projects at the expense of traditional, irrigated infrastructure and the railways which produced and transported the bulk of Sudan's cotton and other important exports". This huge increase in investment increased aggregate demand and generated additional purchasing power, which led to a significant increase in imports, mainly capital and intermediate goods. Initially, economic growth was pushed up, averaging almost 10% over the period 1973/74 to 1976/77. After 1976, "although aid declined sharply, the government continued its expansionary policies by increasing domestic borrowing which contributed to high rates of inflation" (The Sudan Government, 1990). The heavy investment in new production capacity, much of it not export-oriented, necessitated the diversion of critically required finance for maintenance from the existing irrigation schemes, thus leading to a sharp decline in the volume of exports. The situation was made worse by a

substantially appreciated Sudanese pound which resulted in imported goods being underpriced and the competitiveness of exports being weakened. Consequently, the trade deficit rose from a 0.2% of GDP in 1972/73 to as high as 8% by 1977/78, and the country's flow of hard currency was greatly affected. Loans and aid from foreign countries were used to improve and construct road and rail communications as a prerequisite for development. Vast sums were spent on the construction of the Jonglei Canal, which has had no benefits because the work is currently suspended due to the insecurity in the South. "Although these delays cannot be a major part of the explanation of the failure of the economy to grow, the difficulties were compounded by the need to service debt before the returns from these investments were available" (ILO/JASPA Mission Report, 1986). Eventually, "severe shortages of foreign exchange led to a reduction in the volume of imports and the economy began to stagnate since 1977/78" (Unesco, 1983).

The government then launched several attempts to resolve the economic problems, including major programmes for economic stabilization and structural change to boost the production of crops for export in order to balance the external accounts. As a result, by 1981/82 the new policies had the desired effect; GDP, at constant prices, increased by 9.1% over the previous year, led by the agricultural sector's share of 12.3%. By 1983, the continued rise in cotton production reduced the deficit on the current account of the balance of payments to $220m, less than its 1980 level of $784m. Nevertheless, the "Islamization, in September 1983, of economic policies and the legal code, in an attempt to suppress growing popular opposition to the government and to the fall in living standards associated with the austerity programmes, brought this improvement to an abrupt end" (Amanor, 1992). Consequently, economic aid and foreign support for rehabilitation schemes and debt relief were suspended. The resulting uncertainties about security disrupted activities in two vital projects in the Southern regions: the exploitation of the oil reserves and

the construction of Jonglei Canal. Economic growth continued to decline; the situation was aggravated by the devastating drought of 1982 - 84 and the war of attrition in the South. Until 1985, the government tried to solve the disequilibrium in the balance of payments through a series of devaluations to enhance the competitiveness of exports in the world markets. As the problems of this sector were caused by structural factors rather than prices of foreign exchange alone, the result was mounting arrears of foreign debt (US $9 billion) and more dependence on commodity aid to finance the import bill.

2.9.3. Structure of the Economy:

At this stage it is important to examine the structure of the economy. Sudan's economy is dominated by services which contribute, on average, 50% of GDP. The disproportionate increase in the share of the services sector at the expense of the industrial sector indicates a distorted growth of the economy. Agriculture (including livestock and forestry) is the major productive economic sector, which contributes about 36% GDP in 1988. Relatively, the manufacturing sector is small and accounts for 7% of the GDP. Ali (1984) argued that the small share of the manufacturing sector in GDP, less than 10%, portrayed the underdeveloped structure of the Sudanese economy: "the manufacturing sub-sector is supposed to be the most dynamic of all sectors in terms of effecting the growth process - the engine of growth".

Over the last decade and a half, the economy has suffered from severe interdependent structural problems. Its performance was characterized by:

a) "production which is much below capacity in both agriculture and manufacturing, b) stagnation of real exports due to poor production performance, c) large and growing financial imbalances" (World Bank, 1990). All these problems were reflected in negative growth rates of GDP over the period 1978 - 84. The "negative growth period which started in 1978 seems to have lingered on up to 1984 during

which an annual negative growth rate of 0.9% was realized mainly as a result of poor rainfall during the last three years" (Ministry of Agriculture, 1987). However, Table (2.6) illustrates the performance of the economy, by sector, over the period 1981/82 - 1988/89. During the financial year, 1982/83, GDP experienced a slight increase of 0.4%, before declining in the following two years by 2.9% and a low of 12.8% respectively. However, it increased to 11.8% in 1985/86 and 4.3% in 1986/87, but declined again to 1.5% in 1987/88 after which it resumed its increasing trend, as high as 11.1%, in 1988/89. It is important to note that, "with population growing by 2.8% per annum, real per capita income growth rates declined by 2.4% in 1982/83 and by 15.6% in 1984/85, improving thereafter in the following two years" (The Four Year Programme, 1988). As Table (2.6) shows, the trend of growth rate in GDP mirrored that in agriculture, on which the other major sectors are largely dependent. The agricultural sector's rate of production declined by 7.6%, 2.5% and as low as 23.6% during the severe drought period of 1982-85 which was complicated by the serious shortages of foreign exchange. Better performance of the agricultural sector due to increased land areas, policy reform and effect of increased minimum prices announced by the government led to impressive positive growth of 28% in 1985/86 and 3.5% in the following season. In 1987/88 a sharp decline was experienced in all modes of agriculture which led to a negative growth rate of 11.9% before production increased by 27.3% in 1988/89.

On the other hand, the manufacturing sector's rate of growth declined from 10.3% in 1982/83 to a negative growth of 1.2% in 1983/84, before recording positive rates of 0.5%, a high of 9.6% and a fall to 4.7% in the next three years. It had, similarly to agriculture in 1987/88, a negative growth of 1.7% which rose to a positive 0.8% in 1988/89. The services sector's growth rate, influenced by performance in the agricultural sector, recorded negative rates of 1.1% and 8.2% in 1983/84 and 1984/5 respectively, but grew, in the following two years, by 5.2% and 5.3% before the rate of

Table 2.6

GDP by Sector
Constant 1981/82 Prices (in £s Million)

	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89
Agriculture	2396	2214	2159	1651	2114	2187	1926	2452
% of GDP	38.4	35.4	35.5	31.1	35.6	35.3	31.6	36.2
Irrigated	583	738	761	715	686	713	677	673
Rainfed Mech.	354	173	175	64	285	317	132	428
Rainfed Trad	494	328	271	174	305	264	206	400
Livestock	810	818	783	527	656	704	723	746
Forest&Fish.	155	157	169	172	181	189	189	205
Industry	823	952	890	861	882	907	929	974
% of GDP	13.2	15.2	14.6	16.2	14.9	14.7	15.2	14.4
Mining&Quary.	4	5	5	6	6	6	6	6
Manufacturing	365	402	397	399	438	459	451	455
Elect.&Water	76	95	102	117	126	127	129	134
Construction	378	450	386	339	312	315	342	379
Services	3017	3097	3036	2793	2938	3096	3243	3347
% of GDP	48.4	49.4	49.9	52.6	49.5	50.0	53.2	49.4
Commerce&Hot.	927	958	887	805	835	913	945	971
Transport&Com.	683	699	664	615	611	665	708	727
Finance&R.Est.	683	703	731	638	632	683	844	868
Personal Serv.	179	191	196	171	169	183	108	111
Govt.Services	545	546	558	565	692	651	638	670
GDP,Factor C.	6236	6264	6084	5306	5934	6190	6098	6774
GDP, F.C.C.P.	6236	8331	10416	12899	20483	29898	41232	66423
Ind.Taxes -Sub	484	847	895	1014	1322	1218	1828	*
GDP, C MKT P.	6720	9178	11311	13913	21805	31116	43060	66423
% change GDPFC		+0.4	-3.9	-12.8	11.8	4.3	-1.5	11.1
Price Index (81/82=100)	100	133	171	243	345	483	*	*

Source: Compiled by The Author from The Four Year Salvation, Recovery And Development Programme 1988/89 - 1991/92 and the Economic Survey 1989/90, Ministry of Finance and Planning, Khartoum.
Note: % share of Sectors in GDP calculated by author

increase declined to 4.7% and 3.2% respectively in 1987/88 and 1988/89.

Table (2.7) displays the fiscal performance of the government over this period. The increase in government expenditure over and above total revenue led to increased borrowing from the banking system to finance fiscal deficits, thus creating inflationary pressures in the economy. The share of total revenue as a percentage of the GDP was declining whereas that of expenditure was increasing. However, the decline in public revenue was due to a number of factors. Quoting "The Four Year Programme, 1988" these included: a) the replacement of major taxes on income and profits, in 1984, by "Zakat" taxes; imposing a flat rate of 2.5% on income, wealth and agricultural production, b) decline in indirect taxes because of import restrictions and c) decline in non-tax revenues owing to the deterioration in the performance of public enterprises.

The ratio of current expenditure to GDP declined steadily from 17% in 1981/82 to 14% in 1983/84, before increasing to 19% in 1984/85 and declining again to 17% and 16% in the next two years. This increase was necessitated by the civil war in the South, the emergence of extra-budgetary expenditure, debt service and the transfers for regional governments. The latter are mainly the regional governments services' budgets which include education, health, police and prison services, and transport and communication; the education budgets for the three levels constitute the largest share.

On the external sector, the government measures to enhance the competitiveness of the export sector were unsuccessful. Exports continued to suffer from "the high cost of production caused by high rate of inflation, as well as the high import content of exports originating from the irrigated sector, the acute competition from other exporting countries and the increased use of substitutes by traditional importers" (The Four Year Programme, 1988). The imports' bill continued to increase as a result of high demand for consumer goods, raw materials, capital goods and failure of domestic import substitution industries to increase their production.

TABLE 2.7

Government Budget.

(£s Million)

	81/82	82/83	83/84	84/85	85/86	86/87
Tax Revenues	679	1023	1164	1267	1551	1773
Direct Tax	141	207	273	301	352	468
Indirect Tax	537	814	891	966	1200	1305
Non Tax Revenue	492	249	243	200	205	1018
Total Revenue	1081	1272	1407	1467	1756	2791
Current Expenditure	1126	1360	1638	2384	2913	3511
Development Expenditure	315	411	459	472	369	1076
Equity Expenditure	32	31	80	45	70	22
Debt Service	-	126	173	118	450	520
Total Public Expenditure	1473	1928	2350	3029	3802	5129
Overall Deficit	392	656	943	1562	2046	2338
External Financing	185	490	650	870	1213	1156
Internal Financing	207	166	293	692	833	1182
(As a % of GDP)						
Tax Revenue	10	11	10	10	8	8
Total Revenue	16	14	12	12	10	13
Recurrent Expenditure	17	15	14	19	17	16
Development Expenditure	5	4	4	4	2	5
Overall Deficit	6	7	8	12	12	11

Source: The Four Year Salvation, Recovery and Developement Programme, 1988

2.10. Development Planning:

However, since independence, in 1956, the Sudan has launched three socio-economic development plans to develop the economy and increase the rate of growth in order to improve the standard of living and push the economy towards the state of self-sustaining growth. The first was the Ten-Year Socio-Economic Development Plan, 1960/61 - 1970/71. This plan was drafted by the first military regime that ruled the Sudan between 1958-64. The regime promised social and economic development but, realizing the shortcomings of ad hoc projects and programmes, adopted a comprehensive approach for the formulation of the development plan (Economic Secretariat, 1960). The objectives were formulated, briefly, as follows:

1. "An appreciable increase in real income per head through a satisfactory growth of the total national production.
2. The broadening of the structure of the Sudanese economy as a result of structural changes in the composition of national production and export.
3. Strengthening of the country's balance of payments through export promotion and import substitution.
4. Creation of sufficient opportunities of productive employment.
5. Further improvement of social conditions and services, including general and technical education".

The above broad objectives should be fulfilled under the condition of:

6. "The maintenance of a relatively stable price level". (Economic Secretariat, 1960).

The magnitude of investment required during the plan period was estimated at about £s 565 million. Out of this, £s 337 million was assigned for the development of the public sector and the remaining (40%) £s 228 million, was devoted to the private sector. These amounts included both local and foreign finance. The Plan anticipated that £s 146.8 million would come from the savings of the Central Government and up to £s 72.9 million from the savings of public entities. It was hoped that the foreign finance of

the public sector would cover new investment at £s 149.5 million and to meet obligations up £s 54 million; 35% of the capital required for the public sector was supposed to be from foreign sources. However, the Plan formulation was based on a very general economic survey of the characteristics and basic development of the Sudanese economy and no detailed statistical information was collected. Hence, Nimeri (1977) wrote that "the planners in formulating the Ten Years Plan have focused their attention on certain economic aspects not because of their importance to the future economic development of the country, but because of the availability of information about them". This resulted in misdirecting the planning efforts and led to serious shortcomings. Moreover, the Sudan government had no control over the last objective - the maintenance of a stable price level. The country was dependent on the export of one main crop, cotton, the price of which is determined by international market fluctuations. The Plan paid little attention to the development of the traditional sector, "thus its relevance to the bulk of the rural population, 92% of the total population at that time, was very limited" (Ali, 1977). Although the Plan may seem a modest one, available resources were not well balanced among the different sectors. As cash flows for projects and implementation programmes were not determined, capital and infra-structure constraints seriously restricted the growth of the economy.

The Plan was to be financed partly by internal sources, which were savings of the central government and public entities. The former, which depended mainly on the government budget surplus from import duties, contradicts the objective of import substitution. As for the latter, public entities were themselves subsidized. Thus there was no indication of a reduction in public expenditure and no public saving was to be expected. Meanwhile the inflow of foreign aid and loans was far less than had been anticipated. Such an imbalance between public expenditure and public revenue was reflected in the government's

liquidity position and the sharp fall in its foreign exchange reserve.

Moreover education, health and employment opportunities were not integrated into the investment programme. Although the required manpower for the achievement of the set objectives and the realization of the proposed projects was estimated and assessed in terms of technical skills of certain types, the educational qualifications required for them were not indicated (Ministry of Labour, 1977). Thus, it was difficult to discern the educational implications. However, the Ten Year Plan had failed both to allocate the limited resources rationally and to contribute much to their development.

In October 1964, as the popular revolution overthrew the military regime, the Ten Year Plan was discontinued, though its quantitative targets continued to serve as general guidelines. The next military regime, in May 1969, adopted, at first, a socialist outlook towards solving the nation's problems. In this atmosphere planning for development gained a higher priority and a Five Year Plan for development was suggested.

This Five Year Plan, 1970/71 - 1974/75, initially, had a better chance of succeeding than previous plans, as the planning organization was accorded the utmost importance. In formulating this Plan the model used illustrated its consistency by co-ordinating the input and output of each sector of the economy and relating different sectors to the needs of the others (The Five Year Plan, 1970). The planners started with a detailed survey concentrated on determining the existing capacities, the rate of their utilization and the administrative capacity of the different departments and units. Then they determined the size of investment that each sector needed and could cope with efficiently. For the first time national and sectoral targets were specified physically and financially.

As declared by the government, the main objective of this Plan was "... solving the economic crisis which was facing the country, through economic and social development

plans". However, the objectives of the Five Year Plan can be summarized in four points:

1. "To increase the national income and consequently the per capita income through the increase of productivity of the various main sectors. This would be done through new investment and better utilization of existing projects.
2. To improve health, education, cultural and social services.
3. To promote exports and imports substitutions to get foreign capital for development.
4. To change production methods to achieve fair income distribution" (The Five Year Plan, 1970).

The total estimated cost of the Plan was £s 385 millions. Foreign sources, mainly socialist countries, would provide £s 110 million, while £s 170 million was suggested as the private sector's investment.

It is difficult to give an objective evaluation of the Five Year Plan for Socio-Economic Development as, in fact, it was not implemented in its published form. An attempt at a military coup, which was suspected to be supported by the socialist countries, damaged the relationship with them. Thus the foreign component to finance the Plan no longer existed and sectoral priorities were altered; many new projects were added in the course of the Plan. The comprehensive approach, adopted before, was dropped in favour of a partial one. Nevertheless, Mirghani (1979) noted that "one of the major obstacles in formulating the Five Years and Ten Years Plans was the unavailability of reliable information for the formulation of comprehensive, consistent, and flexible development plans". It is important to note that "in the public sector, there is scarcity of information about governmental revenues and expenditure ... reliable information ... for the purposes of development planning is extremely lacking" (Nimeri, 1977). Relevance is another important dimension of economic data for planning; various kinds of statistical data were available for the Five Years Plan which planners could not use because of their irrelevance. The international

economic problems of the early 1970s caused serious inflation internally so the actual allocations made for the Plan were much less than the proposed original ones. The rate of growth during the first half of the Plan period was 5.7% per annum, while the planned rate was 7.6%. The rate of financial implementation was below 50% of the budget allocations. Thus the Plan was extended for two more years and in the second half the political authority formulated a political action programme. "The Phased Action Programme" became operative in 1973 and it set out new national and sectoral priorities and targets and completely altered the shape of the Five Year Plan" (Nimeri, 1977). However, this programme was worked out without reference to the costs of implementation or the resources available.

By 1976 the government planned a phased long term strategy for socio-economic development, for which a Six Year Plan 1977/78 - 1982/83 would be the first phase. However, various constraints hindered its full implementation and led to its abandonment. Then two "Three Years Public Investment Programmes" were launched, 1978/79-1980/81 and 1982/83 - 1985/86.

The economic deterioration, that reached catastrophic proportions by the end of 1984, aggravated by an expensive civil war in the South contributed to the ending of the second military regime which had lasted 16 years. The newly elected government in 1986 promised socio-economic development and prepared a Four-Year programme for Rehabilitation and Construction, 1988 - 92. This was replaced in 1988 by a three-year medium-term recovery programme to reform the exchange rate and trade policy, to reduce budget deficit and subsidies, and to promote exports. The military government that took over in June 1989 formed new programmes with new priorities.

2.11. Conclusion:

In conclusion it is evident that the Sudan is endowed with a wide range of natural resources, that are not available in many of the advanced countries, and the better educated manpower, in the region, to explore, manage and develop these resources for the welfare of its people. Historically, in their drive to free themselves from foreign domination, the Sudanese people target was "Liberation not Construction"; that under-estimated the efforts needed for development. After independence the young nation suffered the repercussions of the problems that could have been solved simultaneously during the struggle for freedom; economic progress and national integration.

In the last decade natural disasters of flood and desertification, the civil war in the South, the instability of government and the exodus of a large number of its skilled labour to oil-rich Arab countries coupled with international adverse terms of trade and mounting foreign debt led to an economic crisis, stagnation and escalating inflation.

Balanced development planning was believed to be the 'panacea' for solving all the inherited problems. However, in their zeal to achieve all their dreams, they did not realize that what could be achieved from planning depended on what was put in it in the first place; accurate, complete, relevant and timely data. The socio-economic development plans were based on fragmented data and information about the existing resources and incomplete and unreliable statistics of the rate of their utilization. Cost analysis, where employed depended on estimated or allocated budgets which did not mirrored the actual expenditure. Hence, the Plans proved too ambitious and could not make the best use of the scarce available resources. Thus, the ineffective development planning worsened a situation already aggravated by adverse climatic conditions, the civil war and the misconceived and poorly managed public sector, which failed to repay the mounting debt and contribute to

public revenue. The Sudan Government Report (1990) acknowledged that "... the physical output resulting from the investment was much below expectation. Many projects were launched without sufficient economic justification and assessment of their financial and technical viability". The next chapter discuss the educational development and how far, as a dependant on the economy for its finance and the gainful employment of its outcome, is affected.

CHAPTER THREE

DEVELOPMENT OF EDUCATION IN THE SUDAN

3.1. Introduction:

In Sudan, as in developing countries elsewhere, education is accorded a high priority in the social, economic and cultural development of the country. It is, primarily, a governmental endeavour, but due to the high rate of population growth, increasing social demand and the limited resources available to the educational authorities, as well as for historical reasons, private and popular efforts play significant roles in this process. Private education is closely supervised to conform to the national education policy. According to the Constitution, education is an investment for good citizenship and production and a democratic and political right, open for all citizens without any condition, except human ability. Nevertheless, the present adverse economic conditions and financial stringency limit the achievement of this goal, especially in disadvantaged regions and among underprivileged groups, even at the primary level.

Generally speaking, the major principles governing the educational policy in the Sudan can be summarized as follows:

"1 - Basic education is a democratic right for all citizens. It should be provided to all children and adults as soon as the available resources and conditions permit.

2 - Equal opportunities of access and success in education without regard to region, sex, rural/urban background, ethnic origin, or social and economic status.

3 - Education is considered as an investment (rather than a mere service) since human resources are vital for socio-economic development.

4 - Education should be effectively related to work and local environments in order to improve the quality of life" (National Report, 1988).

At this stage, it is important to have a closer insight into the historical background of the existing educational system. Although this study concentrates on public academic secondary education in Northern Sudan. It is necessary to give an account of the whole educational system and its historical development, as the various levels are interrelated and the lower stages are the source of student flow in the higher level; the latter is greatly influenced by the policies that determine the quantity and quality of those in the former. The International Education Commission (1955) recommended the "expansion of education at all levels, especially at the elementary level, not only because this was consistent with the idea of education for democracy, but also because this would make it possible to select not only better, but also a larger number of, candidates to secondary schools". As the earlier discussion of the socio-economic realities are imperative to understanding of the context of educational costs, it is equally crucial to examine the evolution of the educational system; how historical trends have greatly influenced and moulded it, and to diagnose its present aspects. Cuthbert (1979), rightly, observed that "... the most potent forces in determining the future are the past and the present".

3.2. The Origin of the Educational System:

" The country had, as far back as the periods of Nabata and Merowe, its own writings which recorded traditions and knowledge to secure their transmission from one generation to another" (Sudanese Education Sector Review, 1977). Holt (1963) stated that "the elaborate titularies and precise phrasing of Funj land-charters of the eighteenth century clearly indicate the existence of trained clerks working according to well-established precedents". Later, the Sudanese people came into contact with a new concept of education represented in the Khalwa (Koran learning School), Massied and Masjid or Mosque, which flourished with the spread of Islam during the two Islamic States of the Funj and Fur, (from the 16th to the 19th

centuries). "Religious education, being a basic requirement of all Moslem societies, demanded a knowledge of the Koran and consequently the ability to read and write in order to inculcate and strengthen the faith" (Beshir, 1969). Children would memorise the shorter chapters of the Koran, the letters of the alphabet, learning religious practices such as prayers, how ablutions were performed, the rudiments of arithmetic, reading and writing. Then, they would progress to study the Koran itself, writing on their wooden tablets, learning by heart and reciting from memory to the Feki (teacher). Older pupils (howar) assisted the young ones. The Feki was very respected in the district where he lived; he led the prayers and presided at wedding ceremonies. The Khalwa, as an educational institution, spread more than the others and emphasized practical education. The pupils, aged six and above, gathered fire wood at the end of each week for light by which to read the Koran at night. They would cultivate the land of their Feki and the endowments of the Koranic school or mosque and would be called upon to assist in various social occasions; protecting the village and school against flood and fires, patching up their roofs, etc. and reading the Koran at funerals and other social gatherings. As Beshir (1969) noted, "the Khalwa constituted a response to the traditional needs of a Moslem society ... Nomadism or subsistence cultivation did not require more than a simple knowledge of reading and writing, which was all that religion asked for". It is interesting to know that similar institutions existed in other Islamic countries under different names such as "Kuttab" and "Madrasa", though the Feki did not always have a high status (Al-Zubaidy, 1986).

The Turkish Rule (1821-85), however, encouraged the existing Koranic schools and missionary education and attempted to introduce modern education by "establishing about nine primary and two vocational schools in Khartoum and other big towns and a school for medicine and pharmacy " (Status Quo in Education, 1985). The Mahdist Regime (1885-98), which succeeded it, ended missionary work and closed

secular schools, though their "graduates formed the core of the bureaucracy and technical staff of (the new) rule" (Holt, 1958). Koranic schools continued to spread. It was known that the 'Khalifa', on one occasion, ordered 4,500 wooden tablets for teaching adults the minimum needed for prayers and the young the three R's and the Koran.

However, the Anglo-Egyptian rule in the Sudan, (1899-1956), re-established modern schools and laid the foundation of the present system of education. Although, in the past education had its objectives, the British administration was the first to announce specific aims for education. These can be summarized as working to: "1) train a class of skilled artisans much needed in the country, 2) spread a limited amount of education among the general population to enable them to understand the principles of government administration, especially those of equality and impartiality in the administration of justice and 3) create a class of administrators from among the original inhabitants to fill the lower administrative posts in the government" (Ahmed, 1988). A three tier system of general education, four years for each level (4+4+4), was introduced. This policy marked a new era in the history of education in the Sudan, reflecting western European theory and practice at the time. "Education had an individualistic concept, its attainment was an individual distinction surrounding its possessor with a special aura and honour" (Sudanese Education Sector Review, 1977). From the start, education was geared to 'white collar' employment in the public sector which eventually led to a lack of respect for practical skills and a lowering of their value for the community. The desire to expand limited education led to the introduction of sub-grade schools (grade 1 to 3) in the North under the native authorities and, later, under the local government councils. Village schools (grade 1 and 2) were established for the first time, in the South, under the control of Christian Missionary Societies. At the beginning, in 1903, Gordon Memorial College housed the teacher training college and Omdurman Sharia College, and

later included a technical training centre, an industrial workshop and a post primary course, which developed into a secondary school by 1924. Overall expansion of schools was very slow until 1930, especially at the intermediate and secondary levels. This attitude developed a voluntary movement in education. An 'Educational Fund' was found under the auspices of the Graduates' Congress and contributions came in from many parts of the country. This popular movement spread all over and "... in a few years, 1942 to 1956, was able to achieve in terms of numbers, as many schools at the intermediate level as the British Administration has established during fifty years" (Beshir, 1977). Due to the recommendations of the De La War Commission (1937) Gordon Memorial College's role was changed from a secondary school to an institute of higher education; first the University College of Khartoum and, on independence, acquired the full status of university. Only after the War was the secondary school transferred to a rural area, Wadi Seidnna near Omdurman. By 1948, another two boarding secondary schools for boys were established in the Central Region and Kordufan, in rural surroundings so as "not to isolate the elite from their society". In 1950 the first girls' secondary school was opened in Omdurman.

Popular effort continued after independence and stimulated an increase in the number of government and private secondary schools; still an important source of financing and expanding education at all levels. On the eve of independence in 1956, the colonial rule left limited educational facilities, unequally distributed between the regions, especially the North and South, and among both sexes. According to the first population census, in 1956, the literacy rate was 14% among age five and above; 22.9% among males and 4% for females. There were 1,219 schools of general education, including teacher training colleges for the elementary and intermediate levels, with a total enrolment of 177,527 pupils. Nevertheless, the sources of this education were varied; "a traditional system of Moslem education, a Christian education provided by missionary

societies, schools, and institutions following the Egyptian system of education, and a network of modern 'Western-type' schools established by the Sudanese Government or voluntary agencies - all existed side by side" (Beshir, 1969). This inherited system of education continued after independence despite several recommendations, from local as well as international committees, to alter it. In 1970, a new educational ladder, which raised primary education length to six years, reduced intermediate and academic secondary to three years each and upgraded technical education to secondary level of four years (6+3+3/4), replaced the old one.

3.3. The Structure of Education:

The structure of general education in the Sudan is of twelve years' duration. It consists of three separate schooling levels: primary, intermediate and secondary. These three main levels are preceded, in a non-formal way, by a pre-schooling stage of two types: kindergartens in big cities and towns, and Koranic schools in rural and nomadic areas. The present educational ladder divides the 12 years of general education into six years of primary, 3 years for intermediate, three years for academic secondary education and four years for each of technical secondary education and primary teachers training colleges. Figure (3.1) displays the structure of education in the Sudan.

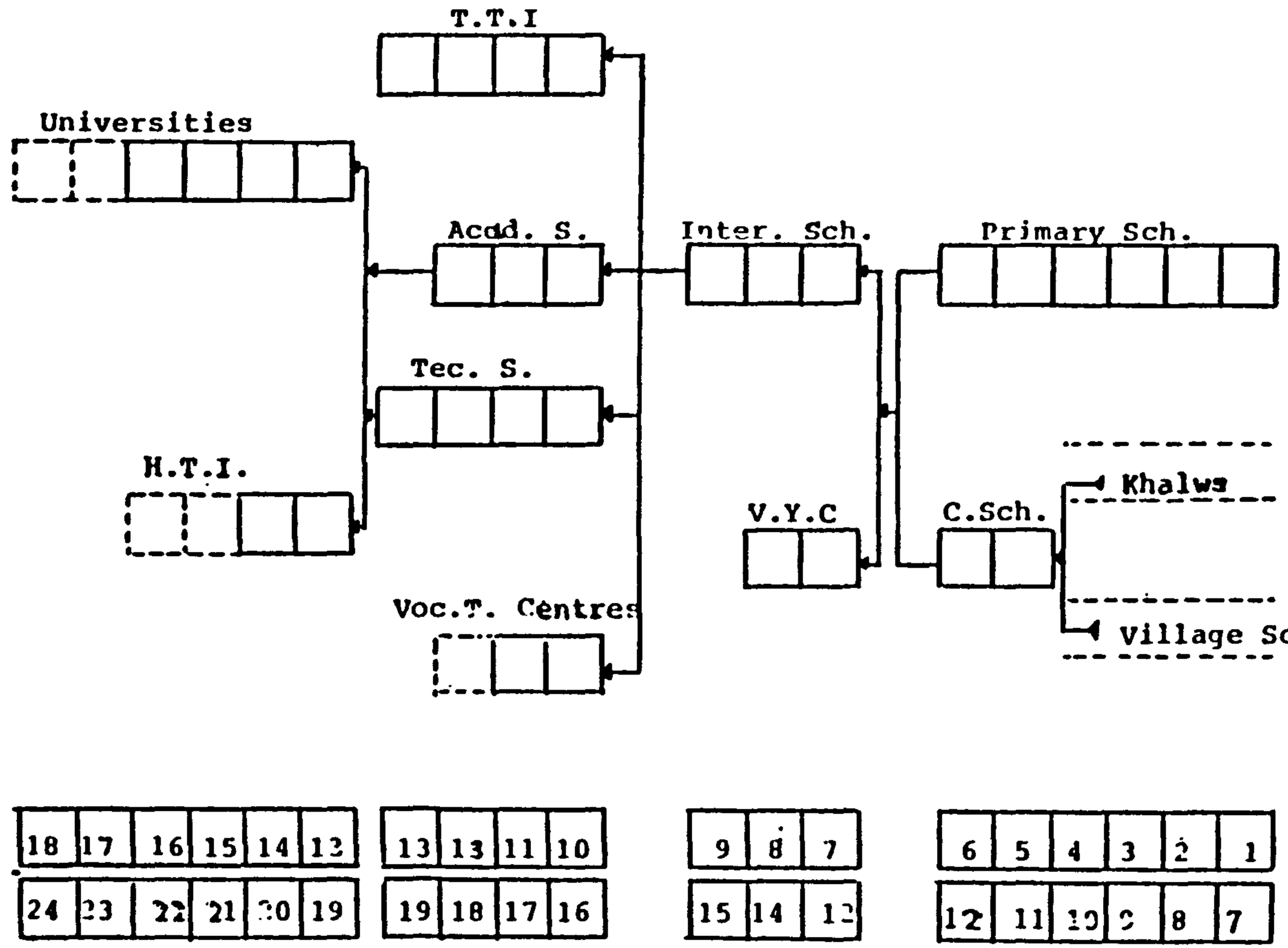
Generally speaking, the present structure of education can be divided into two parts: a non-formal pre-school education and a formal general education. Each is discussed in more detail below.

3.3.1 Pre-school education:

Although research findings asserted the importance of this stage and its crucial role in compensating for the disadvantages of under-privileged homes and enhancing the advantages of good homes, it is not yet fully integrated in the structure of formal education. The Education Sector

Figure (3.1)

The Structure of the Educational System



Review (1977), did admit the importance of this stage for child education and future growth, yet suggested that its universalization was not to be planned for before 1985. The reasons were: 1) at the time it would impose financial burdens that the economic situation could not allow and b) it was foreseen that UPE as a priority would be achieved by that date and hence pre-schooling would be undertaken. Pre-school education is provided in two types of institutions:

a) Kindergartens:

In 1985, according to the above Review, a specialised department was created in the Central Ministry of Education for supervising and training of kindergarten mistresses. A number of kindergartens are established by the Ministry of Education but a higher number are run by the departments of Social Affairs, Religious Affairs, Youth and Sports or local government councils, as well as individuals, private educational organisations, foreign communities and missionary societies. In 1988/89 there were 1,816 kindergartens, comprising 99,910 children between the ages of three and six supervised by 2,781 mistresses. Mohammed-Nur's (1976) field survey found that 20% of the mistresses in kindergartens were primary school leavers, 45% completed intermediate school, 26% were secondary school graduates and 9% university degree holders. These variations in the level of teachers' qualification reflected the standards of the kindergartens and hence the level of fees charged; ranging from a few pounds in publicly maintained kindergartens to hundreds in private ones. These fee-paying institutions found in and confined to large towns widen the gap between rural and urban opportunities in educational success.

b) Khalwa:

Here, children of all ages are accepted and beside religious education, reading, writing and arithmetic are taught. Some children join a primary school, if one is available, at age seven, the others may continue their study in the Khalwa.

Both types of pre-schooling need innovative changes to make important contributions to cognitive as well as skill development and knowledge acquisition. Empirical evidence in advanced countries indicates that, "one cannot expect a transformation in cognitive capacity from regular public preschool education ... the effect of 'traditional' preschool in developing countries is even more questionable" (Smilansky, 1979).

3.3.2. General Education:

Formal general education comprises three separate stages. Following international classification it can be divided into two levels:

3.3.2.1. First Level:

A) Primary education:

The primary level (grade 1-6) covers six years of formal schooling. Admission to these schools is unconditional for all boys and girls who reach the official entry age of seven years; in urban centres, with more facilities, six year olds are allowed and in rural areas children up to eight years can join. Public schools are free, but voluntary contribution for non-salary expenses from the pupils' families and donations from the local community to cater, mainly, for maintenance of school buildings and furniture are accepted. Nevertheless, the free-public education is expensive for the poor families who cannot afford to send all their children to school. Kadouk (1982) noted that 75% of children aged 5 to 9 and 91% of those aged 10 to 14 were classified in 1970 - 1972 as cotton-pickers and worked at cotton-picking in the Gezira Scheme; these were drop-outs or did not attend school at all. Promotion between grades is automatic and repetition is forbidden in the first four years of schooling. As repetition is frequent because of lack of remedial programmes, not allowing it only resulted in not reporting it; statistics on repetition are inaccurate or unavailable.

The official class size is fifty pupils and the pupil-teacher ratio is stated to be 40:1; classes in urban centres are well above that but in rural areas are much lower.

Table (3.1) shows the growth in number of schools, pupils and teachers in selected academic years. The figures pertaining to the first three included sub-grade and village schools that provided 3 and 2 years courses respectively; but were gradually converted to full primary schools by 1970. The growth in the number of schools, pupils and teachers over the whole period, 1955/56 to 1987/88, was tremendous; a factor of more than 6.3, 11.7 and 16 respectively. It is clear, however, that after independence up to the first year of the Ten-Year Educational Development Plan, 1960/61, quantitative expansion has been particularly impressive and unparalleled in any other subsequent period, particularly for girls. Although, gross enrolment increased at an average rate of 19.4% annually, girls' enrolment ratio increased at 34.4% against 15.8 for boys. The organized participation of women in the liberation movement has been fruitful for the younger generations. The annual increase in number of schools, 22.4%, and teachers, 27.8% was even

Table 3.1

Primary Education:
Schools, Pupils and Teachers

Years	Schools	Pupils			Teachers
		Total	Girls	Boys	
1955/56*	1,137	161,144	31,595	129,549	3,229
1960/61*	2,408	317,680	85,774	231,906	7,722
1969/70*	3,200	569,628	188,144	381,484	14,191
1976/77	4,829	1,207,661	445,729	761,932	33,718
1982/83	6,758	1,548,877	629,793	919,084	46,570
1987/88	7,186	1,891,226	776,912	1,114,314	51,520

Source: Unesco Statistical Yearbook (1963), Educational Statistics Academic Year 1976/77, 1982/83, 1987/88, and Development of Education Report, 1982.
Note: *including sub-grade and village schools.

higher. This can be attributed to the up-grading of sub-grade and village schools to "complete" schools and counting their teachers, after retraining, as part of the primary level teaching force. The following period, 1962/63 to 1969/70, showed a sharp decline in the rate of growth of all components. But the annual average increase in total enrolment, 8.8%, was even higher than that for Sub-Saharan Africa during 1960-70, 6.5%. This trend was completely revised from 1969/70 to 1976/77, after the implementation of the present educational ladder and during the Five-Year Educational Development Plan that emphasized education of the masses. It is evident that this period featured the highest rate of growth in number of physical facilities and teachers; an annual average of 7.3% and 19.7% respectively. Interestingly, the average annual rate of increase in total enrolment was 16% almost twice the highest average experienced in the Sub-Saharan region, 8.9% (World Bank, 1988). However, the girls' enrolment growth rate rose to an annual average of 19.6% with boys' at 14.2%. Unfortunately, after this halcyon period, in 1976/77 - 1982/83, a declining trend began, consequent to the economic crisis, discussed earlier. Although the average enrolment rate dropped to 4.7%, that of girls to 6.8% and boys' to only 3.5%, school numbers continued expanding at a higher rate; compensating for a previously much slower rate. The decline in average growth rate of all components continued throughout the ensuing period up to 1987/88. In this last period, total enrolment dropped to 4.4%, slightly higher than the 4.2% reported for Sub-Saharan Africa during the 1980s. The annual rate of girls' enrolment increase was 4.6%, slightly above the growth in school-age population for this age group, (4.3%). It is important to recall the under-reporting of females in the national census, referred to earlier. However, the annual average rate of increase in total enrolment, 4.4%, and boys' enrolment, 4.2%, was already below the corresponding growth rate in the respective school-age populations, at 4.6% and 4.8% respectively (Educational Statistics Academic Year,

1987/88). Nevertheless, girls education progress is impressive; it constituted 40.7% of total enrolment in 1982/83 and slightly increased to 41.1% in 1987/88 despite the economic recession.

Table 3.2 below illustrates the variations in intake and in enrolment ratios in Northern Sudan. The national intake ratio in first year primary was only 52% in 1987/88; with marked disparities among the regions and between girls

Table (3.2)

Primary Education:
Intake and Enrollment Ratios
by Region and Sex in 1987/88.

REGION	Intake Ratio			Enrollment Ratio		
	Girls	Boys	Both	Girls	Boys	Both
Northern	79.7	87.7	83.8	79.3	82.6	81.0
Khartoum	62.7	70.4	66.5	75.2	79.4	77.3
Central	62.3	74.6	68.5	61.2	71.5	66.3
Eastern	36.7	49.5	43.5	37.2	44.2	40.7
Kordufan	39.1	59.2	49.6	33.8	50.2	42.0
Darfur	31.6	58.6	45.5	27.2	49.2	38.2
SUDAN	43.3	60.2	52.0	41.4	54.2	48.0

Source: Educational Statistics Academic Year 1987/88.

and boys. It varied from a high of 83.8%, in the Northern Region, to a low of 43.5% in the Eastern. Though 60.2% of school-age boys were admitted, the corresponding figure for girls was 43.3%. However, within each region there were discrepancies in intake ratios for girls and boys; the difference was only 7.7% in Khartoum but 27% in Darfur Region. Among regions, the variation in girls' admission ratios, 79.7% in the 31.6% in Darfur, was wider than that between boys', 87.7% in the Northern Region and 49.5% in the Eastern.

On the other hand, national total enrolment ratio stood at 48% of the 7-12 age group. This modest average

percentage disguises wide differences between and within regions, especially urban and rural areas, and between boys and girls. As observed above, the Northern Region, also, had the highest enrolment ratio, 81%, and Darfur the lowest, at 38.2%. At the national level, boys enrolment ratio was a high of 54.2%, against 41.4% for girls; wide differences within and between regions are obvious, as Table 3.2 shows. However, the disparity, among the regions, in girls enrolment ratios, 79.3% in the Northern Region against only 27.2% in Darfur, is marked compared to that in boys', 82.6% in the Northern and 44.2% in the Eastern.

Although these percentages indicate further improvement from previous years, for example total enrolment ratio was 38.8% in 1980/81 (32.6% for girls and 44.5% for boys), the gap between and within the regions and among girls and boys is far from being closed. Needless to say, the enrolment ratio is below the targets achieved in most low income countries of Sub-Saharan Africa; 70% and over (World Bank, 1989).

According to the official statistics, it is observed, that, out of a cohort of 305,500 pupils enrolled in first year primary in 1979, only 208,235 continued their education into the sixth grade by 1984; a retention rate of 68.2% and a loss of 97,265 pupils who either dropped-out or repeated in due course. Those who passed the Primary School Certificate Examination and were admitted to intermediate schools (grade 7), in 1985, totalled 128,496 pupils, 61.7% of those who managed to stay up to the sixth grade. Only 420 pupils out of every thousand starting in primary schools can secure a place at intermediate level. The remaining 38.3% (or 79,739 pupils) were not qualified for the next level, either because they failed the examination or because places were limited. More importantly, they were not prepared for the labour market but were too ambitious to pursue the traditional skills of their forebears in agriculture, animal husbandry or forestry. As Unicef (1989) noted "in most cases, primary education is designed to prepare and select the 20% to 30% who will go on to

secondary schools. It, therefore, is designed to fail 70% or 80% of its intake, who then leave with an education relevant to crushed hopes rather than present realities".

Nevertheless, despite this overall impressive quantitative growth in education, UPE is still further ahead. As a member of Addis Ababa Conference for Education Development in Africa (1961), the Sudan planned to achieve UPE by 1980 (Bartels, 1983). The set target of this Conference was 58% enrollment in 1965, 74% in 1970 and 100% by 1980. Unfortunately the enrollment ratio stood at only 20% by 1965, 30.5% in 1970 and 38.8% in 1980. Thus the Sudanese Education Sector Review (1977) postponed the achievement of this goal to the year 1990; "Universalization of primary education within the coming fifteen years (1990). Provinces which can achieve it with their own resources before this target date shall be encouraged to do so". Later, studies of school mapping at the local level in Khartoum (1979) and the White Nile province (1981) indicated the difficulty of achieving even this target by 1990. Hence, as the economic conditions worsened, it was further rescheduled by the National Educational Conference (1982) to the year 2,000.

However, the authorities claimed that "UPE is a top priority of Sudan's educational policy. Serious studies have been conducted in order to discover ways and means of achieving this strategic aim. A policy of UPE by the year 2000 was endorsed and a plan for the actualization of this policy has been drafted" (National Report, 1986). Nevertheless, all estimations of the population of seven year olds for both genders were based solely on the population census projections. The Population Census Office (1989) warned that among the problems which might have affected the quality of data was the under-counting of children because of conventional beliefs, in rural areas, which was detrimental to full reporting. Yet, the strategy of the National Conference on Education (1982) to achieve this target through the "extension of micro-planning and school mapping to all regions to record the actual need, and

rate of utilization of available human and financial resources", was not taken seriously before 1988. Furthermore, the main difficulty of achieving this celebrated goal was financial, but the only Plan drafted for implementing it did not take into consideration alternative types of schools which suited local conditions and reduced capital and recurrent costs. The Sudanese Education Sector Review (1977) suggested, beside the traditional school, several types of lower-cost schools to suit various local conditions and circumstances of the country, such as:

1 - Double-shift school: for densely populated areas, where the same building can house more than one school, one in the morning and the other in the afternoon, thus drastically reducing capital expenditure.

2 - Alternate-admission school: for sparsely populated areas, where pupils of seven eight and years old are admitted together every other year. This type reduces not only the construction cost of building, but the recurrent expenditure on teachers as only three are needed.

3 - One-teacher school: to provide low-cost educational service for nomads and scattered population.

4 - Complementary School: comprises only the 5th and 6th grades and helps to integrate those who completed their studies in the Khalwa into formal education.

It is important to note, that "UPE Plan, 1985" analysed two alternatives for enrolment expansion based on the traditional school of six classes. However, the Six-Year Plan, 1977/78-1982/83, stated that "the most serious problem that hinders the universalization of primary education is the insistence on the traditional school, with its six classes, its daily programme, norms in the number of teachers and school buildings, despite its high establishment costs". The Unesco Mission (1988), which also discussed alternative scenarios for implementation, admitted that this project proved to be a costly undertaking; "even if it became possible to double the annual amount of money invested in primary education over a period of fifteen years, the gain in the enrolment would be

only 67.8%, i.e. only two thirds of the universal enrolment aimed for". Yet, surprisingly, it stated clearly that "the projections do not attempt to reflect any savings that may be possible through reliance on alternative forms of basic education, such as ... alternate-year intakes".

Regrettably, no serious study was conducted to extend educational services to the nomads who constituted 11% of the total population in the 1983 census, but 25.3% of the Eastern Region's, 25.2% of Kordufan's, 15.1% of Darfur's and 4.9% of Khartoum's (Department of Statistics, 1989). Due to the recent incidence of drought and desertification, which resulted in massive human displacement, it was estimated that 40% of the population is on the move at some time of the year. Surprisingly, a mobile school for the nomads was established as early as 1921; "the teacher who was appointed to the Kababish Tribe lived and travelled with the tribe" (Beshir, 1969).

However, to implement UPE, "serious studies", conducted in the national and cultural contexts, should provide guidelines on the factors that promote schooling demand and encourage regular attendance to utilize the scarce resources effectively. Interestingly, access to primary education is not always constrained by "school supply and price factors". Nearer to home, Abraha et al. (1991) wrote that "in Ethiopia, ... the Gojjam study revealed that many children live quite close to the village school and never choose to enter". This is especially true with girls' access to education which, research revealed, involves more than simply opening schools. "It involves special policies that deal with making schools accessible, given women's work day, and with alleviating women's work burdens in the household and in family economies so that women have time to go to school both as children and as adults" (Kelly, 1987). The complex situation and difficulties of achieving this goal was pinpointed, even during the British Administration. Holt (1963) noted that "universal compulsory primary education is not yet feasible. Apart from the financial and material problems of providing and staffing schools, the

Sudan has the particular difficulties of a vast but sparsely populated country, with a considerable nomadic element in its peoples".

B) Khalwa: In rural and nomadic environment, this institution provides a programme of four years for those who continue their education. After that they can sit for an exam equivalent to the 4th grade level, and those who succeed can join the complementary schools for two years (5th and 6th grades) to obtain the primary school certificate. "The Ministry of Education introduced reform programmes which allowed the integration of Khalwas and ordinary primary schools by linking the four-year formal education given in the Khalwas to the fifth and sixth grades of primary schools" (Unesco, 1988). In 1988/89, there were 3,577 Fekis teaching 170,740 children in 2,833 Khalwas all over the Sudan.

C) Village School: mainly in non-moslem societies, in the South; similar to the Khalwa. It is a one-teacher school from whence pupils can join, later, the complementary school.

3.3.2.2 Second Level:

The Sudan Education Sector Review (1977) reported that this level was divided into two stages due to economic and technical necessity, but it did not rule out the possibility of joining them in the long-run. One of its suggestions was "... changing the structure of the present levels into a new form of (6+4+2), a change which may be a step in the direction of uniting the two stages of the second level or dispensing with the two final years".

A) First Stage:

a) Intermediate Education: this is the first stage of the second level of general education (grade 7-9), it extends over a period of three years. Access to this stage is based on certain qualifications, the most important of which is the success in the primary schools' final examination. Moreover, the availability of places,

geographical proximity and the appropriate age are other limitations. The normal class size is fifty pupils. Repetition is not allowed in the first grade and is severely restricted in higher grades, especially in the third year. By the end of the third grade, pupils sit for the Intermediate School Certificate examination.

Table 3.3 displays the quantitative progress in intermediate education from 1960/61 - 1988/89. Over this period the growth in the number of schools and in gross enrolment was fourteen fold, and for teachers was thirteen fold. Interestingly, girls' enrolment multiplied twenty-eight times, whereas boys' was over tenfold. However, the annual increase was not uniform throughout. During the Ten Year Plan, 1960/61 - 1964/65, average annual expansion in schools and physical facilities was slow (8.5%); yet was not matched by an increase in total enrolment (5%) or number of teachers (5%). Prior to the new educational ladder, the 1964/65 - 1969/70 period experienced an unprecedented overall growth; schools, total enrolment as well as boys' and teachers' numbers was more than tripled and girls' enrolment rose fivefold; a trend observed in most countries of Sub-Saharan Africa at the time. However, after the introduction of the new ladder

Table 3.3

Intermediate Education:
Schools, Pupils and Teachers

Years	Schools	Pupils			Teachers
		Total	Girls	Boys	
1960/61	161	28,298	6,457	21,841	1,412
1964/65	217	33,810	7,587	26,223	1,714
1969/70	762	122,690	37,757	84,933	5,691
1976/77	1,173	147,427	42,480	104,947	9,254
1982/83	1,713	332,044	127,721	204,323	14,123
1988/89	2,270	410,794	181,050	229,744	18,600

Source: Educational Statistics Academic Year 1961/62, 1969/70, 1976/77, 1982/83, and 1988/89.

were channelled to the expansion in primary education during 1969/70 - 1976/77, intermediate education experienced a huge decline in the average annual rate of increase in schools (7.5%) and teachers numbers (9%). Total enrolment and that for girls and boys hardly increased, only by 2.9%, 1.8% and 3.4% respectively. Over the Six Year Plan period, 1976/77 - 1982/83, total enrolments more than doubled (2.3 times) and girls numbers tripled; only boys' enrolment was less than doubled, (at 194%). Surprisingly, this increase in enrolment was not matched with a parallel growth in the number of schools (only 46% during the whole period) or staff (only 52.5%). This may indicate that expansion was achieved by adding more classes in already existing schools, over-crowding existing classes, or both. The development budget for building and equipping schools was carefully monitored over this period. The financial stringency during 1982/83 - 1988/89, is reflected in the declining annual rate of growth of schools' facilities (5.4%); capital expenditure was the most hit, total enrolment (4%) and teachers' numbers (5%); girls' rate of increase (7%) was higher than boys'(2%). However, the situation of girls' enrolment, at this level compares favourably with other countries in the region. In 1982/83, it constituted 38.5% of total enrolment which increased to 44.1% in 1988/89.

As Table 3.4 shows, despite the large expansion in the number of schools, pupils and teachers, their distribution among regions is far from equal. The modest national enrolment ratio, 27.1%, disguised wide variations between the regions and between girls and boys in enrolment at this level. Khartoum, followed by the Northern Region had the highest percentage of enrolment (over 60 %). Interestingly, in both cases, the enrolments of girls are higher than boys. The lowest enrolment was in Darfur, half the national average; even worse for girls. The difference in the rate of enrolment among girls and boys within the same region is limited in Khartoum, the Northern and the Eastern Regions (Table 3.4) but in the Central, Kordufan and Darfur it is as high as 7.1%, 7.3 and 6.5% respectively. Reflecting the

Table 3.4

Intermediate Education: Enrolment Ratio by Region and Sex, 1987/88.

REGION	Population age 13-15			Enrollment Ratios		
	Girls	Boys	Both	Girls	Boys	Both
Northern	43,886	45,935	89,821	61.2	59.3	60.2
Khartoum	70,083	79,582	149,665	66.6	62.6	64.5
Central	162,203	167,826	330,029	33.8	40.9	37.4
Eastern	73,910	89,336	163,246	20.2	21.5	20.9
Kordufan	97,567	101,017	198,584	15.8	23.1	19.5
Darfur	90,463	102,120	192,583	10.1	16.6	13.6
SUDAN	710,433	765,065	1,475,498	24.6	29.3	27.1

Source: Educational Statistics Academic Year 1987/88.

primary level, the female school-age population was less than the male of the same age group, (Table 3.4), although under-enumeration could not be ruled out. However, this stage is expanding faster than planned. The 128,496 pupils who joined the intermediate level in 1985 constituted 61.7% of the sixth grade completers; in 1972 only 46.5% were admitted. Out of these, 127,237 pupils were in the second grade in 1986 (99%) and 129,018 continued to the third grade by 1987; (101.4%). The increase of 1.4 % is due to repetition, which is highly restricted in government schools but permitted in Teachers' Union evening classes. In 1988 those who successfully passed the final exam and could secure a place in secondary schools totalled 68,152 pupils, 52.8% of those who continued to the third grade. It seems that the selective system of examination resulted in a high holding power at this level, otherwise a high rate of repetition might have compensated for drop-outs.

Nevertheless, only 530 pupils of every thousand who found a place in the intermediate schools could join the secondary stage. As in the lower level, 47.2% or 60,896 youngsters remained unqualified for more education and unprepared for the labour market. The available vocational training

facilities are too limited to cater, annually, for these numbers.

A recent comparative study of general education revealed that this stage is "the Cinderella of the Government"; primary education has the top priority because basic education and senior secondary are the sources of skilled manpower. Salih (1986) revealed that total unit expenditure was only 20% higher than at the primary level, accounted for by the increase in salaries. Non-salary expenses per pupil was £s 35.20 (25% or one quarter less than that for the primary level, £s 46.70), despite the importance of this component for pupils' achievement and overall performance. Although pupils in this level study 8 periods more per week they spend a mean of £s 16 on textbooks, compared to £s 28.8 at the primary schools. Historically, all qualified teachers were transferred to secondary schools when British teachers had to serve in the forces during the war. Later the Sudanisation Policy before independence opened new avenues for secondary school teachers and, consequently, better trained teachers in the intermediate schools were redeployed to secondary schools. The situation was worsened by the huge expansion of this level through popular efforts without regard to teachers' qualification.

b) Vocational Artisan Training Centres: These schools and craft centres were established by the Ministry of Education to train dropouts from both levels and educational wastage who cannot join the intermediate stage in local industries using local raw material. They offer a two-year course of training in indigenous crafts such as leatherwork, woodcarving, rug and carpet-making and later expanded to include electrical installation, auto mechanics, plumbing and welding to give the trainees marketable skills. These centres are operated as production units to cover part of the operating costs which are shared by the Central and the Regional Governments and in some cases the local communities. In 1988/89 there were 2254 pupils in 15 centres with different specialisations, supervised by 21

teachers and 190 instructors. The Department of Youth and Sports run 18 centres instructing over one thousand trainees annually. Moreover, the vocational training centres organised by the Labour Department prepare more or less the same number of youths for the labour market. Unfortunately, because of drop-outs and the huge magnitude of wastage between levels, all the facilities enrol only a small fraction of these.

c) Religious Institutes: admit successful pupils from religious education backgrounds, for example those from complementary schools for a duration of four years.

B) Second Stage:

This is the final stage in general education. Pupils who passed their Intermediate School Certificate can compete, according to availability of places, for joining secondary education, primary teachers training colleges or Religious Secondary Institutes. Secondary education is of two types:

a) Academic Secondary Education:

Academic secondary is of three years duration (grades 10-12); it remains highly selective. Pupils are admitted to secondary schools after successfully passing the Intermediate School Certificate final examination and according to availability of places. They are promoted from one grade to the next if they pass the end of school year examination. If more than four subjects, plus the total, are failed then the grade is repeated. A second failure, or misbehaviour, can lead to dismissal. The first two years comprise general education and, according to their second grade final results, third year pupils are streamed into literary or scientific branch; the latter is sub-divided into mathematics and biology. At the end of the third grade, pupils sit for the final Sudan School Certificate Examination, leading to higher education.

Table (3.5) displays the progress in the number of schools, total enrolment and number of teachers from 1960/61 to 1988/89. During this period the quantitative expansion

has been impressive. The number of schools increased thirteen times, school enrolment more than nineteen times and boys' enrolment over twelve times. Girls' enrolment increased the most in absolute terms, growing from only 1,134 in 1960/61 to 99,768 in 1988/89; an eighty-eight fold increase. To replace expatriates and cater for expansion at this popular stage, the number of teachers multiplied more than schools (18 times). In 1982/83, 835 expatriates (19% of the teaching force), both Arabs and foreigners, were employed in secondary schools to teach sciences, mathematics, English and even Arabic language. However, the rate of growth in the number of schools, enrolment and teachers was not even throughout the period under discussion. By 1964/65, the end of the Ten Year Plan, although, the number of schools increased by 70% and teachers' numbers more than doubled, total enrolment increased by 12% only. Interestingly, girls' enrolment increased more than twice, while boys' numbers grew by less than 1%. Between 1964/65 - 1969/70, there was tremendous growth, at an average annual rate of over 50% in physical

Table 3.5

Academic Secondary Education: Schools, Pupils and Teachers.

Years	Schools	Pupils			Teachers
		Total	Girls	Boys	
1960/61	30	11,589	1,134	10,455	332
1964/65	51	13,007	2,464	10,543	706
1969/70	128	34,938	8,102	26,836	1,286
1976/77	131	43,943	10,856	33,087	3,258
1982/83	318	131,706	47,281	84,425	4,689
1988/89	416	227,976	99,768	128,208	6,078

Source: Educational Statistics Academic Year 1961/62, 1969/70, 1976/77, 1982/83, and 1988/89.

facilities and schools, total enrolment and boys 'enrolment. Although, teachers' numbers multiplied at a lower rate of

36%, those of girls continued increasing at an even higher rate of 65%. Politicians, during the democratic government in that period, were susceptible to social pressure for more education. Up to 1976/77, the end of the Five Year Plan period, the policy of diversification of secondary education called for limited increase in academic schools to allow for expansion of technical education. The number of schools hardly increased and the average annual growth rate in total enrolment and boys' numbers was slightly over 3%; girls' enrolment progress declined to only 4.8% per annum. However, the number of teachers multiplied 2.5 times to man the newly established primary teacher training colleges needed to supply the required staff for primary education expansion. During the Six Year Plan period, 1976/77 - 1982/83, the number of schools more than doubled, school enrolment tripled and girls' enrolment more than quadrupled, despite the government policy, at the time, of very limited expansion in this type of education. However, the contribution from popular efforts in building and equipping schools increased beyond what was planned; regrettably in the more affluent regions. From then on, from 1982/83 - 1988/89, as at the situation at the lower levels, the deterioration in the average annual growth rate was evident in number of schools (5%), in total enrolment (12%), teachers numbers (4.8%), girls enrolment (35%) and boys' enrolment (8.5%) indicating a marked decline. It is important to note that the envisaged progress was effected through self help and Teachers' Union Schools; in 1988/89, the latter ran 98 schools providing education for 41,450 girls and 46,124 boys. Although, over the whole period, girls' enrolment increased several times more than boys', the wide gap between girls' and boys' education could not be closed. As observed in the lower levels, girls participation was enhanced, from 35.9% of the total enrolment, in 1982/83, to 43.8% by 1988/89. However, the efforts to promote Girls' education and expand it clearly figure in the higher rate of growth in girls' enrolment, at all levels, despite the economic recession and financial stringency.

Table 3.6 illustrates that the national enrolment ratio for academic secondary schools was 15.2%, with a large discrepancy between the regions. The highest was in Khartoum, (40.8%), followed by the Northern Region, (36.8%) and the lowest in Darfur, (6.8%), and Kordufan, (9.3%).

Table 3.6
Academic Secondary Education:
Enrolment Ratio by Region and Sex, 1987/88.

REGION	Population age 16-18			Enrollment Ratios		
	Girls	Boys	Both	Girls	Boys	Both
Northern	36,987	32,996	69,983	33.3	40.7	36.8
Khartoum	66,232	81,508	147,740	43.2	38.8	40.8
Central	145,824	140,568	286,392	14.6	23.0	18.7
Eastern	66,395	75,742	142,137	10.6	13.8	12.3
Kordufan	86,977	82,567	169,544	6.5	12.3	9.3
Darfur	88,519	85,727	174,246	4.4	9.2	6.8
SUDAN	651,777	664,356	1,316,128	12.6	17.8	15.2

Source: Educational Statistics Academic Year 1987/88

Furthermore, the national enrolment rate for boys was 17.8%; it ranges from 40.7% in the Northern Region to 9.2% in Darfur. The lower national ratio of girls' enrolment, 12.6%, reaches a high of 43.2% in Khartoum dropping to 4.4% in Darfur and 6.5% in Kordufan. Regrettably, the less developed regions of the country, which badly need more educated manpower to initiate and manage developmental projects and programmes, have the lowest overall ratios. On the other hand, the female school age population at this level (16-18) is larger than the male in four regions but their enrolment ratios were far below in all of them. The secondary level, only, perpetuated the disparities by region and gender evident in the two lower levels.

Table 3.7 displays the distribution of teachers by gender, region and the status of their training. Female teachers constituted only 19.8%; one fifth of the academic secondary teaching force. More than 48.2% of the total

number of teachers were untrained, the majority were males, 78.4%. This has an adverse influence on girls and boys schools as they teach in both kinds of schools. Although the increase in teachers' numbers was tremendous, it appears that it was more quantitative than qualitative. "Untrained" indicates that the teacher has not even received the basic two or three weeks orientation course on teaching

Table 3.7

Academic Secondary Teachers by Region, Gender and Status of Training 1988/89.

REGION	Female		Male		Both Sexes		Total
	Tr.	Untr.	Tr.	Untr.	Tr.	Untr.	
Northern	104	63	345	210	449	273	722
Khartoum	126	210	505	892	631	1102	1733
Central	150	196	559	410	709	606	1315
Eastern	44	16	297	131	341	147	488
Kordufan	44	73	163	226	207	299	506
Darfur	23	20	164	68	187	88	275
SUDAN	531	588	2390	2129	2921	2717	5638

Source: Educational Statistics Academic Year 1988/89.

methodology. In contrast to developed countries, empirical evidence in developing countries found a positive relationship between the quality and training of teachers and student achievement. The number of untrained staff, however, varies between regions and within regions for female and male members of staff. Surprisingly, Khartoum the centre for most, if not all, the training courses has the highest ratio of untrained staff among females, 62.5% and males, 63.8%; Kordufan ratios of untrained are similarly high. However, female teachers are at a disadvantage in the Central Region and Darfur where the percentages of untrained are higher among them; 56.6% and 46.5% respectively. The ratio of untrained teachers raise serious concern about the quality of education in girls' schools especially in regions where basic facilities and school inputs, at this level, are

inadequate. Research Studies claim that "the evidence suggests that trained teachers do make a difference" (Husen, Saha, and Noonan, 1978). Nevertheless, the overall situation appears to be worsening; in 1984/85 the percentage of untrained teachers was 30.8%; but the ratio among males was more or less the same, 77%. Although regional disparities and disparities among sexes are considered detrimental to any development process, both continued before and after independence in all levels of education, as the above tables show.

It is observed, in respect of the transition rate, that out of a cohort of 282,900 pupils in the first grade primary in 1977, 113,950 reached grade nine in 1985; with a loss of 168,950 or 59.7%. Out of those who completed grade nine, 40.3% of the cohort (68,587 pupils) could secure a place in grade 10 or the first year in senior secondary education, in 1986, 65,899 reached grade eleven, in 1987, and 94,741 reached grade 12 in 1988. The average flow rates within the academic secondary stage were 96.1% from grade 10 to 11 and 143.8% from grade 11 to 12. The high ratio, over 100%, in the final secondary grade was due to the high rate of repetition because of the severe competition for success in the High Secondary Schools' Certificate Examination. The retention rate is improving from 15% for the cohort of 1959, 19% for the cohort of 1968 (NCHE and IIEP Study, 1982) and 33.5% for the cohort of 1977. According to official statistics, the total number who sat for the Sudan School Certificate Examination, in 1988/89, was 112,821 students. Out of these, 62,032 passed the Exam (55%); "of which an estimated 10,000 (and this is an optimistic estimate) found their way to higher education institutions at home and abroad" (El Jack, 1987). The remaining 102,000 would increase the numbers of those seeking employment, but with no technical or vocational skills. Unfortunately, "the educational system and policy ... aims at preparing them for higher education. No consideration is given to the fact that not every one can continue or is able to pursue higher education" (Beshir, 1977).

b) Technical Secondary Education:

According to the International Commission on Technical Training (1966) recommendations, intermediate technical schools were phased out and converted to academic schools and technical schools, at the secondary level, were established. "Diversifying the secondary school curriculum to include pre-vocational subjects has been an educational policy that has flourished over the last decade in many third world countries" (Psacharopoulos, 1985). The Sudan was no exception: diversification of secondary education has been emphasized from 1970; the main goal being to satisfy the manpower requirement of the socio-economic development plans. Technical secondary education is of four years duration after which students sit for the Technical Schools Certificate Examination. "... the extra one year given is not based on the time needed to provide a solid theoretical and practical education in the chosen field of the students specialisation but rather on making it possible to compete in the Sudan Certificate Examination" (El Jack, 1987). There are four types of technical education, namely: industrial, agricultural (exclusively for boys), commercial (available for both) and home-economics (for girls only).

Table 3.8 displays the quantitative development by type of technical education in selected years. Despite the

Table 3.8

Technical Secondary Education: by Type of School, Pupils and Teachers in Selected Years.

Type	1976/77 Sch	1976/77 Pup	1982/83 Sch	1982/83 Pup	1988/89 Sch	1988/89 Pup	1988/89 Tea
Agri.	3	1308	3	1,338	5	1,468	52
Indus.	15	3470	16	6,526	20	7,744	344
Commer.	8	1902	37	13,140	42	13,303	242
H. Eco.	3	717	2	281	2	349	11

Source: Educational Statistic Academic Year 1976/77, 1982/83 1988/89.

importance of agriculture in a developing country like the Sudan, agricultural education is expanding very slowly. Recently, two more schools have been opened but the number of pupils increased by 7.6% over the whole period; an average annual rate of less than 0.7%. During the eleven years (1976/77-1987/88), industrial schools increased from 15 to 19. However, the number of pupils increased at an average annual rate of 14.6% until 1982/83, but continued expanding at the much lower rate of 3.2%. Home-Economics specialization, the only technical education for girls, declined, both in number of schools and even more in number of pupils; total attendance, in 1988/89, was only 44% of that in 1976/77. However, "the fact that secondary education is co-educational only in exceptional cases (52.5% of secondary schools are for boys, 41.6% for girls, and only 5.9% co-educational) limits the participation of girls in streams that are directly employment-related" (Baritsch, 1988). It seems that secondary education for girls is designed to prepare them for higher education; employability of female graduates of this level is not taken into consideration. The official policy of diversification of secondary education calls for the reverse of the enrolment distribution between academic and technical secondary schools from an 85:15 ratio to 15:85 in the long-run. However, even the gradual implementation of this policy is detrimental to the progress of girls access to employment orientated secondary education in industrial or agricultural fields, though females are predominant, in rural areas, in agricultural activities.

Obviously, the only type of technical education that increased tremendously is commercial education. By 1982/83, the number of schools multiplied more than 4.6 times, and of pupils up to almost 7 times. However, as with the trend in general education, by 1988/89 expansion became very limited; average annual growth in school numbers was 2.2% but in pupils' less than 0.4%. It is important to note that this expansion was effected by popular effort, which is concentrated in this type of technical education only; of

the above 24 are government schools, 7 aided and 11 private. The overall number of technical teachers has multiplied since the early 1970s and expatriates have been replaced by Sudanese in almost all disciplines. The aggregation of teachers of all types in the first two periods does not allow for an analysis by individual specialisation.

On the other hand, the policy of "universal technical education" may not be feasible in the foreseeable future as indicated by the extremely low rate of expansion, (Table 3.8) and even the more modest goal of "increasing the number of students enrolled in technical secondary education to 50% of those enrolled in all secondary schools by the year 1995/96" may be remote. The difficulty is not only with financial resources but the age old stigma accorded to technical and vocational education. The educational authorities claimed that measures are taken to "improve the awareness of the citizens regarding the importance of technical education (i.e. trying to induce attitudinal change towards technical education)" (IBE Questionnaire, 1985). Yet the limited development of technical education, and even the decline in its growth, coupled with the reluctance of popular effort to contribute to any type except the commercial sector, project a clear message about the effectiveness of this measure. Other countries in the Arab world have the same difficulty. "Unfortunately, this bias against technical education was reinforced as succeeding generations continued to associate vocational education with low prestige, poor quality and limited job opportunities, such a reputation inhibited the expansion of vocational schools" (Al Zubaidy, 1986).

Furthermore, Psacharopoulos (1987a) found that estimates "rates of return by field of study ... shows that technical education (is) associated with lower returns than the more general subjects - a counter intuitive result that is again due to the relatively high unit cost of technical education". Nevertheless, despite the higher costs per pupil of technical schools compared with those of vocational training centres, the graduates of the latter, contrary to

the former's, in Sudan, "indicate that they were well-trained for their jobs, experienced less than six months unemployment with over 50% requiring less than one month to locate a position, their salaries are higher (£s 175 per month versus £s 125 per month) and are more likely to be working abroad" (Roy and Wolfe, 1985). This confirms Lee's (1985) viewpoint, that, in Korea, the rate of return was highest for in-plant training, followed by vocational institute training and lowest for technical high school training. Roy and Wolfe's (1985) survey of both types of technical training in Sudan found that, "two thirds of the surveyed firms use on-the-job training to either augment their skilled manpower supply or upgrade those coming from technical education and vocational training centres". Lee (1985) argued, rightly, that "inefficient use of public resources occurs when vocational training institutes and technical high school graduates require further in-plant training before they are considered adequate for the job". He noted, in a similar situation to the Sudan, that many LDCs increased the amount of resources for expanding technical education in schools, which may not be the most cost-effective way to train skilled workers. Further, he could write that "those countries with a weak education tradition, and in which the educational attainment of the working class is very low, as in Brazil and Morocco, vocational training institutions established outside the school system are more prevalent".

Psacharopoulos's (1985) evaluation study of diversified curicula in Colombia and Tanzania found, in both countries, that some of the main policy rationales put forward to institute such schools "to improve the fit between the school and the world of work" - or "to stop the one-way street from school to the university" were not supported by his study's findings. He noted that "graduates from both types of schools spent roughly the same amount of time finding employment and in some cases graduates of diversified schools are more prone to continue their studies at the university (surprisingly) studying completely

different subjects e.g. liberal arts". In Sudan El Jack (1987) observed that the dual objective of technical education, coupled with the age old stigma accorded to technical and vocational education, led the students to neglect the technical subjects in favour of the academic ones; access to higher education depends on their performance in these. That resulted in poor academic performance and inadequate preparation for junior technicians. In conclusion, Psacharopoulos warned that "there is one clear instance where diversified schools should not be offered as part of a country's development effort. This is when the country's secondary schools system is very selective and only, say, 20% or less of the eligible population age group attend secondary education. The more developed the country, the more it may be able to afford diversification ... the opposite happens in practice, i.e. the poorer the country, the greater pressure exists for making the secondary school curriculum more relevant to the world of work".

As the issue of an improved and balanced system of secondary education in Sudan is still under discussion and not yet settled, the above viewpoints may guide the decision as to which direction "the proposed new practical orientation of secondary education (would take) ... to serve better the employment readiness needs of its leavers" (Education Project Identification Mission, 1989).

3.4. The Curriculum:

After independence, Bakht-er-Ruda Teachers' Training Institute continued as the sole body responsible for planning, implementation and evaluation of the curriculum for primary and intermediate education. In 1968 a separate section, responsible for secondary school curriculum, was established in the Ministry of Education. "Its functions were to produce ideas and materials to be followed in all schools; the objectives were laid down at the headquarters of the Ministry of Education" (Educational Development, 1982). In 1970, with the implementation of the new

educational ladder, a specialized department for curicula, textbooks and planning was established for secondary education. The main objective was 'Arabization' of the syllabus; new text books were written in the national language. "Civics was introduced as a subject in secondary schools to develop in the students a sense of responsibility, social co-operation and duty towards the world community" (Status Quo in Education, 1985). English was taught as a second language and French as a foreign language. In 1977, it was recommended to merge the units responsible for school curicula in Bakht-er-Ruda and the other in the Ministry of Education into a single department for curriculum development, to integrate the syllabuses of the various levels and avoid repetition and duplication. After the restoration of civilian rule in 1985 curicula and training was accorded a high status; an under secretariat was created for planning the national curicula for all general education levels. Bakht-er-Ruda Institute retains all its previous duties of revising the existing curicula, planning and developing new innovations. Moreover, it is "entrusted with the preparation and revision of text-books, teaching manuals and the selection of teaching aids (and) contributing in research, technical assistance, evaluation and training pertaining to curriculum development" (National Report, 1988).

In spite of the above impressive numerical expansion of schools and pupils, reform in and development, revision and enhancement of the content of Education and curicula are urgently needed at all levels and for all types. The present curriculum, basically academically oriented, as inherited from the colonial rule, bears little relation to the pupils' lives and the needs of the environment in which they live. The first attempt to relate education to society's needs was in the 1930s, when the rural teacher training college of Bakht-er-Ruda was founded and began to relate school work to the needs of the local community. Otherwise, expansion of education institutions continued responding to social demand and immediate needs through

public investment programmes and plans. Interestingly, as early as 1958, the Akrawi Report drew attention to the fact that the elementary school curriculum did not prepare the children for life as individuals, citizens or workers. This Report suggested that this level should not "turn out a skilled craftsman but a more lively, interested and active human being (and) recommended the introduction of agricultural activities in the schools in rural areas and trade activities in the schools of the urban areas" (Beshir, 1969). The crucial role of rural education was emphasized earlier at the continent level. Balogh (1962) noted that "Africa's future depends on a peaceful yet speedy transformation of African agriculture and a rural renascence is inconceivable without a revolution in rural education. The generalisation of the present educational system, far from bringing about a rural renascence, will render it impossible". The Sudan Education Sector Review (1977) noted that practical applied studies were completely ignored at all levels. Hence, it recommended the introduction, at the primary level, of a course in rural studies (rural schools) or industrial skills (urban schools) to ensure for those pupils who do not have the opportunity of proceeding with their studies at the secondary stage vocational preparation related to the needs of the environment which will help them in earning their living. It was recommended that the study would be two periods in the 4th grade, and four in the next higher ones. Furthermore, it suggested teaching rural studies and industrial skills in the intermediate stage to link the school to the environment and its development. "This is done by teaching production operations and methods of protection of crops and livestock ... to encourage in the pupils a respect for this work and an understanding of its human and national importance, so that they may discover their natural inclinations for the kind of work they may later practise in life" (Sudan Education Sector Review, 1977). El Jack (1987) noted that initiation of pupils into technology and the world of work "should be a required

element in curriculum beginning in primary education and continuing through secondary education".

Nevertheless, all these suggestions to give the curicula a practical slant were not implemented and general education remains academically biased, as the weekly time-tables of the different levels (Table 3.9 to 3.12) illustrate. Although practical education was introduced, on an experimental basis, in a number of primary schools to relate education to "productive employment", it was not extended to all schools. However, rural education (for boys) and home-economics (for girls) are part of the syllabuses of primary and intermediate levels. Table 3.9 shows that boys primary schools have one period (40 minutes) per week of rural education from grade four to six; the rest of the time, over 30 periods in each case, is for theoretical studies. In girls' schools, two periods from grade three on for home-economics are quite adequate, if used for this purpose instead of revising examinable subjects. At the intermediate stage, Table 3.10, rural education is raised to two periods of 40 minutes per week for each grade out of 42 periods; only 4.8% of the total. The time devoted to home-economics is similar to that in primary schools, industrial training is not an option; indicating the priority given for practical subjects. On the other hand, in academic secondary even "science is taught in a theoretical way because of lack of laboratories, equipment and essential materials in most schools" (Sudan Education Sector Review, 1977). Home-economics periods, in the absence of a specialized room and the necessary equipment, are frequently used for revision of other subjects. The quality and relevance of education, starting at the first level, has been a matter of serious concern, as reflected in the Fisher Report (quoted in El Jack, 1987), "... inadequate attention given to include science, technology, mathematics and manual skills in the curicula has contributed to perpetuating the traditional stigma accorded to the pursuit of technical rather than academic education in the post primary level". However, a

Table (3.9)

THE WEEKLY TIMETABLE FOR THE PRIMARY SCHOOL

Subject \ Grade	1	2	3	4	5	6	
Religious Education	4	4	4	4	5	5	Periods
Arabic Language	10	10	10	10	9	9	"
Mathematics	6	6	6	6	6	7	"
Science & Health Education	-	2	2	3	4	4	"
History	-	1	1	1	2	2	"
Geography	-	-	2	2	2	2	"
Physical Education	2	2	2	2	2	2	"
Rural Education	-	-	-	1	1	1	For Boys
Arts Education	2	2	2	2	2	2	"
Home Economics	-	-	2	2	2	2	For Girls
Total No. of Periods for Boys	24	27	29	31	33	34	178
Total No. of Periods for Girls	24	27	31	32	34	35	183

Table (3.10)

THE WEEKLY TIMETABLE FOR THE INTERMEDIATE SCHOOL

Subject \ Grade	1	2	3
Religious Education	4	4	4
Arabic Language	9	9	9
English Language	9	9	9
Mathematics	6	6	6
Geography	3	3	3
History	2	2	2
Science	4	4	4
Civics	1	1	1
Arts	2	2	2
Home Economics & Rural Education	2	2	2
Total No. of Periods	42	42	42

Table (3.11)

THE WEEKLY TIMETABLE FOR THE ACADEMIC SEC. SCHOOL

THE 1ST TWO GRADES

Subject \ Grades	1	2
Religious Education	3	3
Arabic Language	6	6
English Language	6	6
French	4	4
Mathematics	6	6
Biology	2	2
Physics	2	2
Chemistry	2	2
Geography	3	3
History	3	3
Arts	3	3
Physical Education	1	1
Civics	1	1
Total	42	42

Table (3.12)

THE WEEKLY TIMETABLE FOR GRADE 3 SECONDARY ACADEMIC EDUCATION

Compulsory Subjects		2 <= No. of Optimal Subjects	<= 5
Subject	No. of Periods	Subject	No. of Periods
Religious Education	3	Mathematics	4
Arabic Language	8	Biology	4
English Language	7	Physics	4
Elementary Mathematics	7	English Literature	4
		Chemistry	4
		History	4
		Geography	4
		French	4
		Arts	4
Total No. of Compulsory Periods	25	Total No. Depends on No. of Subjects Chosen	

A Pupil has to choose at least two subjects and at most 5 subjects.

comprehensive school type was suggested to fill this gap as the "relationship in them between theoretical and practical courses is established and an end is put to the practice by which the student is compelled to accept technical education after failure to enter an academic school. They will encourage students to enter fields of practical education with a true desire based on personal ability" (Sudan Education Sector Review, 1977).

3.5. Administrative Structure of Education:

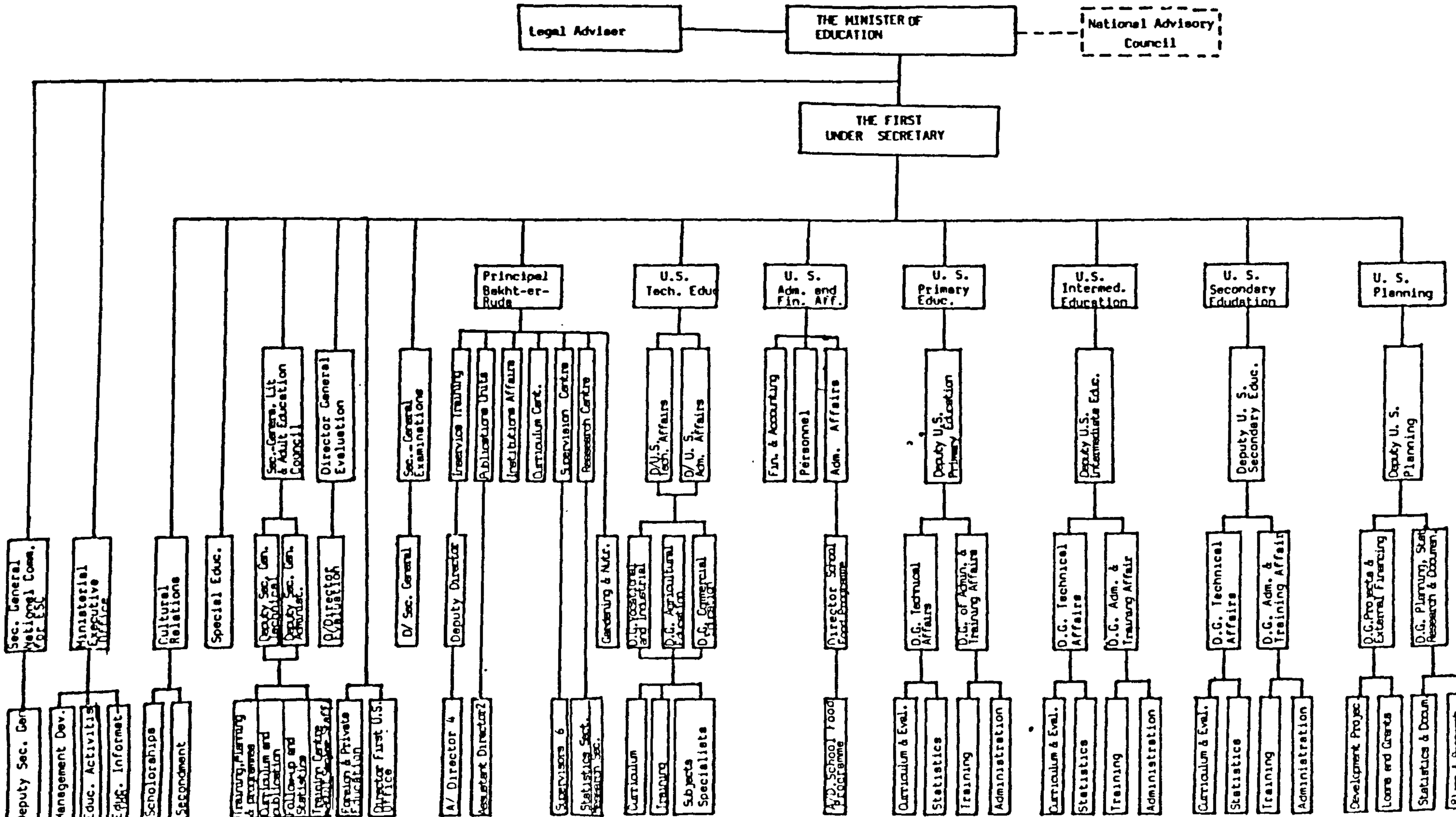
The Educational administration system has undergone many changes since independence as a result of political re-organisation and/or extensive expansion of facilities. The most significant is the Regionalisation Act (1981) that instituted regional governments with wide powers. This Act delegated all the responsibilities of general education - except technical education - beside other services, to the regional governments. Hence, the Central Ministry of Education is entrusted with the following main functions:

"- setting the educational policies, plans and programmes within the framework of the general policy of the state.
- curriculum development in accordance with the set aims and objectives.
- administration of technical and vocational education.
- training of teachers at all levels.
- co-ordination between the regions in all issues that are related to the educative process so as to achieve harmony, rather than disparity, between the local systems and the national system.
- establishing co-operative and mutual relations between international, regional and sub-regional educational organisations" (National Report, 1986). Figure (3.2) displays the administrative structure at the central level and the major departments and sections.

At the regional level, however, further decentralisation followed. Historically speaking, "the provinces have been responsible for primary education since

Figure (3.2)

The Structure of the Central Ministry of Education



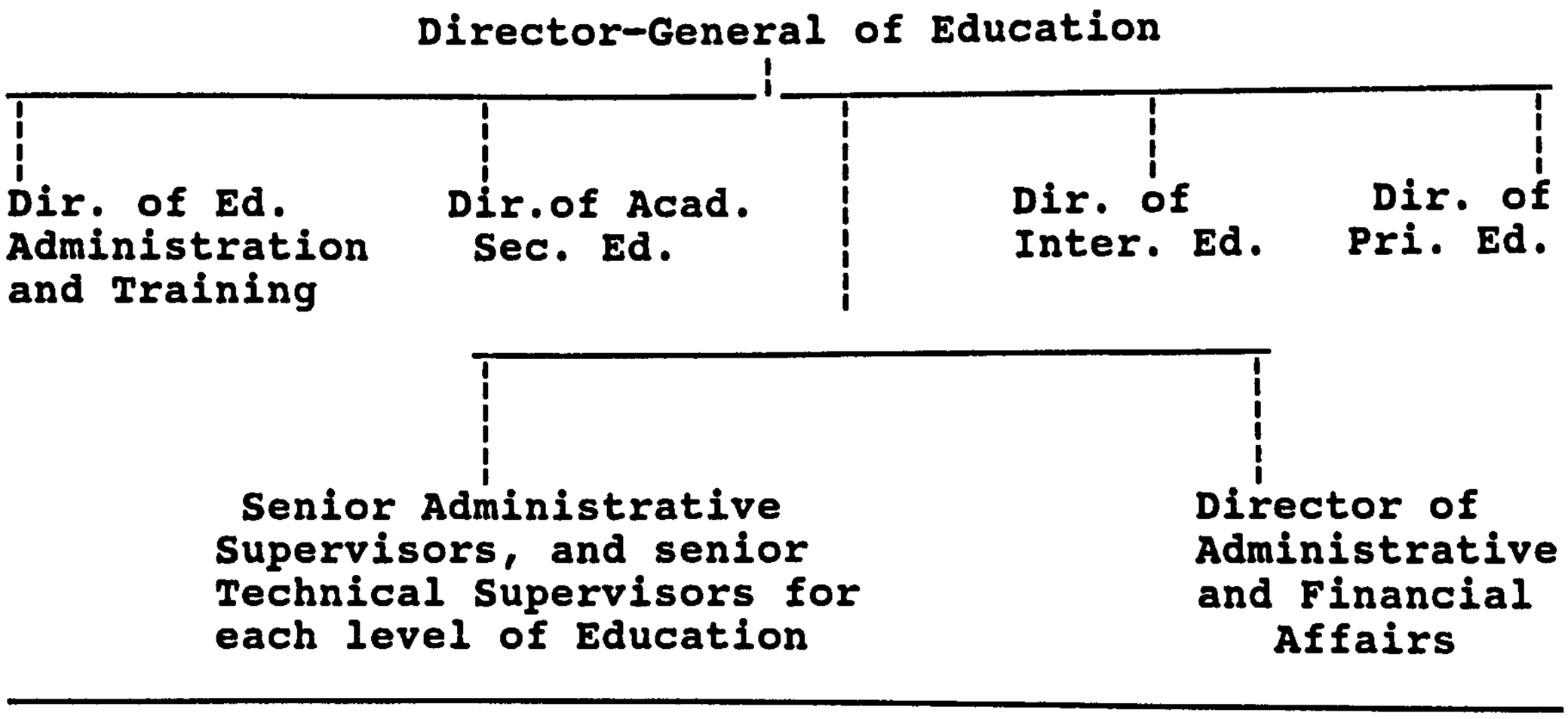
U. S. = Under Secretary • Subordinate Staff and Section not Shown .

the 1940s, followed by the intermediate level in the early 1960s and the academic secondary education in 1973 due to the introduction of the People's Local Government Act 1971" (Abbas, 1982). The Regionalisation Act of 1981 gave the Regional Minister of Services (or Education in some cases) the responsibility for general education, i.e. primary, intermediate and academic secondary, in his region. Regional ministers of services (Education) are responsible for day to day administration of Education in their regions, which include intake of pupils, supplies, building and maintenance of schools, staffing, administrative and instructional supervision, etc.

The Director-General of Education in the region is the executive head of the regional education administration, Figure (3.3). He is directly responsible to the Regional Minister of Education in all matters pertaining to finance and administration, and to the Central Ministry of Education in matters related to the technical aspects of education. Planning and statistics units were established at the regional educational offices to ensure co-ordination in educational planning, through the flow of information between these units and the Central Planning Directorate in

Figure (3.3)

Administrative Structure at the Regional Level



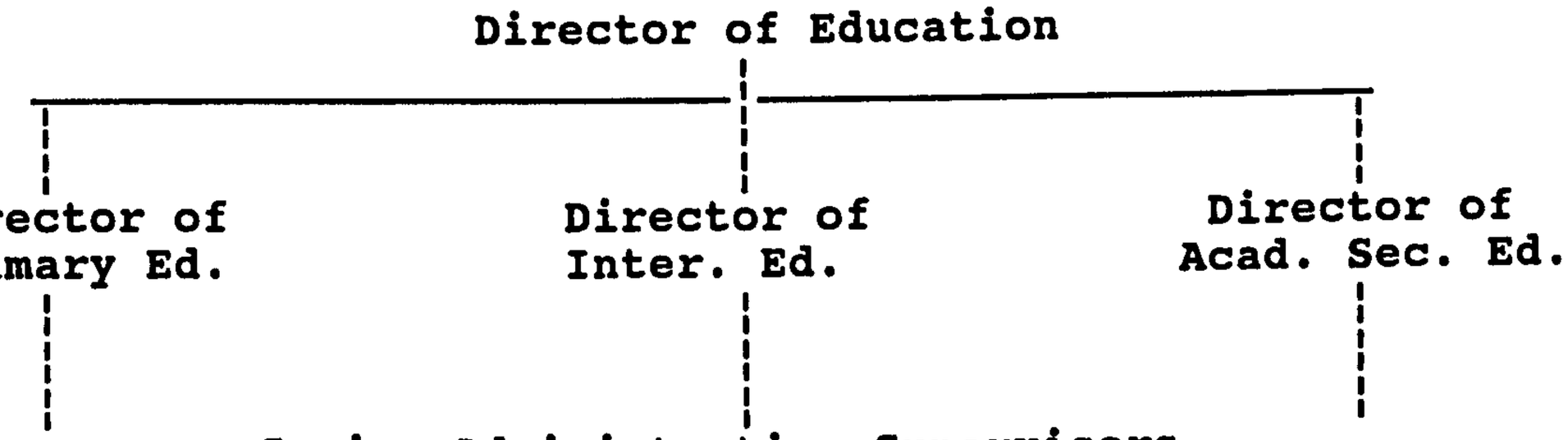
Source: National Report, 1986.

the Central Ministry of Education. Experience revealed that this is easier said than done, "in other words, the infrastructure must exist at the local level for decentralisation to be viable. These procedures and others all demand considerable technical and professional expertise" (IIEP Seminar, 1977). Academic secondary education is the direct responsibility of the Director of Education in the region.

Each province in the region has a director for education heading the provincial office for education, (Figure 3.4). At the provincial level academic secondary education is the direct responsibility of the Director of

Figure (3.4)

Administrative Structure At The Provincial Level



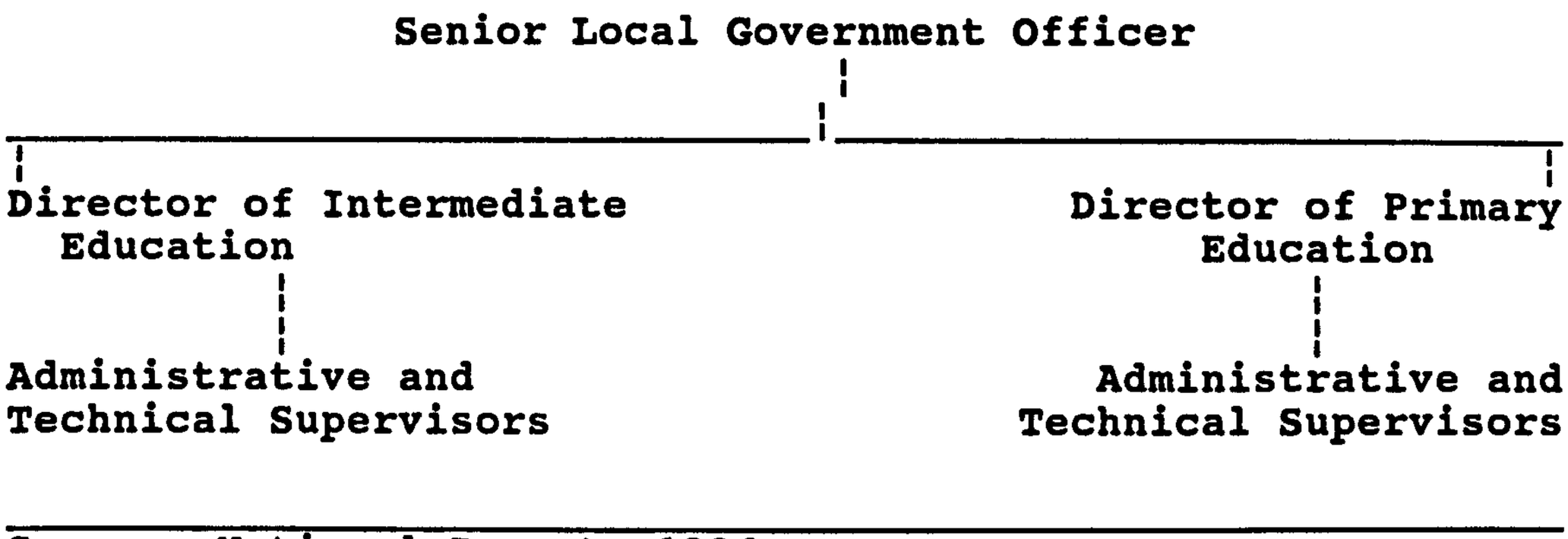
Source: National Report, 1986.

Education in the province, while technical secondary education is the responsibility of the Central Ministry.

Under this director is the local district administration which is responsible for education at the primary and intermediate levels. At district level, the senior local government official heading the office is responsible financially for education and all the other local services (Figure 3.5). In the absence of trained staff in regional planning at this or even the higher levels, it is not possible to expect adequate data on education expenditure by level or heading. That may be

Figure (3.5)

Educational Administration At The District Level



Source: National Report, 1986.

attributed also to "the lack of effective rules and provisions which govern the responsibilities of the regional development unit..." (The Four-Year Programme, 1988).

3.6. Finance of Education:

Educational costs increased in the last decade and reached a ceiling which hindered its expansion and development. The escalating trend of prices and the increasing social demand for education, combined with the high percentage of population growth (2.8% in 1983), in the prevailing economic situation, limited the realization of planned goals. However, it is important to delineate the internal and external bodies which finance general education. These are, mainly, the following:

1 - Central Government: Up to date, detailed, actual expenditure on education by level and heading is not available since the implementation of the Regionalisation Act (1981). Prior to that, in 1980/81 the general education recurrent expenditure budget was £s 6,651,550. It consisted of two sections:-

a) Salaries, wages and allowances (conventionally known as Chapter One) was £s 3,951,021.

b) Services, transport, minor equipment, supplies and maintenance (known as Chapter Two) was £s 2,562,734.

In addition to that, capital or development budget (Chapter Three), mainly, expenditure on buildings construction, furniture and equipment, was £s 11,864,416 including foreign currency which amounted to the equivalent of £s 8,674,000. A substantial share of this budget was for technical education, which is the responsibility of the Central Government.

2 - Regional Governments: According to the Regionalization Act (1981), the regions retain the responsibility of the day to day administration of general education and consequently, that power is delegated to their administrative units at the lower levels. The Central Government distributes "block grants" to the regions; that is "general grants since they are not earmarked for any specific service and leave local decentralised bodies some discretion over their precise allocation" (Crispin, 1977). As the philosophy of decentralization aims at decreasing dependence on central support, the regions are supposed to develop their own resources to supplement these grants. However, many problems contributed to their inability to achieve such an objective, not least the lack of trained "technical staff required to handle the responsibilities of the people's councils and regional planning units" (The Four-Year Programme, 1988). Table 3.13 shows the Central Government increasing appropriations to the regions over the last decade. Although regional governments have been delegated wide powers, the financial aspect was overlooked and they are highly dependent on central subsidies; an average of 80% of their total expenditure in 1989. The regional appropriation for the services sector included, beside education, health, housing, police and prison services. Thus education at the local level has to compete with the other sub-sectors for the available limited resources, whatever the priority of the national government.

3 - Local Councils: Earlier, before the Local Government Act (1981), decentralization (in 1973) transferred the responsibility of general education to the local councils at the provincial level. Thus the local authorities levy local

Table 3.13

Central Government Grant-in-aid by Region, 1980/81 - 1989/90 (£s Million)

YEAR	Cent.	Khart.	North.	East.	Kord.	Darf.	South	Total
80/81	41.9	25.5	27.9	16.4	24.2	21.8	40.0	197.6
81/82	63.2	36.8	40.7	27.6	36.6	29.8	48.0	282.7
82/83	66.0	24.5	45.5	33.5	43.5	34.0	52.0	299.0
83/84	72.0	31.1	52.0	37.1	47.5	38.0	58.0	335.7
84/85	76.0	61.0	55.0	40.0	50.0	40.0	65.3	387.3
85/86	86.9	96.1	55.0	41.5	63.1	40.0	65.3	447.9
86/87	205.7	131.5	118.3	105.2	132.1	114.0	196.5	1003.3
87/88	234.9	136.8	136.9	116.3	164.8	135.1	244.0	1132.8
88/89	296.5	152.3	174.9	148.1	196.6	169.0	283.2	1420.6

Source: Economic Survey, Economic Under-secretariate, Ministry of Finance and Economic Planning, 1989/90. Khartoum, Sudan.

taxes and mobilize self-help, in addition to their own revenues, to establish and expand educational buildings and schools. Table (3.14) shows that the recurrent budget of

Table 3.14

Local Government Councils' Recurrent Budget for General Education 1980/81 (£s Million)

Level	Chapter 1	Chapter 2	Total
Primary	23,073,185	34,058,068	57,131,253
Intermediate	14,655,835	10,631,661	25,287,496
Academic Secondary	7,290,135	6,812,606	14,102,741
Total	45,019,155	51,502,335	96,521,490

Source:- Central Government Budget 1980/81, Ministry of Finance and National Planning, Democratic Republic of Sudan.

the local councils for the three levels of education in 1980/81 (the last budget before the Regionalization Act) amounted to £s 96 million. Primary education total recurrent budget was £s 57 million, 59.2% of the total; due to the huge number of schools at this level, compared to those at higher levels and the high priority given to this basic education. Intermediate and academic education budgets constituted 26.2% and 14.6% of the total budget respectively. It is noticeable that at higher levels, the share of personnel costs (Chapter One) dominate total recurrent expenditure. It indicates that education is a labour-intensive activity; a commonplace phenomenon in developing countries.

4 - Self-help: Unfortunately, there is no accurate statistical information about this source but the Educational Sector Review showed that 1% of the general education budget in 1975/76 was contributed by self-help.

5 - External Aid: This includes cash money, equipment, food, scholarship and text books. The donors are sisterly and friendly countries, regional and international organizations, e.g. UNESCO, ALECSO, A.F.E.S.D., O.A.U., World Food Programme, UNICEF, E.E.C., etc.

6 - Egyptian Schools: The Egyptian government finances the establishment and running of schools in the three levels with a small contribution from the Ministry of Education.

7 - Loans: These come from sisterly and friendly countries and the regional and international organizations, especially the World Bank. The World Bank financed three educational projects and a fourth is on the way. It supplied the foreign currency component and technical assistance while the Sudan Government contributed the local component. The first project (1968) total cost was US $15.4 million; 8.5 million from the Bank and the equivalent of 6.9 million in local currency. It established teachers training institutes for academic secondary and intermediate levels and improved the facilities and supplied furniture, equipment and books for 13 academic schools. In the second project (1975) the Bank contributed US $10 million of the total cost of 18.31

million, West Germany donated an equivalent of US $600,000 in tools and equipment, and the remainder was the Sudan's share in local currency. This project emphasized basic education for children and adults in the most deprived areas through integrated rural education centres (IRECs), vocational training, and related teachers' training and curriculum development. The third project (1984) concentrated on raising the internal efficiency of general education, improving technical and vocational training, technical teachers' training and upgrading of educational planning and management. Attention is focused, in the fourth project, on improving local administration at the regional and district levels, quality of education through curriculum development and related teachers training and school inspection, and educational planning and management.

8 - Ministries and Departments: Some of these, like social affairs and labour departments, have some educational activities which are financed from their own budgets.

9 - Self-Financed Institutes: Some Educational Institutes derive some revenue from school registration fees or selling their products.

From the above it is clear that the Central and Regional Governments' budgets for education amount to a high percentage of the total expenditure on education. The study of costs and finance of education (1982), crudely estimated public expenditure on education as 99% of the total. Thus educational expansion and promotion is strictly linked to the general economic conditions of the country. Hence, the economic recession, in this past decade, and the difficulty of recovery which led to high inflation, as mentioned earlier, influenced, greatly, the educational development budget. The suggestions proposed by the Ministry of Education, which reflected the basic needs, were constantly scrutinized and pruned by the Ministry of Finance and National Planning. Then, mainly because of liquidity shortages, actual expenditure was always below what was officially approved.

3.7. Expenditure on Education:

Although there are a large number of aided and private fee-charging schools at all levels, education is the government responsibility, provided free, except for voluntary contribution by pupils' families and the local communities. The government not only finances public education and aided some community schools, but also provides it in schools and institutions that are publicly run and closely controlled and supervised. Psacharopoulos (1985) observed that "as any other public enterprise, where incentives are lacking and accountability is difficult to establish, such involvement leads to further inefficiencies in education". As Table 3.15 illustrates, educational expenditure has been increasing, in absolute terms, since independence. It multiplied almost sixty-two times, over the whole period; relatively less than the total government expenditure, seventy-eight fold. Although during the first period the rate of increase in education expenditure was below the government's, it continued more or less at the same rate. However, in the absence of an educational price index it may not be possible to deduce whether there is a positive rate of growth or otherwise. As a ratio of

Table 3.15

Educational Expenditure as a Percentage of total Government Expenditure in Selected Years(£s)

Year	Ed. Exp. (1)	% inc.	Govt. Exp. (2)	% inc.	% 1/2
1958/59	9,372,863		49,562,123		18.6
1968/69	24,522,580	16	163,697,124	23	11.2
1978/79	135,637,527	45	861,929,702	43	15.7
1983/84	326,760,000	28	2,178,400,000	31	15.0
1984/85	377,063,250	15	2,513,755,000	15	15.0
1985/86	579,536,550	54	3,863,577,000	54	15.0

Source: Education Statistics Academic Year 1979/80 for the first three years and the National Report, 1986 for the latter three.

government expenditure, education's share loomed high in the 1950s and the early 1960s but by 1968/69 it declined sharply, from 18.6% to 11.2%; though in monetary terms its average annual rate of growth was 16%. In 1978/79, it increased to 15.7%, before the financial stringency worsened, and expenditure on educational services remained stagnant at 15% in the ensuing period. In the absence of more recent detailed cost data, Table (3.16) displays the pattern of the budgeted expenditure by components of the total unit costs per pupil, including the administrative

Table (3.16)

Estimates of Recurrent Budget of Academic Senior Secondary Education (1975/76)- Northern Provinces (£s)

ITEM	Unit Cost/ Pupil	% of Total Cost	Total Cost
PROVINCES HEADQUARTERS:			
Wages & Salaries	6.95	4.64	378,203
Services	1.44	0.96	78,638
Total	8.39	5.60	456,841
SCHOOLS:			
Teachers & Salaries	88.90	59.38	4,839,157
Administration	15.00	10.01	822,529
Books	4.94	3.30	368,486
Equipment	2.20	1.42	119,486
Maintenance	2.22	1.48	120,812
Transport	1.95	1.30	106,172
Services	1.62	1.08	88,124
Miscellaneous	1.35	0.90	73,613
Total	118.18	78.87	6,538,379
BOARDING:			
Wages & Salaries	5.04	3.37	374,555
Food	16.08	10.72	774,630
Services	2.00	1.34	109,130
Total	23.12	15.43	1,258,315
GRAND TOTAL	149.69	100.00	8,253,535

Source: Sudan Education Sector Review, 1977.

costs at the provincial headquarters and at the school level. Interestingly, at both levels, personnel salaries and wages consumed the lion's-share (75.7% of per pupil costs). At the time, boarding facilities was, also, an important component of public secondary education but it constituted only 18.3% of a day-pupil's total costs, £s 126.75. It is important to note that there is a large discrepancy between budgetary allocation and actual expenditure. The difference is accounted for by "the declining level of implementation in this sector in general. Liquidity constraints and poor executing capacity were the main factors responsible for this deteriorating level of performance" (The Four-year Programme, 1988). This serious constraint bedevilled any attempt to study levels of resource utilization and all meaningful analysis of education expenditure for effective planning and management of resources. The World Bank (1990) reported that, "A further problem one encounters in trying to analyze government expenditures in Sudan is that data on actual expenditure is not available, as finalization of accounts has fallen seriously behind".

Nevertheless, it is important to note that there are other unforeseen expenditures on education which are not recorded; for example, the cost of the school site which is given free and could have been bought or rented. Moreover, the opportunity costs of pupils' time (which constitute a substantial amount) was not included. In the Sudan, as in other developing countries, child labour is demanded and contributes to the household income and support, not only at the secondary level but even at the primary stage; it needs to be studied and included to understand the true costs of education for the poor household.

3.8. Educational Development Planning:

Historically, the Department of Education had always drawn up development projects and programmes, even during the colonial era. Those projects were limited in scope and did not take into considerations the general educational

situation as well as being out of line with the conditions and needs of the country and the aspirations of its people.

Since independence, many attempts had been made to reorganize and develop the educational system. In most of these attempts the help of international bodies, mainly UNESCO, was sought. Moreover the Sudan participated in many regional and international conferences and seminars for the development and improvement of education. Educational Planning has been adopted to achieve better utilization of already scarce and limited resources. However, three education development plans were adopted in the post-indepedence era and claimed to be integral parts of the national socio-economic plans; each is evaluated, below, briefly.

The first was the Ten-Year Educational Development Plan, 1960/61-1970/71, which was integrated, for the first time, into the National Socio-Economic Ten-Year Plan. This Plan aimed to expand education and improve its quality in order to accelerate the socio-economic development of the Sudan. To fulfil this function the Plan stated the following specific targets for general education:

"1 - The most important target was the recommended new educational ladder. The Ten-Year Plan for Educational Development clearly stated that "... the present educational ladder is to be abolished and replaced by a new one consisting of three stages, viz. a primary level of 6 years followed first by a general secondary of four years and further by a senior secondary of 4 years. Thus the period of general education preceding the university will be 14 years".

2 - To achieve the adequate development and sufficient expansion of general education, the Plan proposed the following changes:

a) at the primary level all the sub-grade or junior elementary schools should be up-graded to full elementary schools. Then all the elementary schools would be up-graded by 1970/71 to full primary schools of 6 years as the new

ladder demanded; the enrolment will increase to 30% of the age group.

b) expansion at the general secondary level: all the intermediate schools should become general secondary schools giving a four year course; the recommended enrollment would be 4% of the age group.

c) expansion of the senior secondary level: all intake to these schools should be after completing the general secondary schools to be given a three year course leading to the Sudan School Certificate. The fourth year would substitute the preliminary year in the university; the rate of enrolment would be 2% of the age group".

Evaluation of the Ten-Year Educational Plan:

However, the main framework upon which the Educational Plan was built, the new educational ladder, could not be implemented. It could not be adopted because of practical, as well as economic, difficulties, as mentioned earlier. This new ladder proposed vocational education as part of the curicula of the three levels. As it was not implemented, the Plan failed to give the educational system a practical bias, therefore continuing the dominance of purely academic education and technical education was not popularized. Even those forced into the vocational schools because of shortage of academic places concentrated on academic subjects to find employment in the modern sector and escape "blue collar" and agricultural occupations. Consequently, the Plan did not introduce a major qualitative change in the school curriculum to make it relevant to the child's own environment. In fact nothing was done to break down the prejudice against manual work or to encourage children to undertake it. Although the Sudan, by all measures, was then an agricultural and pastoral country and about 92% of its population were living in rural areas, activities related to the environment were ignored. The conclusion was that the "school curriculum did not include the development of practical skills to create a disposition in children towards manual work, and a respect for labour, thus it was not

conducive to the economic and social development of the country".

Moreover the Plan proved to be modest by local as well as international standards. Nevertheless, the lack of accurate detailed cost data of the educational system led to under estimation of the Plan's costs, estimated at about £s 60 million. A re-calculation of the costs by the Unesco Educational Investment Programming Mission (1960), which was invited to establish priority requirements in the educational field, showed that the Plan's costs amounted to £s 150 million; the costs of the three levels of education alone being more than £s 98 million. In spite of all these, financial stringency resulted in the reductions of even these underestimated costs by about 50%. These drastic reductions were only in terms of money, while the set targets continued without any revision or adjustment to suit the new situation. Educational planning was not employed to make the best use of the scarce available resources; very little was known about utilization of the already committed physical and financial resources.

Nevertheless, there was a rapid expansion, both in the number of schools and pupils enrolled; it even exceeded the Plan's target at the elementary level. However, the effects of the increase in the number of places were minimized because of insufficient, unqualified teachers, lack of suitable school buildings and financial resources. Also, in spite of the high rate of overall enrolment, girls' education was not emphasized. Historically speaking, girls' education was not promoted by the colonial rule and national efforts was initially discouraged in this field. Prior to the Plan, girls' enrollment was particularly low. Despite this, the Plan provided only two sevenths of the new primary schools for girls and less than one-third of the new junior and the new high secondary schools. However, the Plan was discontinued, as happened to its integral part, the National Socio-economic Plan, in October 1964, and its quantitative targets continued to serve as general guide lines for further expansion.

In the second plan, the Five Year Educational Plan, 1970/71-1974/75, priority was given to the education of the masses. The new slogan under which the Plan was formulated was "Education for Employment" and this influenced the set objectives. The Plan adopted a new educational ladder which changed the educational system to a six year primary stage, three year general secondary stage and a three year high secondary stage. This last stage would consist of two sections: an academic section and a technical and vocational section. The technical section would include various technical schools with architecture on the list, agricultural schools, veterinary schools, sanitary schools, commercial schools, teacher training institutes and womens' colleges for Home Economics, social services and hotel administration. The curriculum of the vocational and technical schools was to be modified and linked to the economic plan and the labour market conditions. Technical education would be improved, expanded and diversified to meet the manpower requirements of the integral socio-economic plan; 40% of the high secondary education would be reserved for technical and vocational education. The remaining 60% would be allotted to academic education. School leavers at the end of the primary and the general secondary stages who might not be able to join the next higher stage would be absorbed in the vocational training centres which would be founded in collaboration with specified ministries. National industries schools would be established to train skilled labourers in textiles, shoe making, etc. Education would be a type of economic and social investment aiming at developing human resources by qualifying professionals, administrators and planners needed for national development policies.

To achieve these objectives the following targets were defined: 1) the plan aimed at increasing the enrolment of pupils in all stages of education. The number of pupils in primary schools would increase from 697,700 in 1969/70 to 1,195,000 at the end of the Plan period, with an increase of 71.3%. This meant that the rate of enrolment would be

increased from 48% in 1969/70 to 54.3% by the end of the Plan. The Plan aimed at increasing the number of pupils in junior secondary schools (intermediate) from 63,000 at the beginning of the Plan to 98,000 by the end of it, an increase of 35.5%. At the high secondary level the increase would be 40.3%. The number of pupils in the academic streams would be 37,000 compared to 22,100 at the beginning of the Plan.

2) The Plan approved sixteen new streams for primary schools teachers' training.

3) Technical education would be expanded and diversified.

4) The Plan aimed to increase the number of those attending literacy classes from 64,000 in 1969/70 to half a million by 1975" (The Five-Year Plan for Educational Development, 1970).

The approved Plan aimed generally at a higher rate of enrolment in primary education, a low enrolment at the high secondary level and an even lower enrolment at the junior secondary level. This policy was defended on the belief that access to primary education should be expanded as widely as possible because it might be the most that the majority of children could aspire to in that decade. Senior secondary education should be expanded, but within limits, since it is the source of a workforce with the skills and knowledge to participate in and promote socio-economic development. But the junior secondary is an in-between level. It neither gives basic education for the masses nor produces qualified, trained manpower.

Evaluation of the Five-Year Educational Plan:

This Plan was faced with financial difficulties from the start, which greatly restricted the expansion of education. Its estimated cost was £s 58,623,150, but the allocated budget for its execution, was only £s 12 million. This sum was not sufficient to support the already established institutions. Thus a serious hindrance to educational expansion and the new system was caused. "Self-help" efforts were sought as an alternative source of financing and were estimated to raise 50% of the cost of

primary school building (£s 6,784,205) and 50% of the cost of junior secondary school building (£s 6,779,875); a total of £s 13,564,180, whereas the total needed for development was £s 30,249,127. After seeking all possible means for reducing expenditure, the Plan still had a deficit amounting to 50% of its financing cost. "This is a serious constraint, not only for future expansion of education but for the continuity of the then existing educational system regardless of any improvement in its quality or its diversification"

As mentioned above the Economic Plan, in its published form, was not implemented and the Educational Plan, which was part of it, did not stand a better chance. This Educational Plan was, like the socio-economic plan (of which it was an integral part), more comprehensive and relevant. It related educational expansion to manpower requirements for the first time, at least in theory. However, in the Five-Year Plan "the Manpower and Personnel chapter consists of a series of loose conflicting statements on probable levels and rates of growth of employment without any attempts to disaggregate prospective supply and demand for different types of skills". In neither the Ten-Year, nor the Five-Year Plans was there an accurate projection of the development needs of the different sectors of the economy and reliable estimations of what would be available did not exist, so there was never any scientific way of matching the supply of graduates of different levels with the future demand. Neither Sudanese development plan included a section for human resources, so educational expansion was haphazard and was not directed towards development objectives; which constrained a better utilization of already scarce resources.

Thus the rate of enrolment increased slightly at the primary level, decreased at the high secondary level and fell to about half the proposed rate at the junior secondary level. The intake in first primary in 1975/76 (the end of the Plan) was 45.8% and the rate of enrolment in primary schools was only 39.1%. In high secondary schools, the rate

of enrolment, which was 46.9% at the start of the Plan, declined to a low of 37.8% by its end. This would not even satisfy the roughly-estimated manpower needs, not to mention the actual ones.

Technical education, which was supposed to be expanded, diversified and developed, was crippled by the Plan itself. The vocational centres, for those who were not able to join the next higher level (an important target which the Plan aimed to achieve) were cancelled.

Moreover the curriculum did not include any work to teach children practical skills and initiate a respect for manual work. Thus the prestige of technical education was not enhanced and all attempts to 'ruralize the curriculum' of primary schools and make it more relevant to the pupils' environment antagonised the pupils themselves, as well as their parents.

By the end of this Plan period it was calculated that the main constraints hindering expansion and promotion of education were the meagre resources available and the huge burden such development imposed on the educational budget.

In 1977 the first serious steps taken towards the development of education were the recommendations of the Education Sector Review launched in 1977. This comprehensive study of the Education Sector recommended more sophisticated planning approaches to maximize utilization of available resources to reduce the ever increasing cost of education. The quantitative, non-analytical planning that had prevailed since independence proved to be unsatisfactory. Thus the strategy was to develop and strengthen the planning methodology in the Central Ministry of Education and to establish planning units in the regions and provide them with qualified staff. This was a necessary step as enrolment ratios continued to expand and claims on public resources had greatly increased. The Review formulated a long-term strategy aimed at 100% intake ratio of children aged seven by 1990/91. This meant an increase in intake ratio in first grade of primary schools from 45.7% in 1975/76 to 84% by 1990/91. Thus it was programmed that the

ratio of children enrolled in all grades of primary schools to those in the relevant age group (7-12) would be as follows:

1975/76	1980/81	1985/86	1990/91
45.7%	56%	68%	84%

The strategy was phased for implementation and the first phase was the Six-Year Plan for Educational Development 1977/78-1982/83. This Plan was formulated as an integral part of the Six-Year Plan for Socio-Economic Development, to implement the first phase of the long term perspective plan, guided by the newly-adopted educational development strategy. The main objectives of this educational development plan were:

1) to universalize primary education (the basic education) and to expand the next highest levels according the the needs of the socio-economic development, while trying to expand education in deprived areas.

2) Diversification of secondary education to fulfil the manpower requirements of the socio-economic plan in the agricultural, industrial and services sectors.

3) Democratisation of education and guarantied freedom of access to all levels, to all capable individuals and to minimize the wide gap between the two sexes in education.

4) Eradicate illiteracy and minimize relapses into illiteracy by directing drop-outs and educational wastage to vocational centres according to their readiness and capabilities.

These objectives were broken down into specific targets:

1) to increase intake ratios of children aged 7 from 39.1% to 75% and hence total enrolment from 35.5% to 60% of the 7-12 age group.

To achieve this target by 1982/83, the end of the Plan period, 55.5% of the total development budget of Education was allocated for primary education as Chart (1), below,

explains. Primary school forms were to be diversified according to the following percentages:

53% traditional schools
29% double-shift schools
13% complementary schools
5% alternate admission schools

2) Establishing of 260 junior secondary schools, which is the expansion in intermediate schools necessitated by universal primary schools according to the norms (the norm is one new intermediate class for every four primary schools).

3) At the high secondary level the transition rate from intermediate will be 50%. To implement the long-term strategy of secondary diversification will imply admission of 50% of those enrolled in first year secondary in various types of technical schools, according to manpower needs. The other 50% will be admitted in academic secondary and teachers' training institutes for both primary and intermediate levels; the comprehensive school experiment will be expanded.

3) Eight vocational centres will be opened to absorb part of the drop outs to qualify them for fruitful employment.

4) To finance the campaign for eradicating illiteracy and, in support, six centres for nutrition education will be established.

5) Secondary schools' libraries are to be established.

6) Teachers' houses project - 269 houses in different parts of the country - to solve the teachers' housing problem.

Evaluation of the Six-Year Educational Development Plan:

As an integral part of the Socio-Economic Development Plan, this Educational Plan has been formulated after a careful, reliable study of the status quo in the educational field. It was designed as phase one in a long-term strategy for educational development and promotion but, because of meagre resources, out of the 5466 planned primary schools, only 1284 were established. Thus, until 1981/82, 2216 traditional, 1213 double-shift, 209 alternate-admission and 544 complementary schools could not be built. This

happened, irrespective of the fact that the main objective of this Plan was to mark the first step on the way to universal primary education and to ensure equity of access and success for all children in all regions.

The investments of the Six Year Plan in the Education Sector, General Education New Projects, was over £s 52 millions, in addition to over £s 3 millions in foreign currency. But the suggested educational development budget, which represented the financial needs for educational expansion, was always scrutinized and pared down during the last decade. Even the approved budget, during this period, could not be spent on school buildings and facilities as liquidity presented a serious problem. Although a primary school establishment was spread over six years, construction budgets were completely cancelled in some years (1977/78, 78/79, 79/80) and only funds for consolidating already established schools were actually spent. Moreover, the initial establishment cost of each form of school in 1977/78, the beginning of the Plan, more than doubled three years later in 1980. This was true for the primary education as well as the other levels and educational facilities. Self-help contributed to educational expansion at the secondary level, establishing 60 new streams in academic secondary - contrary to the Plan, which was in favour of technical education expansion. Complete projects, essential to educational development, were cancelled because of shortage of finances; among them educational centres for training drop-outs of different levels in various trades.

Although this Educational Development Plan was integrated in its counterpart, the Socio-Economic Plan, and the manpower requirement section was carefully and scientifically calculated, financial constraints forbade its fulfilment. The curriculum continued to be academically orientated and technical education expansion could not be achieved; the planned semi-skilled, skilled labourers and the professional and managerial staff and technicians needed by the different sectors could not be guarantied. Thus, in spite of the known needs in different specializations and

the calculated difference between demand and supply in different professions, nothing could be done.

Costs of buildings, furniture, text books and equipment represented a serious constraint for school establishment and education expansion. Thus the Six-year Educational Development Plan targets could not be realized and the long-term educational strategy could not be implemented.

In 1982 a "National Conference" on Education was held, to discuss various aspects of implementation, taking into consideration the national economic conditions and constraints. This National Conference, after two weeks' deliberations, produced many recommendations for developing education. The most important is that the target date for attaining Universal Primary Education was extended to the year 2000. Thus the strategy confirmed by this National Conference can be summarized by the following:

1) Extension of micro-planning and school mapping to all regions to record the actual need, and for national utilization of available human and financial resources.

2) To achieve the Six-Year Plan target of 75% intake ratio for children aged 7.

3) To achieve universal primary education by using the different forms of schools adopted in the long-term strategy.

4) One-third of the expansion should be borne by non-formal schools and educational institutions like the Khalwas and village schools, which depend on popular effort.

5) At least 5% of pupils completing non-formal schools should find places in the fifth grades of the complementary primary schools.

6) To reduce expansion to reasonable levels: in intermediate 22% of primary completers and in secondary 50% of those enrolled in the intermediate level.

7) Expansion of technical education to 40% as a short-term objective and 50% as a long-term objective.

Taking all the above mentioned recommendations into consideration and guided by the long term strategy, a

programme was designed to achieve the postponed targets in their new target dates.

However, the Six Year Plan marked the end of macro-planning which integrated social and economic programmes in overall comprehensive plans. The continuing economic difficulties, accompanied by natural disasters in the form of drought and desertification and the attrition civil war in the South ended the May Regime, as noted earlier.

In 1986 a new, elected, democratic government came into power. Rehabilitation and socio-economic development gained top priorities in every political party's programme.
One of the most important recommendations was an overall comprehensive Socio-Economic Plan, an integral part of which was an Educational Development Plan. Hence the Four-Year Socio-Economic Development Plan 1987/88 was formulated. But the political instability that become a feature of the multi-party system was not conducive to its implementation. However, in June 1989, a new military government, with new priorities and objectives, took over.

3.9. Conclusion:

It is noted that education in the Sudan is a government endeavour, despite the substantial popular effort and the private sector contribution. Since independence there has been an impressive quantitative expansion at all levels. However, the inherited educational system, which is academically oriented and promoted "white collar" employment, led to serious concern about its relevance to the bulk of the population - 80% rural inhabitants and nomads. Lack of practical activities and initiation in technology and marketable skills at an earlier age, bedevilled all attempts to diversify secondary education and reverse the enrolment ratio to give technical education the dominant share.

Educational planning, as an integral part of overall socio-economic planning was adopted to maximize the utilization of the available limited resources. However, these plans, similar to their integral parts, were not based

on adequate information and accurate, detailed cost data. Lack of detailed data on the cost of and expenditure on education by level and heading led to the design of ambitious plans. Unimplementable targets were adopted, such as achievement of UPE by 1980 (and its continuous postponement) and the reverse of technical enrolment from 15% to 85% in the long term. This led to frustration with the educational planning process and disbelief in its feasibility. As educational planners are not professional, and still believe that education should be provided regardless of economic considerations, all the issues of costs recording and cost projecting are ignored. In the absence of the appropriate infrastructure, the Regionalization Act (which was endorsed to promote more local initiatives and facilitate exchange of information and data), complicated the situation and submission of expenditure returns, i.e feedback to the Central authority was not practised. "Yet the experience has shown that financial and economic elements cannot be disregarded in educational planning. If they are, the 'plans' may be simple wishes or they may indeed lead to the wrong kind of investments relative to a country's priorities" (Psacharopoulos, 1985). Hence, the need for a costs analysis study to accumulate information in this important field and to base future decisions on such studies.

CHAPTER FOUR

Literature Review of Educational Costs

4.1 Introduction:

This research aims to study the variations in the unit costs of academic secondary schools and their components and the factors that determine these observed variations in different environments, in an attempt to achieve better resource utilization. Ideally, the literature review in this chapter should concentrate on school costs based on expenditure data at the school level, taken from individual school accounts. This would make it possible not only to include important resources collected and mobilised at this level, but also to compute only those physical and financial resources that are actually consumed in the teaching and learning processes rather than those nominally assigned to them. In many developing countries not all resources allocated are actually used at school level; although some may be over-spending their budget others are under-spending. However, previous research work in the area of school costs is relatively limited and references relating to the subject are drawn from a wide variety of sources: education finance, education administration, educational planning and education management, to mention only the main ones. Hence, the education industry has often been accused of lagging behind all other industries of its size, or even smaller, in accumulating adequate statistics on the cost of production of its various types of output.

Surprisingly, educational cost analysis was for a long time partially ignored, not only in developing countries but even in many developed countries. Coombs and Hallak (1972) noted that "...educational systems and institutions, even in the most highly industrialized countries, have not been very 'cost conscious' in the sense of analyzing their costs for purposes of evaluation, planning, policy-making, and general improvement of their cost effectiveness".

This review endeavours to trace the evolution of this important discipline first in developed countries, and then revert to explore "the state of this art" in the developing world. In doing so, the review will embrace past studies in the field of educational costs at different levels of aggregation, being closely inter-related. The examination of the available literature is crucial in many ways. It is necessary both to highlight the main conclusions of past investigations that are relevant to the present study and are directly or indirectly related to this study, as well as to identify important gaps in the literature. Other literature, pertaining to unit costs (Chapter 7), educational costs indicators (Chapter 8), teachers' characteristics (chapter 9), boarding costs (Chapter 10) and economies of size and educational output determinants (chapter 11) are mentioned in passing, but further discussed in the respective chapters.

4.2 Studies in Developed Countries:

As Coombs and Hallak, (1972) noted above, it was only in 1958 that Vaizey could answer the question about how much was spent on education in the U.K. satisfactorily, though he could report a dearth of statistical data on costs of education. After some necessary adjustment, he analyzed the main trends in national education expenditure in current and constant prices, breaking it down by type of expenditure, functional headings and level of education. Interestingly, he found that per pupil costs in different geographical areas differed greatly, though the extent was unknown. In concluding his study, Vaizey identified several factors likely to affect educational costs in the future: a rise in the general price level, relative change in the level of teachers' salaries, increase in the school age population in state schools, rising educational standards and demand for higher education. The events of the ensuing years not only verified the validity of Vaizey conclusions but asserted their relevance to most educational systems throughout the world. In a follow-up study, Vaizey and Sheehan (1968),

reported that there was then "some improvement in the public presentation of education costs". They found that teachers' salaries, as a proportion of the total, had declined in both levels of education whereas expenditure on "other salaries and things" had the biggest increase. The dramatic rises in the latter indicated a shift to increased use of equipment and material and non-teachers instead of teachers; education had become more capital-intensive. Finally, they concluded that the rise in educational expenditure was largely attributable to the growth and changes in the rate of growth of the national income.

Cumming's (1971) pioneer study on Scottish educational costs included a thorough analysis of individual schools costs. He noted that educational accounts were kept with a view to fiscal accountability rather than "managing schools". Consequently, no information was kept relating to the cost of individual schools, costs of different ways of organising schools, costs of separate levels of education or costs of individual subjects within schools. He emphasized the problematic nature of data at the local authority level, its inflexibility and inadequacy for planning of resources. "Generally speaking most head teachers of schools have no way of saying how much their school costs". In conclusion, some interesting results emerged:

1) in contrast to Vaizey's findings, primary and secondary education were intensive users of labour,

2) unit costs on teachers' salaries in secondary schools were more than twice that in primary,

3) per pupil expenditure on "non-labour" items in secondary schools was more than twice that in primary, due to the large allocations for equipment in the former,

4) a stronger relationship was discerned between unit costs and pupil-teacher ratio in primary schools (explaining 69% of the variability) than in secondary (explaining only 50%),

5) considerable variations were reported in unit staffing costs and unit teaching costs per pupil, per pupil period, and per teaching group in the different subjects taught

within the same school and for the same subject among different schools,
6) the subject costs per pupil were strongly related to a) size of class, b) size of school, c) age of pupils and d) the mix of teachers' qualifications.

Hough's (1981) study, similar to Cumming's in Scotland, was the only detailed research work on individual school costs in England ever published then. He found the variations in per pupil expenditure for complete groups of secondary schools were striking; the mean unit costs ranged from as low as £215 (LEA'B',1974/5) to as high as £463 (£442) (LEA'A',1976/7). However, these marked disparities may be, first, due to the wide dissimilarities between these two LEAs ('B' with a small number of comprehensive schools each had its own particular characteristics, but 'A' had a larger number of comprehensive schools with large sixth-form and a number of the selective, more expensive, grammar schools). Secondly, average costs at current prices for two LEAs were compared for different years in a period of high inflation; "the rate of increase in prices from 1974/5 to 1976/7 was over 31%" (Hough, 1981). In the homogeneous sub-groups of secondary schools, although the costs variations was supposedly more limited than for the above, "still there are six sub-groups in which the maximum cost figure is more than twice the minimum, and for the majority of the sub-groups the differential is of 50% or more". However, to raise the question "how far were these sub-groups homogeneous" is important and only legitimate in view of the recent re-organisation of secondary education, at the time, when the school started a sixth-form, and the size of the sixth-form. Although, grave differences in school costs by geographical area were noticed by earlier researchers (Vaizey, 1958), there was no attempt to explore variations by location, in spite of the large number of secondary and primary schools in rural and semi-rural areas. In conclusion, Hough presented very interesting findings, as summarized below:

1) in any comparable sub-group of schools within any LEA average cost per pupil differed by a factor of two or three from one school to another, 2) per pupil expenditure increased, in real terms, for all sub-groups from 1974/5 to 1975/6, but for a number of them it did not exceed the inflation rate from 1975/6 to 1976/7, 3) teachers' salaries dominated total costs per pupil, although its percentage contribution to the latter in different sub-groups of schools ranged from 48% to 66%, 4) per pupil costs on teachers' salaries were strongly correlated with other constituents of total costs and particularly with non-teacher salaries per pupil.

Robert's (1980) inter-temporal study could identify important results, despite the small size of his sample:
i - variations in unit costs between schools was not as wide as suggested by previous research, ii - unit costs for sixth form ranged between 1.5 and 2.1 times that for year one to five; unti costs for the main school and sixth form needed to be calculated and compared separately,
iii - considered separately, variations in main schools' unit costs were minimal whereas, in sixth forms were wider; the highest figure was 50% more than the lowest.
iv - re-organised, former grammar schools had higher unit costs than former secondary modern because of higher average teachers' salaries and more favourable pupil-teacher ratios.
v - capitation expenditure was not strictly controlled; some schools consistently overspent their allowances, others underspent. Ilett (1981) undertook a more detailed study of school subjects. He noted, similar to Cumming (1971), that the obvious cause of the variation in unit costs between subjects was class or group size, the data for which was readily available. However, it was not possible to find which teacher taught which subject to which age group or to which ability grouping without referring to the timetable itself; "this is a very time consuming task". He concluded that the conception of staffing and teaching costs as defined by Cummings was very useful for examining the

variations in costs between subjects, pupils of different age groups, different abilities or taking different courses.

Hough (1986) found the difference in per pupil expenditure among any two similar schools within any one year was 70% and more. Most probable this wide variation relates to the costs of the whole school together, including the sixth form. He could detect a trend of consistently high-spending groups of schools over time which had higher costs in the three major components of unit costs: teachers' salaries, non-teacher salaries and other expenses, and others more disadvantaged in all headings. Nevertheless, the relative differential in teachers' salaries between high and low-spending schools was one third to one fifth, but for non-teacher salary and non-salary costs the range was between 50 to 100%; a trend discerned in many developing countries (Tibi, 1986). Hough noted that the percentage increase of teachers' salaries over time was mainly "due to the relative ease with which LEAs have been able to cut back non-salary expenditure in the face of ever-worsening financial stringency". In conclusion, he emphasized that the consistent inequalities of funding and resource allocation between individual schools continued to be a matter for serious concern.

However, the Education Reform Act, 1988, introduced the most significant change in the traditional school system in the UK. Accordng to this Act each Local Education Authority (LEA) works out a budget for each of its secondary and primary (over 200 pupils) schools, according to the number of pupils in the school (Local Management in Schools Initiative, 1988). The schools are delegated the power of how to spend their allocation. Thus the schools have more control over their affairs, enabling them to adjust to the needs of their pupils and comunities, make the best use of the funds available and report on their achievements. Nevertheless, the LEAs retained some powers. Although the Act required schools to follow a national curriculum, the LEAs decide the policies for education in their area. Furthermore, they apportion the total amount to be spent on

schools, the way these funds are divided between schools, provide some central services to support schools and keep track of the schools' achievements and their use of resources. The American system, discussed below, demands far more autonomy for their school-based finance structure.

Contrary to the U.K., the field of educational costs attracted more interest for a long time in other countries. Much related and voluminous literature on education costs and expenditure has been published in the U.S.A*., but its emphasis was on equality of educational opportunity. In the late 1960s and early 1970s U.S. researchers' great interest was initially on the inequality of finance among school districts. This period saw an increasing number of legal challenges to the states' finance systems of education (based on local property taxes) and state courts were involved to equalise provision. School boards in different states sued the states for disparities in per pupil costs. The unique case Hobson v. Hanson, where a parent sued the school board itself for the inferior quality of education in ethnic minority schools (Michaelson, 1972) is well documented. Nevertheless, this type of inequality persists and is still important. The current educational funding inequities are inherent in the system of finance. Similar to other states, Illinois schools are supported by local property taxes, state aid, categorical grants and federal grants; the latter three sources attempt to equalise differences in taxable property wealth and depend on the number of students with special needs. Hess, Laine, Lewis and Gilbert (1991) wrote that "the variations in property wealth between districts were so great and the level of state support so low that the disparity in revenue available to support education of individual student has reached intolerable levels, exceeding a ratio of 5 to 1 at the extreme". Frank and Chaudhari (1992), compared Illinois school district wealth by region within district type between 1981 to 1991. They found that changing economic

* See Hough (1981) for a comprehensive literature review.

conditions had resulted in regional wealth differences and school districts, which depended on local property taxes, had very different resources available to them while all were expected to do the same job. They concluded that differences in school funding existed in Illinois, based on the part of the state in which a student's parents happened to live, and suggested that this was not a rational basis for differential treatment of students; "this is simply unfair". However, litigation to overturn finance systems that produced wealth-related disparities in per pupil spending between districts within the same state is not yet a historical incidence. The continuous involvement of the judiciary function, as represented in the Federal Supreme Court and the State Supreme Court, is unique to the USA in protecting educational equality of opportunity and in effecting reforms. Wood, Thompson and Honeyman (1992) noted that the current methodology for financing education in America was the product of nearly a hundred lawsuits over the past forty years. They contended that reformers have embraced litigation as the preferred mode of change; "a strategy which has increased in the last two decades and with significant signs of escalation during 1992". The authors examined the latest suits that emerged in the state courts. They argued that the financing "... formulas under question allowed and created disparities and inequities relating to wide differences in wealth, variations in per pupil expenditures, and unequal tax efforts". Texas Supreme Court declared the reform of funding system supported by the State aid unconstitutional and ruled that Texas had to implement a new plan for efficient and equitable funding of public schools (Clark, et al., 1991). A complaint was filed in 1991 by a group of Illinois school districts in which the constitutionality of the current system of funding public schools was challenged; the Committee v. Edgar (Frank and Chaudhari, 1992). Wood, Thompson and Honeyman (1992) found that disparity in many states was still the norm, that wealth, budgets and tax efforts were closely linked and that factors such as sparsity adjustments were not effective or

rational in relation to constitutional mandates. The authors presented an intensive analysis of inequity and inadequacy in one selected state, developed on behalf of plaintiff districts which supported the change that expenditure disparity was strongly related to local wealth, despite the operation of formulas and denial of state agencies. Monfiletto and Hess (1992) tended to focus on the issue of inequity between school districts. They observed that frequently overlooked in such situations was the further distribution of funds from the school district to the school level and the inequalities between schools in large urban or countrywide systems. Picus (1992) wrote that major court order changes were taking place in the school finance systems of several states and there were active court cases in 19 others. In addition to standard school state finance equity criteria and fiscal equalisation (taking into account the differences in needs, costs, scale, etc.), court-change had co-ordinated financial and substantive upgrading of state education systems. The aim of such an endeavour was to reorient the traditional individual state school finance assessment so that it would encompass concerns about resource use and productivity, as well as traditional concerns about fiscal equity. Adams (1992) noted that Kentucky enacted major changes in its entire education system, goals, curriculum, student testing, governors and finance in response to a court decision. These include specific student performance goals, new state curriculum, frameworks, new forms of performance, assessment, site-based management, school-based performance awards, bonuses of up to 40% of teachers' salaries and school take-over for under-performing schools in response to the court's ruling.

Another form of disparity was noticed in the wide variety of fee assessment practice among and within states. Crosser and Hamm (1992) found that 67% of the state systems permit assessment of some types of student fees, while 31% prohibit student fees. The remaining 2% either permit student fees on a district-by-district basis or have no statutes. However, ranking these groups according to per

pupil expenditure revealed that 67% of those permiting student fees were in the bottom half nationally and 40% in the bottom quarter; only 2% were in the top quarter. The evidence suggested that states which permitted fees tend to spend less than the national average per pupil costs. In conclusion the authors pinpointed the negative effects of student fee use at a time when a national effort is directed at improving the quality of instruction in public schools.

Interestingly, the interest on financial equality was diverted to more efficient resource management at the school level, being the basic unit for the delivery of services. Wohlstetter and Odden (1992) noted that school-based management (SBM) policies research have long histories, way beyond the current generation of reformers. They defined school based management reforms as decentralised decision making to the school site and were designed to produce changes in educational practice that result in higher levels of student learning and achievement in thinking and problem-solving. They argued that SBM, as a governance reform, entailed more than decentralising budgets and personnel decisions and ought to be joined with content (curriculum and instruction) reforms in order to enhance its probability of improving educational practice; ought to be designed to create high levels of student performance. The theory behind recent school based management reforms is that productivity and effectiveness can be enhanced if clear goals are set at the top of the system, therefore implementation is decentralised to the school site where services are delivered and accountability is structured either with rewards for accomplishing goals and sanctions for not, or through parental choice of school.

In the 1960s and 1970s, decentralisation was promoted as a way to empower local communities to improve administrative efficiency and/or balance state authority (David, 1989). Today school districts are adopting school based management in order to improve school productivity and student learning (Cohen, 1989). Research supporting the current interest in school based management suggested that

teaching and learning at the school will improve when sites are given control over decision making; but "School based management is a generic term for diverse activities" (Malen, et al., 1990). They proposed a comprehensive framework that includes decentralising for knowledge, information and rewards. They emphasised that School Based Management policies are effective if supported by site administrators, teachers' unions, district administrators, superintendents and boards of education if willing "to give up power and authority to individual schools". Richardson and Flanigan (1992) found no correlation between any of the variables which could lead to, or predict increased student performance as a result of increase in education expenditure. As some researchers would predict, the research indicated that increased spending alone will not improve education.

Odden (1991) had a more radical perspective for school finance structure. The proposed structure included the following components: 1) A common foundation expenditure level across all schools in the country; funded by state and local funds (80%) and the federal government (20%), 2) schools would have the responsibility of the full budget, resource allocation and expenditure authority including hiring of staff; real site-based management and budgeting, 3) a uniform salary scale statewide and a compensation structure based directly on what teachers know and can do, not indirectly on their education and experience and 4) school-based monetary rewards for faculties meeting or exceeding student performance improvement goals. He concluded that moving education finance from district to school would focus funding on the organisational unit that is responsible for producing the bold student performance levels embodied in the country's education goals - schools. "... if the school is the production unit in the system (this) structure could dramatically improve the productivity of the educational system, a long sought goal".

In his endeavour to secure equitable distribution of resources, Nelson (1987), developed a Resources Cost Model

(RCM) to determine an appropriate cost of education for each Illinois school district. Appropriate cost is a function of the quality of resources (teachers, supplies and buildings) needed and the price of resources faced by each district. He believed that a modified RCM or framework could remove the model's suburban bias and improve judgement of poverty areas. However, the extent of differential cost in providing equal educational service initiated a large body of literature on education in American large cities, earlier in the 1970s. Levin, Muller and Sandoval (1973) found higher total per pupil costs, for providing comparable services, in central cities than in the rural districts and even most of the suburban districts included in the study. Instructional costs were the major factor attributable for the expenditure differentials; disparities in non-instructional costs were minimal. Interestingly, disparity in teacher costs between cities and suburbs in the same metropolitan area were explained by teachers' levels of education, seniority and pupil teacher ratios, but the discrepancies between the metropolitan and the rural areas of a state was accounted for by the salary differences for teachers of equivalent education and experience. The authors concluded that to secure equal 'educational services' for central cities, rather than 'dollars', allowance had to be made for such critical factors as: "1 - cost differentials in providing equivalent educational services, 2 - the concentration of students who require additional educational services and, 3 - the municipal overburden factor (cost of non-educational services)".

Baron's (1971) earlier study of Chicago high schools reported persistent bias in the allocation of resources in favour of white pupils and those with higher status. He noted that federal funds were spent on peripheral activities, not for improving the quality of basic education. Owen's (1972) study of nine large cities reached similar conclusions; in low-income and non-white neighbourhoods expenditure per pupil on teachers' salaries was lower, teachers were less experienced and had lower

verbal ability scores. Surprisingly, despite the widespread interest to minimise inequalities of educational provision, Williams (1976) found that educational statistics in many states did not show whether inequality existed at all. On the other hand, the movement towards greater equality and the debate on what to equalise directed the emphasis towards equalised school output; pupil achievment. Cresswell (1974) explained that "equity in the wider context...should ...go beyond resource availability ...educational opportunity involves achievement as well... there is little evidence that greater resources alone will reduce disparities in achievment levels".

However, the strong belief that uniformity of school finance would realize equality of educational opportunity and achieve 'greater' equality of outcome was dashed earlier, by the conclusions of the Coleman Report. Coleman et al. (1966) were commissioned to investigate the extent of inequality in American schools but they further examined the relationship between schools inputs and outputs. Surprisingly, they found that the family background, socio-economic milieu and to a lesser extent the peer group were the major determinants of variations in pupil performance. Jencks' et al.(1972) re-analysis of this data confirmed these findings which implied that schools scarcely affect the attainment of their pupils and hence questioned the whole concept of equalising school expenditure. They concluded that "additional school expenditures are unlikely to increase achievements, and redistributing resources will not reduce test score inequality". This pessimistic attitude dominated the literature then and many researchers, explicitly, expressed that education could not reduce the prevailing disparities. Conclusions such as "...educational inequalities are rooted in the basic institutions of our economy" (Bowles, 1977) and "education cannot compensate for society" (Bernstein, 1970) were widely publicised. However, the Coleman Report's controversial findings generated an extensive body of research on input-output relationships of schools. Burkhead, Fox and Holland's (1967) study of

Chicago and Atlanta high schools found that the socio-economic variables were far more important determinants of differences in school outputs than in-school variables. Interestingly, current expenditure had very little impact on school outputs and its positive association with dropout rates would imply that increasing resources would not reduce this problem; a disappointing result for planners who are keen to improve the internal efficiency of education. Averch et al.(1972) reported, along the same line, that "research has not identified a variant of the existing system that is consistently related to students' educational outcomes". Hence, that implied that increasing expenditure was not likely to improve pupils outcome and significant reduction or redirection of educational expenditures would be possible without deterioration in educational outcomes. Similarly, Tuckman (1973) found that student's home and social background variables contributed more than those within school factors to the pupil performance; school inputs only reinforced the effects of social factors. Hanushek (1989) concluded that it was evident that expenditures were not systematically related to student achievement. The prior belief that constraints on expenditure were the most serious "road-block" to improved student performance were, at best, misguided; school decision-making ought to move away from traditional "input directed" policies to ones providing performance incentives.

Earlier studies in the U.K. (Plowden Report, 1968), similar to the American findings, showed that variations in the general resources available to schools did not account for differences in pupils outcome. Overall expenditure per pupil, number of books in the school library, teacher pupil ratio and teacher quality did not show any systematic relationship with pupils' levels of attainment. Further, Hough and Warburton (1986) related six socio-economic indicators and per pupil recurrent expenditure to the result of GCE O-level for three successive years. They found that the variable SOCL2 (social class2) emerged as the most important predictor of examination success, similar to the

above findings, and per pupil costs was only significant in one instance. However, Rutter (1983) found that schools differed greatly in the extent of their effectiveness in raising standards of pupil attendance, behaviour or achievement. He concluded that research findings indicated that measures and variables that referred to academic emphasis, classroom management, discipline and pupil conditions, pupil participation and responsibility and the organisation and the management of the school as a whole were associated with pupil success in the various aspects of schooling, in particular scholastic achievement. On the other hand, Gyimah-Brempong and Gyapong (1990) found that school resources did influence student performance positively, but due to collinearity it was difficult to disentangle their independent effects from those of the socio-economic characteristics. They suggested that the "search for educational excellence should be fought on two fronts: the school with more and better resources and the student's environment outside the school".

4.3. Studies on Developing Countries:

In developing countries, however, research along the above lines conducted by local scholars is very limited especially in African countries. The initial effort to promote educational cost analysis was an earlier research project (in the late 1960s) undertaken by the International Institute for Educational Planning (IIEP), a branch of UNESCO, in some African countries. This project, which attempted to shed light upon problems of educational planning, included studies on the costing and financing of educational development and on the effect of rapid education expansion on the quality of education. Knight's (1969) study of Tanzania which was a part of this project, found that the available statistics were collected for administration purposes and not suitable for planning purposes. The system of accounting did not lend itself to the calculation of unit costs by level or type of education. However, he did succeed in calculating not only the average

cost by level and type of education but also the cost for different grades at the primary and secondary levels separately. Average costs were further disaggregated into their components as each component might change differently over time. He noted that recurrent per pupil costs would be affected by changes in teachers' salaries scales, movement up that scale, percentage of teachers with different qualifications, average class size, the proportion of pupils in boarding and those in day schools, and the cost of text books and educational equipment.

Callaway and Musone (1969) studied the finance of education in Nigeria as another part of this project. In secondary education the full-boarding government grammar schools' average cost per pupil was higher than that in assisted grammar schools because the former had all the sixth form extensions, a larger number of graduate teachers and the entire staff were on the higher government salary scales which included a number of allowances not available to the latter schools. Recurrent costs for government secondary schools were dominated by teachers' salaries which varied greatly between regions: from 79.1% in the North to 54.1 in the West. Other items such as subsistence of students including boarding and maintenance, equipment and stores varied by a factor of 3 and 4 respectively, between regions. In conclusion, they stressed the need to support public revenue for education via school fees and/or a specific tax and to reduce costs in the secondary sector by sharing the expensive laboratories and equipment of grammar schools with neighbouring schools, and to introduce scholarship aid, based on merit, for equity purposes.

The International Institute (IIEP), then supplemented this empirical initiative by publishing a number of monographs on theoretical aspects, concepts and methodologies of cost analysis (Hallak, 1969; Vaizey and Chesswas, 1967) and the papers contributed to the special seminar on 'Educational costs and productivity' (Hallak, 1967). The IIEP further boosted research activity in this field when it carried out, in 1968, twenty-seven diverse

case studies from all round the world; widely scattered geographically, well distributed by level and type, varied in scale and breadth of coverage. The project included developing countries from Africa (Tanzania, Ivory Coast, Madagascar, Uganda, Morocco), Asia (Ceylon, Thailand, India), Latin America (Chile, Barbados, Brazil, Colombia) as well as countries from Eastern Europe (U.S.S.R., Poland, Hungary) and the Organisation for Economic Co-operation and Development (France, Canada, Norway and the United Kingdom). Basically, the case studies were designed to illustrate the main purposes of cost analysis which included: 1 - improving the allocation, efficiency and productivity of available resources, 2 - checking the economic implications and testing the feasibility of policy decisions, and 3 - evaluating the short and long term cost implications of major innovations. These studies served countries aiming at linear expansion of their educational systems, those modifying the whole system and others involved in fundamental innovations of their educational structures. The twenty-seven case studies were published in three volumes and have been a useful guide for planners and researchers in educational costs in many countries, especially in the developing world. This review includes the case-studies on developing countries that are related and relevant to the theme of this study.

Chau (1972) found that the cost estimation of the Ivory Coast reform of primary education (televised instruction in schools, lower pupil teacher ratios and improved level of teachers' qualifications) was based on 1967 average costs and were held constant thereafter; a procedure which led to serious underestimation of costs. Improvement of pupil teacher ratio involved, in addition to the increase in teachers' salaries, more teachers, more facilities for training those teachers, more classrooms and equipment; more capital expenditure not provided for in the Plan. However, comparing the estimated costs with the resources earmarked for primary education, it became clear that the reform was not feasible; not so much because of the introduction of

television but due to the increase in salary costs. Chau, Hallak and Coombs (1972) noted that the costs analysis of Madagascar reform was not based on essential data such as the breakdown of total enrolments by grade levels, between first and second-cycle schools, variations in pupil teacher ratios by type of school and grade levels and, more importantly, the age and salary distribution of teachers. Bennett's (1972a) study of Tanzania drew the attention of planners to the serious financial implications of the basic policies for structural changes, the upgrading of the teaching force and the changes in the pupil teacher ratios. Self-reliance was introduced at the primary and secondary levels to reduce unit costs and school children participated in productive activities to make their schools self-sufficient. However, two policies at the secondary level operated in the opposite direction: the abolition of school fees and expansion of the secondary level in new boarding schools. Although the cost per place in existing schools was considerably less than that of building new schools, the decision was based on a policy of regionalising entry into this level. Unit expenditure on secondary education was expected to rise because the ratio of non-graduate teachers fell from 32% in 1964 to 25% in 1969 and the pupil teacher ratio slightly decreased for the same period. Nevertheless, unit costs on teachers' salaries fell by about 5% because more young nationals joined the teaching corps at the bottom of the salary scale and pensionable expatriates were replaced by short-service, inexperienced officers and overseas volunteer teachers. Chesswas (1972) observed that using the current average teacher salary for costing the salary bill of required teachers could result in dangerously misleading conclusions for policy decisions. He advocated that it was necessary to take into consideration: 1 - intake of pupils, 2 - size of classes, 3 - division of teachers into categories, 4 - official staffing policies and identifications of particular categories with specific grades, 5 - the salary scale of teachers, number of incremental steps, methods of training (pre- and in-service)

and supply of teachers. He concluded that to pay teachers on incremental scales had important influences on the level and trend of teachers' salaries and the quality of education. Chesswas and Hallak (1972) noted that two major factors and several minor ones emerged to have greater impact on the level of secondary schools' unit expenditure on non-teacher costs: 1) it was obvious that the higher the school income per student the higher the expenditure per unit and vice versa; the financing of non-teacher costs favoured boarding schools, well established schools and schools that operate one shift only, 2) the expenditure patterns on non-teacher costs were affected by the school director's personality; within any income bracket different directors would have different priorities and hence patterns of spending. The minor factors included economies of scale in the per pupil costs on administration and non-teaching staff salaries. Moreover, schools with classes at the 'High School Certificate' level had higher unit costs on library expenses, new schools experienced a fall in unit costs as they approached full capacity, and boarding costs was related to the locale of the school. In conclusion, the authors emphasized the role of non-economic factors such as traditional, institutional and essentially human factors, and structural factors such as the size of the school, location, etc. in determining the level of total and unit expenditure on non-teacher costs. Proust (1972) observed marked disparities in Moroccan complete cycle secondary schools; the highest per pupil expenditure was three times the lowest. The range of per pupil costs was from 1,750 DH (one school), over one third more than the most expensive of the other similar schools, against the average in this category of 1,025 DH. It was partly explained by the high percentage of foreign teachers, 67%, most of them holding university degrees, 53%. Nevertheless, this school's output of graduates, almost the same as the national average, 36%, did not justify the higher costs of 70%. The total average costs per pupil for a complete cycle was estimated at 1,200 DH, out of which 1,013.82 DH at school level, 29.50 DH

centralised expenses and 130 DH private family costs. Finally the author summed up his conclusions as follows: 1) per pupil costs in schools was generally reasonable, but in some cases it was certainly not adequate for quality output, 2) expenditure on operating materials was below the necessary level, 3) the existence of more privileged institutions in complete-cycle category was reflected in the wide range of variation of per pupil costs. Alles, et al. (1972) found that total unit costs on secondary education (second-level), in Ceylon, and its major constituent, unit costs on teachers' salaries, increased over time. The dominance of teacher and non-teacher salaries was evident, (94% of total unit costs) whereas, unit costs on non-salary was remarkably small, 2%; 'education is a labour-intensive activity'. However, in the absence of readily available data, teachers' salaries were estimated without taking into consideration the teaching staff qualifications, age structure or position in the salary scale. The authors concluded that "the traditional education budgetary accounting systems...failed to yield many essential types of data required for good cost analysis, sound educational planning and effective education management". Reiff's (1972a) study of Thailand found that where the per pupil recurrent expenditure in primary schools = 100, secondary general = 300. The school survey disclosed five types of general secondary schools; apart from the two types of private schools, the data on unit expenditure on teachers' salaries was more or less comparable to the national average supplied by the budget estimate. Total unit expenditure in the sample schools revealed the wide disparity between per pupil costs in rural areas, 1420 baht, and that in urban centres, 1029 baht. Unit costs on teachers' salaries was higher in rural schools (79.9%) than in the urban (73.5%) not only because the former type had a lower pupil teacher ratio (11:1) than the latter (19:1) but also because "... urban schools usually have a greater enrolment, so that the fixed number of specialist teachers needed are probably more intensively utilized, with corresponding economies of

scale". Regarding the unit costs on 'other expenses' it was particularly high in rural and comprehensive schools because of under-utilisation in the former and the wider expensive range of materials required by the latter. Otherwise, the large difference between the unit costs on this item from the survey and that from the budget estimate was because the former included 'non-budgetary' expenditure from the school's own financial resources such as fees and donations. Such discrepancy asserts the importance of micro data for meaningful cost analysis. Finally, he concluded that:
1 - cost data obtained from macro-sources had severe limitations and combining them with costs statistics from sample school surveys was necessary to include non-budgetary expenditure from fees and/or donations to ensure greater accuracy in cost data. 2 - an analysis of recurrent unit costs had to take into account the variations by type and location of schools, urban/rural. Reiff (1972b) found that the major determinant of the increase in the unit costs, in real terms, by level of education in Thailand was the increase in per pupil costs on teacher salaries; mainly determined by the pupil teacher ratio and the average teacher salary. An analysis of the former indicated that it increased slightly from 1954 to 1964 in public elementary and secondary schools. However, it was not expected to decline for several reasons; the increase of social demand for more education, the increase in the school age population, the programmes of compulsory primary education and the expansion in secondary schools. The available data indicated that the average salary of primary and secondary school teachers increased by 46% over this period; less than the corresponding rise in per capita income of 55%.
Teachers' salaries dominated current expenditure at all levels; 91% at the primary, 82% at the secondary. On the other hand per pupil expenditure on materials and equipment increased slightly and thus had very limited impact on the real increase of the per pupil recurrent costs. Rieff emphasized that the average teacher salary was a function of: a) the official salary scale, b) teachers'

qualifications, and c) age or seniority. Fachin (1972) computed the unit costs on salaries for teachers and for each category of staff employed for the secondary education expansion project. The author explained that in the absence of adequate information on personnel and data on earnings, salary estimates could not be based on an analysis of the distribution of teachers and other staff by level on the salary scale and by sex and age. Unit costs on other expenditure was calculated from the budget estimates of expenditure on materials and was not related to any trend in relation to the type of school (academic, vocational, etc.). However, both recurrent and capital expenditure estimations did not take into account future price increases.

However, the above empirical effort was promoted by two favourable factors at the time; those that determined the amount of resources allocated to education and those that determined their expenditures within education. Coombs and Hallak (1987) noted that in those "...halcyon years..., when education budgets in virtually all countries were expanding rapidly, the big question facing policy-makers and educational managers was how best to allocate the sizeable annual increments among different educational levels and uses". However, by the late 1970s the high costs of linear expansion of the educational system and the need to educate more pupils at a lower cost shifted the emphasis to the study of an alternative technology, the new educational media. A large body of literature existed on cost analysis of the new instructional media at the planning stage (Chau, 1972) and after implementation (Unesco, 1977; Eicher and Orivel, 1972). Educational media are used in three directions: (a) to improve the quality and relevance of traditional schools; (b) to lower the costs of education or curb its rising costs; (c) to improve access to education in rural areas (Jamison et al., 1972). However, the new media could make substantial saving depending on the size of the project and how large an audience it served; 'the number of pupils strongly influences the unit costs'(Vaizey, Hewton and Keith, 1971).

However, most of the studies on the traditional school above relied on cost data at the national, state, district or local education authority level which generally underestimate the actual expenditures at the school level; particularly in developing countries with mixed finance. The first attempt to emphasize educational costs analysis at the institutional level was launched by the International Institute for Educational Planning (IIEP) in mid 1979. This project which concentrated on thorough analysis of establishment operating costs was designed to improve knowledge of educational costs and their components, utilisation of resources, reduction of disparities between educational establishments, and more accurate evaluation of the resources required for various measures to improve teaching efficiency (Debeauvais, 1982). It included twelve developing countries in Africa (Algeria, Congo, Morocco, Nigeria, Sudan, Tunisia), Asia (Indonesia, Nepal, Philippine, Thailand) and Latin America (Brazil, Venezuela). These case-studies have not been published as individual cases, but some of them were summarized for seminars and as training material; these are reviewed below.

Radi (1982) noted that teachers' salaries in Morocco varied not only according to their qualifications but also in relation to the geographic location of the school and the level at which they taught. He concluded that disparities between regions were relatively small due to the strict centralised control over the distribution of funds to schools. Philippine cost study (Dalupan, 1982) reported that in secondary education per pupil costs in municipal and barangay schools (predominantly rural schools) were much below that in the urban national, provincial and city types. Most of the secondary schools' expenditure was devoted to instruction, 68%, but expenditure on administration was 15%. Nevertheless, variations in unit costs among public secondary schools were less than between private schools. Interestingly, the lower average number of teaching hours per week (between 11 and 20) asserted the contention that there was no shortage of teachers and the problem was the

deployment and under-utilisation of the teaching staff. Surprisingly, average teacher's salary was higher for elementary than secondary teachers as, when started, local high schools teachers used to be paid what the local government could afford. However, the teachers' profile showed that 92.6% of all teachers in elementary schools were holders of college degrees in education (86 for secondary), quite a large number, almost 50%, had some graduate work (35% for secondary) and the number of years of teaching experience was also higher in elementary schools (16 years) than secondary schools (8). Public secondary schools were comparatively less supported by the national government (53%) but the local government contributed a larger share (36%) and so were the tuition fees (8%). Government sources paid for teachers' salaries at both levels and supported other operating costs in secondary schools; fees were an important source of finance in rural high schools. Sharma (1982) found extremely high costs at higher levels of education in Nepal. Compared with the unit costs at the primary level, lower secondary was almost twice and upper secondary four times as expensive. Teachers' salaries accounted for the largest proportion of total costs and were exceedingly high compared to 'other costs'. Per pupil costs in real terms declined as its growth had not kept pace with inflation. A detailed study of educational financing revealed that very low proportion of government budgets were allocated to education, out of which a high percentage was devoted to higher education. He concluded that the severe imbalance in budget allocation (schools in perpetual deficit and poor physical facilities with almost no money assigned for educational materials and supplementary reading) led to low performance of educational programmes. Rach-Intra's (1982) study of Thailand found that secondary schools in Bangkok, Central and the North had the highest unit costs (2926.29 baht, 2964.71 and 2924.69) whereas, those in North East and South regions had the lowest costs; because of the lowest level of salaries per pupil. As expected upper secondary schools were more expensive than the lower, and

double-shift schools had higher costs than single-shift; the only recurrent saving in the former was on administration costs. Project schools had a higher cost; perhaps due to their experimental nature. The average unit costs on recurrent expenses was 2525.21 baht; out of which 94% (2373.40 baht) personnel salaries. Non-salary expenditure was only 6%, distributed between subsidies 2.7% (69.24 baht), sundry expenses 1.7% (42.74 baht), and honoraria 1.6% (39.83 baht). Teachers' salaries dominated personnel salaries, 84.2%, whilst 6.6% was spent on service personnel, 6.2% on administrative staff and 3% on supporting staff. However, the study did not develop any indicator to explain the observed variations, especially those which influenced teachers' salaries or variation by location.

Tibi (1985) found striking variations within and between the different types of schools in both levels among the various regions in Indonesia. He concluded that these wide variations might well be deliberate because of the disparities in wealth of different regions, which resulted in constraints in resource allocation for the poor areas, differences in operating conditions and variations in class sizes. In Salih's (1986) study, it was evident that per pupil costs increased the higher the level; if in primary = 100, at the intermediate = 120, and at secondary = 200. Unit expenditure, at the secondary level, varied widely by region - much more than by size and that observed at lower levels. Interestingly, Khartoum had the highest per pupil costs, £s 228, and the highest unit costs on the components non-salary expenditure, £s 61, and non-teaching salaries, £s 22, almost twice that in the Central Region, £s 144, compared to a mean of £s 181 around which the other regions clustered. The Central Region, on the other hand, had the lowest per pupil expenditure on all of these, £s 144, £s 37 and £s 14 respectively. Variations in class size were limited, but larger within the Central Region, 63 against the mean of 56; most probably one of the main factors for their lowest unit costs. Average curriculum loads cluster around the mean of 34.5, but much greater variations were

observed in the average teaching load; a high of 18.6 periods in Kordufan and Darfur to a low of 11.7 in Khartoum, around the mean of 15.1. Since Khartoum did not pay the highest average salary this extremely low load may account for their highest unit expenditure on teachers' salaries. Pupil worker ratios were highest in Central Region and Khartoum (42:1) but most favourable in Darfur (27:1), similar to the lower levels. Surprisingly, the proportion allocated to non-salary expenses was less than that at lower levels, despite the requirement of science laboratories, raw materials and libraries. Non-salary costs were mainly financed by government, 93.5%, and only 6.5% from self help. In conclusion, resource management, at the secondary level, had to concentrate on teachers' salaries as it was the highest single proportion of the recurrent costs. Tibi's (1986) comparative analysis of the case-studies highlighted the importance of non-budgetary contributions by parents and the local community for financing non-salary costs; a category of expenditure positively related to pupil achievement. Variations in unit costs among schools of the same type were quite wide at the primary level and even wider at the secondary; disparities were more marked in countries with mixed finance. An analysis by heading of expenditure revealed that wider variations were observed for non-salary expenses than non-teaching staff salaries and more pronounced in the latter than for teaching staff salaries. Disparities in teachers' costs per pupil were accounted for by variations in class size, utilisation of teachers and their average salaries. However, class sizes reflected regional variations in population densities, and the degree of adequacy of the school network to meet the demand for education, but the variations in teacher utilisation depended on the quality of the institution, regional administration and the ability of the latter to distribute teachers among educational institutions. Average teacher salary was determined by the distribution of qualified teachers, the extent of the impact of their qualifications on salary levels and their type of

remuneration. The report highlighted the relationship between the utilisation and the disparities in resources betwen schools, especially with regard to teaching staff. He concluded emphasizing the importance of: a) resource management and devolving powers of resource allocation to educational institutions, b) the analysis of institutional costs data, c) and comparisons of these data with global figures which sometimes revealed highly significant divergences. Tibi (1987) found striking diversities of financing mechanisms and processes of internal resource allocation for primary and secondary education among the twelve case-studies surveyed. These had serious consequences on current unit costs and on disparities on resource allocation between institutions and level of utilisation of these resources within individual schools. Interestingly, the range of variations in total unit expenditure, its constituents and the main indicators differed markedly within the same country. Morocco, for instance, at one end, had very little variations in its unit expenditure and unit teachers salary cost, which indicated very limited disparities in resource allocation among educational establishments. At the other end, Indonesia's unit expenditure and indicators differed greatly between institutions; revealing wide disparities among local institutions and limited public control on resource allocation. The principal indicators of teaching conditions and utilisation of teaching staff differed greatly among countries; showing wide differences between institutions. He reached very critical results:
1 - important geographical discrepancies in public resource allocation could be observed due to the location of the establishment rather than variations in salaries, 2 - variations in private resources were greater than in public funds in mixed financing countries, 3 - average utilization of teachers was influenced by: a) relations between supply of and demand for teachers generally and by subject, b) problems of posting and transfer of staff, c) the institution director's decisions. Hough's (1980) study of

education in Bendel and Ogun states of Nigeria showed that schools did not keep records of financial expenditure on any standard or systematic basis; some figures had to be adjusted to allow for meaningful comparisons. Variations in per pupil costs at both levels were striking. Secondary education was mainly available in boarding schools which had significant effect on expenditure patterns, and important implications for expanding secondary education on the day side. Such places were relatively cheaper to provide and parents would take them up as they charged no fees. Per secondary pupil expenditure varied as much as a factor of four, much higher still in the urbanised area of Oredo, which could be explained by the most favourable pupil teacher ratios. He noted that schools with a small number of boarders had the lowest per pupil costs, although the total of non-teaching staff salaries was allocated to the educational expenditure heading. The average teacher's salary also differed greatly, with the highest in Abeokuta urban area; the figure for one school was three times the other. Secondary schools had relatively fewer unqualified staff (20%) than primary schools, and 58% of their teachers had qualifications above the required level. On average, secondary schools had a young teaching force with a higher degree of mobility, worse than the primary level; the average length of service in these schools was 2.2 years. Longe's (1982) study of secondary schools in the Oyo State of Western Nigeria showed that 91.2% was spent on salaries and only 1.81% was allocated to school maintenance expenditure. Teachers' salaries were higher in urban than in rural areas and wide variations in unit costs prevailed between them. The per pupil costs in rural schools ranged from N159.36 to N236.28 and in the urban sector from N120 to N378.70; the average for both was N205.43. He used linear and multiple regression to analyse the relationship between the unit costs and their determinants; the age of a school, the size of a school (enrolment), class size, student teacher ratios, average teachers' salary and the percentage of trained teachers. In linear regression, only the 'student

teacher ratio' was significant (at 5% level) to influence unit costs on its own; it explained 36% of the total variations. Using stepwise regression, it was evident that average teachers' salary and student teacher ratio were the most important explanatory variables for the unit costs; 39% and 36% respectively. He concluded that student teacher ratio turned out to be the most crucial factor for controlling unit costs, other variables such as the average teachers' salary, school size or enrolment had also considerable effect on the cost of education; not less was the age of teachers in the long-run. Interestingly, Tilak (1988) noted that the share of the GNP devoted to education, in India, was 3.9%, but including 'private' or 'household' costs, 3.5% of GNP and the 'opportunity cost', 4.2% GNP, the total social cost of education was 11.6% of GNP in 1979-80. He emphasized the importance of estimating private 'visible' and 'invisible' (opportunity) costs for proper placing of resources for education. He found that between 1950/51 and 1975/76 per pupil costs at the primary and middle level largely increased at current prices, but surprisingly the large growth, in current prices, represented, in real terms, only marginal rates of increase. At the secondary and higher levels the 'real' costs of education even declined (rates of change were -0.1% and -0.3% respectively). A breakdown of institutional costs by items indicated that teachers' salaries accounted for more than 70% and the cost of non-teaching staff to about 10% of the total cost, whereas non-salary costs, including buildings and equipment, was only 5%; 'educational activity is labour-intensive in nature, but for the human capital embodied in the teachers'. Teachers' cost, as a proportion of total cost, increased the lower the level (93% at primary and 88.3% at middle) but the non-salary costs increased the higher the level (2% at the primary and 3% at middle). There were wide variations in unit costs betwen different states and within states which in some cases persisted between 1960/61 and 1976/77. Similarly, private costs of education varied among socio-economic groups, between backward and non-backward castes,

and between rural and urban areas; the weaker sections could afford less to invest in education. However, level-wise, disparities in unit costs increased considerably at the primary and middle levels, though declined marginally at the secondary and higher levels. Surprisingly, increased disparities were observed at those levels that received extra resources from the Central Government. Generally, four important variables explained the disparities in unit costs: 1) the size of the institution or enrolment, 2) teacher pupil ratios, 3) average teacher's salary and, 4) the ratio of non-teaching costs to teaching costs per pupil; the first two were most important. Tilak concluded underscoring basic points to cost and financing of education: 1) budgets cuts should be based on reliable estimates of the costs of education, 2) a minimum level of the cost of education per pupil should be defined taking into account a threshold level of facilities and should not be allowed to fall below this level in real terms in any region or over time, 3) construction of educational price index or indices for any inter-temporal analysis of investment in education, 4) a thorough knowledge of households' capabilities to invest in education was absolutely essential to state planners.

However, since the late 1970s and especially in the past few years, stagnant economic growth and severe fiscal constraints (in developing countries) have shifted attention to the control and/or reduction of educational costs, as well as employing alternative mechanisms for financing education (Tsang, 1988). Eicher (1984) discussed a set of complementary measures for reducing unit costs to realize the stated goal of 'universal primary education' by the end of this century: 1) to increase the internal efficiency of education by reducing dropouts and repetition rates; a measure easier said than implemented because of the complex causes of these phenomena, 2) to improve school organisation by upgrading the managerial capacity of school directors; identified by research as 'very cost-effective', 3) to reduce the curriculum options or length; difficult to

implement given the already low quality of education in these countries, 4) to increase the average class size or raise the average teaching load; class size was already high enough in most African countries, in urban centres, to impair the quality of education, and in the rural areas such measure meant that pupils had to walk too far to school but increasing the teaching load could be an easier task subject to the bargaining powers of the teachers' unions, 5) to reduce the high average teacher salaries; though politically not feasible because of powerful unions, nevertheless, a marginal reduction in their costs through a deal may be quite effective, as in Benin, 6) to hire less-qualified and/or temporary teachers; both these alternatives could not be adopted on a permanent basis because of their adverse implications on teachers' effectiveness, 7) to improve the quality of education cheaply by providing text books; proved to be most cost-effective. He recommended several options to finance general education: i) productive schools to increase the relevance of the curriculum and finance recurrent costs and quality improvements; two positive results were cited in Benin and Mali, ii) raising fees; an inefficient way to cover the costs of education, as increasing fees is generally considered regressive for poor families, and iii) to develop private education as an indirect way to reduce the financial burden of public education; not always advisable for equity reasons, iv) to cut subsidies for higher education and shift public resources thus saved towards primary education; a cost effective and equitable measure, though politically difficult to implement. However, Mingat and Tan (1985) questioned the equity and efficiency of subsidization in public education where subsidies were given to students merely by reason of their status as students. They noted that although a shift of public subsidies from secondary and higher education would increase private costs it could improve efficiency and equity. A fifty percent cut in higher education student subsidies would lead to a 10% increase in primary schools enrolment; with a 100% cut the

increase would be 20%, whereas further reducing secondary education student subsidies by half would increase the figure to 27% and to 35% if abolishing them totally. Interestingly, if the same resources were channelled to secondary education the potential rate of expansion would be larger, 100%, despite the higher unit costs. They concluded that movement towards reduction in subsidies would free a substantial amount of resources even if these extremes were not attained. Similarly, Psacharopolous, Tan and Jimenez (1986) suggested that recovering the public cost of higher education and possibly secondary education might improve equity if the extra funds were to be used to expand education at lower levels where lower-income groups were most widely represented. Greater decentralisation, including more leeway for private and community schools would improve efficiency among schools by encouraging competition; within the school efficiency would increase with managerial accountability. MacMahon (1988) observed that, in developing countries a more selective financial aid based on need among qualified students would allow some reallocation to primary levels where rates of returns are higher as well as further attainment of economies of scale in higher education; both increasing social efficiency and contributing more than at present to economic growth.

Wolff (1985) found wide variations in unit costs in both levels of education among Eastern Africa countries; that occasioned little surprise owing to the marked disparities in the determinants of costs among these countries. Average unit costs on secondary schools was the equivalent of US $430; seven times the primary per pupil cost. The range of variations was extremely wide, from the equivalent of US $41 in Uganda and US $93 in Ethiopia to US $823 in Tanzania, US $806 in Botswana and even US $1075 in Zimbabwe; a range of from 2 to 26. However, as enrolment increased unit costs decreased substantially. The determinants of these unit costs were the pupil teacher ratios, teachers' salaries and non-teacher salary costs; the latter constituted, on average, 35% of all secondary

education expenditure. Over the period under study the average pupil teacher ratio increased slightly from 21:1 to 22:1. Some countries retained their higher ratios; others kept their ratios far below this average. It is important to note that these average ratios disguised variations between the lower secondary level with high enrolment (and higher ratios) and the upper, highly selective level (with lower ratios). Average teachers' salary in secondary education ranged from one and a half to nine times higher than that of primary level; a much greater differential than in developed countries. It was explained by the high demand for this level of manpower and a carryover from expatriation times. Non-teacher salary costs included boarding costs (the largest share), school operation, equipment and text books. In countries with no boarding facilities (Lesotho, Mauritius, Swaziland and Ethiopia) this heading constituted less than 12%. However, the author noted that comparative analysis highlighted issues and problems which might be studied further in individual countries. He proposed several measures of cost reductions for the secondary level in different situations:

1) to raise low pupil teacher ratios to reduce costs,
2) to review higher teachers salaries in order to facilitate expansion of this level, and revise lower salaries to raise morale, 3) to expand access through correspondence courses and/or radio programmes, 4) to reduce wastage and increase internal efficiency by remedial classes, additional hours of attendance and homework, 5) to shift cost of boarding, textbooks and expendable materials to students, 6) to encourage expansion of private education. Interestingly, along the above lines, Tan (1985) found that families' school-related expenditure in Tanzania was quite substantial; totalling, in 1981, US $139 for public schools pupils and US $439 (including US $242 for fees) for private pupils. He concluded that the future expansion of public sector education in Tanzania might require the tapping of private sources of finance to supplement government resources. Scheifelbein (1983) emphasized that differences

in unit costs among countries were widening; disparities within countries were even more marked. These were accounted for by variations in teachers' salaries at each level, non-wage costs per class, and class size. Regrettably, there were strong constraints on quick changes, especially on the key determinants of educational expenditure, teachers' salaries and class size. As Fisher (1956) noted "a high proportion of costs made up of salaries and wages is intractable. In the remaining expenditure are many fixed charges and there is, of course, an irreducible minimum for such things as maintenance or for books, stationery or apparatus". In the presence of powerful teachers' unions attempts to monitor class size and enforce weekly load schedules could be limited. Costs did relate to physical characteristics and increase in sparsely populated areas or those with extreme climate, for disadvantaged children, and at post-primary levels because of the more capital intensive technology of education. Unfortunately, few studies on developing countries have assessed the combinations of sources of finance at the state and local levels. Fields (1980) found that in Ethiopia, Kenya and Tanzania public education systems were financed mainly by the national government (90% or more) but the private systems were predominantly financed by households' direct contributions. In Kenya household expenditures in education amounted to one-third of total resources. There was, often, a community decision to build schools by voluntary contributions of labour and local material, in addition to the individual expenditure. He concluded that as all the evidence suggested that public funds alone could no longer support the educational system, it was necessary to understand how those aspects of the financial system could be set into motion to propose alternative ways of raising new funds for education. Eicher (1984) suggested double-shift schools as a measure of cost reduction, but was concerned about the limited information available about their effectiveness. However, Bray (1990a) found that academic achievement in double-shift schools could be as

high as in single-shift; "their educational costs were not serious and need not necessarily be high ...multiple-shifts can be a valuable way to maximise cost-effectiveness". He further reported, Bray (1990b), that savings on capital costs ranged between 46% to 25% and other sources of savings included recurrent costs of administrative and ancillary staff, which rarely increased proportionately with enrolment, as well as teachers salaries where they were allowed to teach in more than one shift. He concluded "... that in most cases the economic savings permitted by multiple-shift schooling outweigh the additional financial costs (though) precise determination of the balance sheet ... is difficult".

Heyneman (1984) found that the proportion of the national budget devoted to education in developing countries was as large as, if not more than, that in industrialised nations. However, in the former, nine-tenths of the investment went to teachers' salaries whilst the share of teaching materials declined as the financial stringency tightened. Non-salary costs per pupil range of variations, in American dollars, was from over 300 in Sweden and Norway, 220 in USA and Netherlands, 75 in Italy to 2.24 in Indonesia, 1.54 in Ivory Coast, 1.24 in Malawi, and 1.15 in El Salvador. These levels of expenditure influenced the quality of the classroom materials and was reflected in wide differences in learning achievements. The average score in reading comprehension and in science for a typical student from a developing country falls in the bottom fifth to tenth percentile of the scores across all countries.

Edwards and Tisdell (1989) found that even in Zimbabwe, which devoted the highest ratio of GNP to education among African countries, two important areas had deficient expenditure: scholarships for primary and secondary levels and teaching materials, (0.4%). Unit expenditure was highest in Zimbabwe at all levels mainly due to an exceedingly high level of teachers' salaries; the pupil teacher ratios in primary and secondary levels were comparatively high. Reduction in unit costs could be

achieved if the high rates of wastages at both levels were lowered and if teachers' salaries were reduced; the latter might not be politically feasible. They concluded that Zimbabwe's high cost per pupil enrolled and per graduate was a result of its drive to increase enrolment extremely rapidly; that incurred paying high teachers' salaries to attract expatriate teachers and to expand teachers training to increase indigenous supply.

The World Bank (1988) reported that the financial crisis of the 1980s and the scarcity of resources led to stagnation and even decline in enrolment ratios and low quality of service as indicated by per pupil expenditure, non-salary instructional materials, physical facilities and equipment, and output as measured by the scores of cognitive achievement tests. In developed countries per primary pupil costs (in current 1980 U.S dollars) was $2,200, in Sub-Saharan Africa about $65, in East Asia $190, and in Latin America about $155. In the median African country, between 1970 and 1983, per pupil expenditure (in constant 1983 U.S dollars) at the primary level declined from $67 to $48 and at the secondary level from $362 to $223. Moreover, the misallocation of expenditure between the increasing share of salaries and the decreasing proportion of non-salary costs as budget cuts increased further constrained educational achievement. Instructional materials accounted for 1.1% of the primary budgets; only $0.60 per pupil for textbooks, teaching aids, stationery and wall charts. The Report proposed a number of measures to achieve expansion in both levels and improve the quality of education including containment of unit costs and restoration of an efficient mix of inputs. Reduction of unit costs could be achieved by reducing teachers' salaries bill by recruitment of unqualified and untrained teachers at the primary level; this would reduce teachers' salaries but not promote quality. Other measures which could be applicable at the primary and secondary levels were to:

a) increase the gap between teachers' salary increments; this may not however be possible to apply with a unified

salary scale for all civil servants and b) increase pupil teacher ratios by increasing average teaching load per teacher, reducing attendance of pupils per year, increasing class size, and reducing dropouts and repetition rates. However, to increase pupil teacher ratios is administratively more feasible than to take measures related to teachers' salaries, but to increase average teaching load where the required load was delineated by agreement between the educational authorities and teachers' trade unions would need the consensus of both sides. In most countries of this region average class size was above fifty pupils, especially in the lower primary classes where face to face contact with teachers is most essential, and in many secondary schools it was around fifty. Dropouts and repetition could be due to the quality of education or the high opportunity costs of children and youth, the irrelevance of the curriculum to rural or nomadic societies, or the expensive 'free' public education. More in depth investigation into the causes of educational wastage is needed before any steps can be taken to reduce it. Caillods (1989a) evaluated critically the solutions recommended by the above Report to the problems of education in Sub-Saharan Africa. She doubted the effectiveness of the proposed measures such as textbooks and teaching aids for improving the qualities of education where low teachers' morale prevailed. The suggestion to reduce teachers' salaries did not take into consideration the drastic decrease in real terms of average teacher pay in a large number of these countries. Some teachers made up for a reduction of salary in real terms by taking on a second or even a third job, resulting in absenteeism; teachers with specializations in high demand elsewhere might even quit the teaching profession. She suggested that the decline in real salaries should be stopped and teachers should be compensated and remobilised. The recruitment of under-qualified and untrained teachers could not be justified where they had to teach large and multi-grade classes. She also considered that the measures suggested to decrease pupil dropout rates and increase expansion would not be

adequate as there could have been a number of reasons for lack of demand. She observed that 'free education' was expensive for poor families because they had to pay for uniform and instructional materials, to build schools and maintain facilities, and forgo real income when their children went to school instead of helping in the farm or household. Her suggestion was that entirely `free' primary education, at least for the poorest families, could really help efforts in this direction. She stressed the importance of examining alternatives for the existing formal structure of education, especially at the primary level; shortening its length, or recognising its traditional forms.

Caillods (1989b) summarized the discussion on the four main themes of the workshop on the prospectus for educational planning; namely the financial crisis in education, the deterioration of the quality of education, administration and management of education, and the relationship between education and work. The attempt to adjust resources to accommodate larger numbers of school age population affected resource allocation by level and type of expenditure. The types of expenditure first reduced were capital and non-salary costs; the latter included teaching materials and school maintenance, which affected the quality of learning. The nominal teacher and administrative staff salaries, being inflexible, were kept constant and increments for seniority were frozen. Inflation reduced the level of salaries in real terms and eroded their purchasing power, which lowered the morale of all staff. Three major financial strategies were recommended regarding the allocation of public resources, the improvement in the utilization of existing resources and measures to diversify funding resources and to acquire new ones. There was a general agreement on the need to improve the management of existing resources, especially teachers. Unit costs could be reduced without undermining quality by increasing class size, multi-grade teaching, training multi-subject teachers, and producing textbooks locally. Moreover, increasing the length of the school year and time for instruction could

improve the effectiveness of teaching without much increase in costs. No consensus was reached on the role of the State and the transfer of part of the responsibility to the private sector through cost-recovery at post-primary level. Some participants argued that privatization of management and cost recovery were indispensable components for restoring economic rationality. The decline in quality, which was attributed to the earlier growth in enrolment without commensurate change in teaching methods and curricula, had been accentuated by the financial crisis. Several measures were discussed, such as distributing textbooks for pupils and teachers and even defining packages of 'inputs' necessary for minimum levels of quality learning. The key role played by teachers was stressed and hence the need to re-mobilize them through a number of measures including pedagogical guidance, career enhancement opportunities and even increasing salaries (though tied to performance) where necessary. The role of the school principal was stressed; quality depends not only on acquisition of resources but on the mode of their management as well. The financial crisis amplified the importance of redeployment of available resources and their better management by administrative units. The quality of education needs improved educational administration, especially at the institutional level. The workshop's main conclusions were that:

1) the quality of education, preparation for employment, funding strategies and management were relevant to all contexts, despite the variation in extent and gravity of the problems, 2) some countries were faced by limited education coverage, and growing inequality in terms of access to education among regions, social groups and gender; such problems must be given high priority, 3) improving the quality of education was a central preoccupation everywhere; developing countries were struggling to improve teaching conditions, whereas developed countries' main concern was pupil achievement. Eicher (1989) argued that the causes of the financial crisis experienced by educational systems in

the last decade were partly rooted in the systems themselves and were only amplified to different extents by the global economic crisis. The increase in the cost of teachers, the most important factor, stemmed from two causes: first that teachers' salaries tend to rise with economic growth and second that there is strong pressure from educationalists and parents to cut class sizes. The costs of the other factors, such as non-teaching staff, buildings and land tend to increase with more urbanization and technical development. On the other hand, the education budget in many countries had stabilized or even declined and 'resource cutting' had affected the supply of the service. As teachers' salaries declined in real terms, they tended to lose interest in their work and seek other activities to ensure their subsistence. In addition non-salary items disappeared from the budget and buildings and furniture deteriorated. The consequences of all these were lower success rates in public examinations and the top priority goal 'universal primary education', planned to have been attained by the 1980s, had to be postponed even further.

The effect of the financial crisis on the demand for education was equally significant. Surveys conducted in countries where enrolment was falling revealed that poorer families tend not to send all their children to school as public education costs, even when 'free', were on the rise and its returns were diminishing; access to well paid white-collar jobs were no longer guaranteed. He suggested that entirely public funding would not be feasible in many developing countries, in particular Sub-Saharan Africa; users had to pay part of the costs and private financing had to be topped up. Moreover, if budgetary cuts were inevitable it was crucial to reduce costs of factors with the least possible negative effect. His conclusions stressed the importance and urgency of policies such as better management of resources, extension of private education and reform of university and student aid funding for low-income countries. Tibi (1989) pinpointed the profound consequences of the economic crisis as slow growth

and decline in absolute and relative effort in the allocation of resources to education. In a period of financial crisis, under utilization of the existing resources would reinforce the arguments for limiting or even reducing money available for education. Many factors contributed to this phenomenon, among these were the quality of the management of financial and real resources and conditions for recruitment, deployment and renumeration of personnel. Budgetary credits were frequently paid for persons who no longer worked in the administration and/or for highly evaluated contracts for construction and equipping of educational and administrative buildings and for purchases of other goods and services.

The problems relating to the utilization of teachers were numerous, the most important being:

- a surplus in the number of teachers indicated by the large numbers working in administrative jobs, those working in other ministries, not carrying out their required teaching loads, or allocated to an establishment in name only.
- varying distribution of teachers between establishments according to region and location (urban/rural).
- difficulties in the utilization of teachers related to size and location of establishments.
- in the majority of developing countries, the systematic decline of teachers' salaries in real terms lowered their morale; most research indicated that teachers' motivation was positively related to pupils' achievement.
- marked disparities in total non-salary expenditure between establishments of the same size and kind; this is closely related to the financing mechanism and the distribution of resources to establishments and led to under-utilization of resources. However, the percentage of recurrent expenses and the share allocated to pedagogical materials and to text books were completely inefficient. Total unit costs in Africa and Latin America tend to decline at all levels, whether expressed in constant prices or as a ratio of GDP per capita. This could be attributed to the interplay of three important factors; the decline in real terms of

teachers' salaries, variations in class size and reduction of the unit non-salary expenditures in real terms. Tibi concluded that an appropriate response would be a mix of options of which it was necessary to assign top priority to improvement of the public sector performance through efficient management of the utilization of resources at all levels. Caillods and Postlethwaite (1989) also found that in many developing countries teachers' salaries had declined in real terms; between 1979 and 1984, they had lost above 40% and even 85% of their purchasing power in some countries in Latin America and in Africa. Related to the decrease in salaries, in spite of some corrective measures, was the decline in the status and prestige of the teaching profession; the effect on motivation had been very negative. Teachers often worked in an unfavourable environment without pedagogical guidance or supervision or even the necessary aids such as blackboards, text books, library and science kits in secondary schools. On average, expenditure per pupil on instructional materials was very low in developing countries, US $2.24 in Sub-Saharan Africa. Few school principals were trained and this had an adverse impact on the orientation of young teachers and on the efficient running of the school and management of its resources. School buildings and furniture were often in very bad condition, lacking the minimum facilities such as lighting and water; budgetary restrictions worsened the situation. The outcome of the teaching/learning process as evaluated by two indicators of internal efficiency, repetition and retention ratios and levels of achievement, was very low. These differences might be associated with urban-rural differences, variations in teachers' qualifications and motivation, and with availability of resources; to which school a child goes does make a great difference. They suggested a whole mix of variables to improve the teaching/learning processes within the school including a number of measures for re-motivating teachers, pre-, in- and on-service training of teachers and school principals, basic instructional materials and classroom furniture, larger

classes (up to 50) and larger schools (up to 2000) in urban areas, increased instructional time and time on task and frequency of homework, and revision and renewal of the curriculum, adapting it to the changing needs of the society. Abraha, et al. (1991) found that the number of school shifts was positively related to the persistence of girls in primary schools in Ethiopia. They reported that "crowded school conditions, as indicated by large class sizes and multiple shifts, do not hinder girls' persistence. In fact, such indicators of high social demand for schooling are positively related to girls' attainment".

Psacharopolous and Mingat (1985) observed high unit costs of schooling at all levels in Sub-Saharan Africa. Regrettably, these were not due to low pupil teacher ratios or to the high quality of education but was attributable to the relatively high teachers' salaries in terms of GNP per capita and the high share of state subsidies to pupils that increased the higher the level. Non-salary costs had fallen, in this region, to the extent that education quality had been greatly impaired; cost-efficiency analysis revealed that increasing these expenses would be beneficial and economically efficient. On the other hand, the high teachers' salaries could be reduced by three measures:

- by better utilization of teacher time,
- by reduction of teacher pay; though generally more difficult to apply this would be relatively easier where teachers were a highly privileged group in relation to other civil servants,
- by lower teacher qualifications; there could be a trade-off between the quality of the teachers and the number of pupils the country would enrol: but "... the loss in terms of knowledge acquired by individual pupils is much more than offset by the gain in enrolment within a given budget".

Hence, they suggested more efficient management of the education system by means of three measures:

- by reviewing the priorities of investment between the various levels and types of education according to national goals;

- by reduction of unit costs based on cost-benefit analysis to avoid repercussions on educational output and quality;
- by reduction of student grants in post-primary education, particularly in higher education.

Tsang (1988) observed that there were significant disparities in per pupil costs of education in different situations, in developing countries. Interestingly, there were clearly identifiable patterns in the unit costs because of the common technology adopted that reflected similar operations in education across countries. He found that it (unit costs) rises with the level of education, it is dominated by personnel costs, it is higher for boarding schools than day schools at secondary level, it is generally higher for vocational education than academic education at secondary level, and it has a built in tendency to rise over time. At the secondary level non-teaching costs such as boarding facilities expenses and equipment costs for vocational and technical education were significant cost determinants, as well as teachers' salaries and pupil teacher ratios. The main factors that affected unit costs in developing countries were changes in the technology of educational production in terms of staffing, class size and school organisation, teacher costs as determined by the salary structure, the current pattern of qualifications and the age composition of the teaching force, average teachers' salary and pupil teacher ratio, the rate of utilisation of educational resources, and rates of drop-outs and repeaters. Consequently, a number of cost reduction strategies had been suggested, including revision of teachers' salaries, low cost teachers, increasing teaching load, increasing class size, school organisation and alternative education technology. The main drawbacks of these measures was that their potential impact on school output, such as pupil performance, was not empirically tested. He concluded that "cost reduction at the expense of school quality does not raise the technical efficiency of the school".

Similarly, other researchers emphazised that in order to avoid repercussions on educational output and quality

according to a cost-benefit analysis (Psacharopolous and Mingat, 1985) it was crucial to reduce costs of factors which would have the least possible negative effect (Eicher, 1988). However, this emphasizes the critical importance of the educational production function studies in pinpointing those variables.

Simmons and Alexander (1978) found that the socio-economic background was the major determinant of student academic achievement in developed as well as developing countries, although it accounted for less variation in pupil performance in developing countries where the impact of variables relating to schooling was, on the whole, greater. Interestingly, Fuller (1985) also found strong evidence which showed that school quality contributed to higher pupil performance, even after controlling for pupil family background and economic context. However, there were some factors which were consistently related to student achievement such as expenditures per pupil, instructional materials, school library activity, teacher training (tertiary level), length of instructional programme and teacher's social class. Other factors which seemed to influence performance, though less frequently, included class size, laboratories and individual teachers' salary levels. Some further variables were thought to have some influence but the number of studies launched were too limited to draw definite conclusions, particularly frequency of homework, use of instructional radio, and in-service teacher training. However, it was evident that costly inputs such as class size, teachers salaries and science laboratories were not related to higher achievement levels (Fuller, 1987).

Lockheed and Hanushek (1988) also emphasized that to improve the internal efficiency of education resources had to be shifted to those inputs that had larger effects on learning. They reviewed eleven case studies relating to: instructional materials with the focus on textbooks, interactive radio for learning mathematics, foreign and national languages, technical and vocational training in

secondary schools, and teacher education. In nine out of eleven the effect of the intervention on students' performance was positive, but the per pupil costs of these interventions varied from $561 in lower secondary agricultural training, to $0.25 for textbooks. Regarding the efficiency of alternative educational 'processes' two studies on unique pedagogical practices were reported as cost-effective; 'group investigative methods' and 'cross-age peer tutoring'. In the latter older students tutored the younger and both tutors' and tutees' learning gains improved. Interestingly, a similar practice is found in `Koranic Schools' in Sudan. Older pupils (huwars) with outstanding behaviour and achievement were assigned to supervise the younger ones' reading and writing. The authors concluded that, although the large majority of the studies was effective across several countries and student learning outcome measures, the more cost-effective interventions were textbooks, interactive radio, peer tutoring and co-operative learning.

Fuller (1987) signalled some of the limitations of the school effects literature, such as how researchers in this area concentrated on the effect of material inputs and not on how these inputs were mobilised and organized within schools and classrooms. Similarly, Cohn and Rossmiller (1987) critically evaluated the quality of data and the generalisability of the findings. In most cases the linkage between effective schools characteristics and student achievement was assumed or indirectly exerted, for example the school principal's role. However, they claimed that research on effective schools offered 'a list of ingredients' but did not produce 'a recipe for an effective school' or identify the relative importance of the various ingredients. Nevertheless, they admitted that the strength of this research was its focus on the school as a producing unit and realizing that the substance of education was in classes and schools; "education may ... be regarded as a cottage industry because most decisions ... are made in schools and classrooms by ... school principals and

teachers". Surprisingly, they found a set of certain school characteristics which, persistently, emerged associated with pupil success. These included the instructional leadership by the school principal, academic emphasis within the school and classroom, more time-on-task, class management and discipline, staff professional development as well as the composition of the student body and the home environment. Although research findings revealed that 'throwing more money' at schools would not improve student learning they implied that school expenditures were necessary and all depend primarily on how the additional funds were to be used and whether schools would be aware of resource reallocation strategies that would improve output. It was evident that adequate facilities, equipment, books and other instructional materials were necessary for a school to be effective, but these alone could not insure effectiveness if those who taught in them were not competent. The findings did suggest that, at some level (as yet undetermined but apparently reached in highly developed countries) attention must increasingly be directed to how resources were used in the educational process. In line with other studies of school effectiveness, Vulliamy (1987) research work in Papua New Guinea provincial high schools emphasized the importance of the head teacher and the style of his administration as the most important single factor determining the quality of a school besides the levels of staff morale, school facilities, teacher housing and student discipline.

4.4. Sudan Studies:

In the Sudan for the last two decades the 'Educational Statistics' yearbook included no data or information on educational budgets, current or capital, at the central or regional levels. The only information relating to that was the data on per pupil cost for each level of education which was available for the financial year 1983/84 as a result of the study on educational cost analysis (Salih, 1986); discussed earlier. Surprisingly, the Educational Statistics had always included a section on 'expenditure on public

education' since the 1950s. It was very comprehensive, tabulating in details the current and capital expenditure of the government budget, the educational budget and the total educational expenditure as a proportion of the total government expenditure for the period of last ten years annually. Detailed data of education expenditure on each level including technical education, eductional administration, and teacher training colleges by each item of expenditure: personnel, non-personnel costs and boarding costs, were also presented. Per pupil costs was computed separately for each level and by each heading of expenditure. However, the trend ceased in the 1970s and only in the academic year 1979/80, that data relating to educational expenditures and per pupil cost by level of education was published once again.

However, the 'Sudan Educational Sector Review'(1977) was the first attempt to estimate the cost of education from budgeted sources. This review found that from 1969 to 1975 the ratio of school enrolment to school age population (7-24) increased from 19.9% to 34.7%, whereas the ratio of recurrent education expenditure to Gross National Product (GNP) systematically declined from 7.7% to 5.7%. "The present ratio of expenditure is so high that there is little hope of its increase, while the ratio of school enrolment is so low to an extent which calls for treatment by other means". The total capital and recurrent budget of education in 1975/76 was £s 77,472,000, out of which 45.3% was allocated to primary education, 19.3% to junior secondary (intermediate), 14.2% to upper secondary, 7% to headquarters (administration) and 14.2% to higher education. Salaries and wages claimed the highest share at each level; 81.2% for primary, 79.9% for junior secondary (intermediate) and 77.4% for senior secondary. This budget was mainly financed by the People's Local Councils (81.7%) but the Central Government share was 14.1%, self help contributd 1%, whereas 3.2% came from foreign assistance. Based on this national educational budget, the unit costs at the primary level was £s 30.30, at the junior secondary (intermediate) level

£s 72.20 and at senior secondary level £s 151.00; a secondary school pupil cost 5 times his/her primary's, and more than twice his/her junior secondary's counterpart. The strategy recommended two measures to control costs, after conducting studies to test their effectiveness: a) reduction of teacher cost by raising the pupil teacher ratios for all levels, b) reducing the cost of boarding or abolishing it where possible. Primary education was to take different formats; alternate admission schools and the one-teacher school in sparsely populated areas, and multiple-shift schools in the urban, densely populated centres.

The 'Cost of Education Committee' (1983) in the Central Region estimated the cost per pupil for the three stages of education from the regional approved budget. The total per pupil cost at the primary level was £s 120.85; £s 38.66 on teachers' pay, £s 1.20 on service personnel, £s 8.50 on other services (transport, electricity, water, etc.), £s 22.50 on pupils' furniture (desk and chair) and £s 49.99 on text and exercise books. The latter two items were to be used over the six years, duration of the cycle. Per pupil costs at the intermediate level was less than that at the primary level, £s 113.10, because in contrast to the latter, at the former level the total costs of textbooks and pupil furniture were apportioned over three years and five years respectively, being their estimated lifespan. However, applying the same notion to the primary level and apportioning the cost of textbooks and furniture over the six year period, per pupil expenditure would be only £s 60.44, half the inflated cost presented by the Committee. A breakdown of the intermediate level per pupil costs showed that £s 68.80 (60.8%) was on teachers' pay, £s 6.70 (5.9%) on service personnel, £s 10.60 (9.4%) on text and exercise books, £s 7.00 (6.2%) on pupils' furniture, £s 20.00 (17.7%) on school operation. At the secondary level, per pupil costs was £s 174.36; over 50% higher than the intermediate level. Similar to the lower levels teachers' salaries dominated the total costs, £s 101.00 (57.9%), school operating costs £s 51.36 (29.5%), text and exercise books

£s 15.00 (8.6%) and pupil's furniture £s 7.00 (4%). It seems that the intermediate level teachers had a higher share of total unit costs than the secondary level, though the latter's operating cost was higher. Interestingly, a comparison of these per pupil costs and those of the schools surveyed in Salih (1986) revealed that at the intermediate level both the macro and micro data presented the same unit costs, £s 113.00, the same proportion of teachers' salary, though there was a higher percentage devoted to non-teaching salaries at the school level, whilst non-salary costs were higher at the regional level. At the primary and secondary levels there were wide differences both in total unit costs and its distribution.

The Educational Planning Section (1985) assessed the capital and teacher costs of achieving universal primary education by the year 2000, the base year being 1983. The estimation assumed two alternatives for school enrolment: with intervention for improving the internal efficiency by gradually abolishing repetition and dropouts, and without. Three teachers' requirements options were calculated for each of the two alternatives: a) a teacher per class ratio of 1.33:1, b) a teacher per class ratio of 1.17:1, c) a pupil teacher ratio of 40:1. The first option required a teaching load of 23 periods per week whereas, the second 26 periods. However the total cost over the period, calculated on the basis of a per pupil costs of £s 89.00 at 1983 current prices, was over £s 353 millions for the first alternative and over £s 344 millions for the second. However, each of these alternative costs highly underestimated the total costs. For instance, 1) the alternative based on reducing and eventually abolishing educational wastage did not estimate the costs of the proposed measures for achieving that; whether remedial classes, automatic promotion, provision of school meals, or a combination of all of them would be used. Research indicated that causes of educational wastage are very complex and were not always within school control, 2) the cost of teacher training for the whole period was neither

estimated for the expansion purpose nor for slow learners, 3) raising average teaching load from the required 18 periods (Salih, 1986) to 23 or 26 periods without consulting this level teachers' union may not be feasible; overloading teachers may have adverse impact on their effectiveness which is badly needed to improve the internal efficiency of the system, 4) the total cost of expansion was based on the current per pupil costs of 1983/84 which : a) did not allow for improving the level of provision at the time or even, to maintain that level up to the year 2000, b) assumed that the average costs would remain constant over the planning period and thus were not adjusted for inflation, 5) teachers' cost estimation was based on the current average teachers' salary with no regard for their distribution by qualification, on the salary scale, age composition, or future increase in the salary scale; no incentive increase to raise morale was considered, 6) adding teachers' cost to pupils' cost (which included expenditure on teachers) was mere duplication or double counting. However, this is only a crude evaluation on the current expenditure side; cost of buildings and furniture would definitely be several times higher.

The Directorate of Educational Planning and Statistics in the Northern Region could calculate from budgeted allocation for secondary education the per pupil costs in secondary schools for 1987/88. Per pupil costs, in Day Schools was a total of £s 958.00; with £s 403.00 costs on teachers' salaries(%), £s 301.00 on books and equipment, £s 74.00 on services (transport, water, electricity, etc.), £s 20.00 on service personnel wages and £s 160.00 on furniture. The costs per boarder was higher on services, £s 148.00 (boarders were given free transport three times to and from their home town) and on service personnel wages, £s 75.00, in addition to the extremely high feeding expenses, £s 1,200.00. The figure included for 'furniture', usually a capital expenditure, did not indicate whether it was the total cost of furniture or part of the cost apportioned over two or three years. Per pupil cost on administration was not computed separately; quite a

substantial amount, specially at this level of aggregation. Interestingly, the pattern of expenditure at this level indicated a well balanced mix of inputs; 42% for teachers' costs and 31.4% on textbooks and equipment. However, the detailed analysis at the micro level, next chapter, would verify whether this pattern is reflected in the individual schools' operation. On the other hand, the total cost of educating a boarder was £s 2,287.00; 2.4 times as high as the cost of a day pupil.

Ombadda (1988) attempted to estimate the cost of adopting an alternative educational ladder (9 years-3 years). He found that if only the existing primary schools (6,775 schools) were to be completed to nine classes, equivalent to adding a one-stream intermediate school (3 classes) to each, the cost would be £s 1,000 million; the cost of building one-stream school, estimated at current prices, was around £s 200,000. The automatic promotion to class seven would mean the admission of 340,000 pupils (those in 6th grade primary) instead of the 92,000 usually admitted by selection in the first year intermediate. The current cost per day pupil then, at the intermediate level, was £s 108.00 and £s 370.00 for a boarder. He assumed that all the pupils would be accommodated in day schools (impossible in practice) and the total recurrent costs was around £s 25 million at 1984/85 prices, which could be double this figure in 1988 prices. However, in relation to the current budget of the Central Ministry of Education (only £s 20 million) and the educational budget for all the regions and district councils (only £s 120 million) in 1985/86, this alternative ladder was beyond the means of the nation and hence could not be implemented. In conclusion he suggested a detailed study which would include all the costs by headings and items of current and capital expenditure and by region.

Nur (1987) observed that, since independence in 1956, financial resources flowed into the education sector from various internal and external sources, but the main providers were the Central and Regional governments. He

explained that there was no information relating to the individual regional current and capital budgets; this level was responsible for all general education. Although the Central Ministry of Planning retained data on the annual subsidy for each region pertaining to all wages and salaries, services and minor maintenance, there was no standard formula to isolate that assigned to education at the regional, provincial or district level. Hence, the total budgets allocated to education or for each level of education were not available at the Central level; regretably where overall educational development is planned. However, he found records of the deductions for textbooks and school equipment by region for two consecutive years (1985/86 and 1986/87); based on the regional ability to pay. Interestingly, the Northern and Eastern Regions increased their expenditure on textbooks and equipment in 1986/87 marginally, Kordufan raised it by 69% but the Central Region almost trebled its expenditure. On the other hand, Khartoum reduced theirs to 75% but Darfur to only 35% (most of the schools were closed due to security problems). The Central government total current and capital education expenditures, which included only allocation for technical education, was available for a number of years. The current budget revealed a declining rate of increase between 1980/81 and 1984/85; even a negative increase in the last year because more responsibilities were transferred to the regions. However, the capital or 'development' budget as a proportion of the total central services budget increased from 16.2% in 1984/85 to 27.7% in 1986/87; the first two years of technical education plan for expansion. In conclusion the author indicated, quoting the Ministry of Finance and National Planning, that it was impossible to account for the total amount spent on education in the Sudan in one financial year, for both capital and current expenditure, as each individual region's current expenditure could not be computed. Ali (1987) claimed that 'the low quality of the system is seen in the complete absence or inadequacy of educational and occupational guidance services'. The low

quality of education in the various levels has been the subject of discussion in all recent conferences on education, but indicators of low quality are lower per pupil expenditure, lower non-salary expenditure, unqualified teachers, etc.; not the absence of educational and occupational guidance services. That would not lower, by itself, the quality of the system. Moreover, he argued that 'the internal inefficiency of the educational system results in very high dropouts and repetition rates'. Educational wastage can be a result of an irrelevant curriculum, inadequate school facilities, poverty, etc.; they are indicators of the internal inefficiency of a system, not "a result of it". More importantly, quoting, the Sudan annual 'Economic Survey,' he reported that the educational expenditure was £s 8.3 million in 1973/74, slightly increasing, though unevenly, to £s 22.9 in 1983/84, the highest level, after which it started to decline to only £s 15.6 million in 1985/86. This represented 4.4%, 1.6% and 0.5% of the total government expenditure, respectively. He wrote "the figures show a very insignificant proportion of government expenditure is allocated for this sector. One wonders how such a small portion is divided among the various sub-education sectors". Surprisingly, one would definitely wonder how did he calculate the 'recurrent unit costs' on primary education (£s 102), on intermediate (£s 155) and on secondary (£s 241) to project future costs of expanding the three levels if he assumed that the total expenditure on education for the three levels was £s 22,900,000? However, this budget did not include any current expenditure on primary or intermediate education before 1980 and not any level of general education except technical education after that. According to the Regionalization Act of 1980, all expenditure on general education was transferred to the regional governments. Hence, this budget was only for the Central Ministry of Education and represented expenditure on centralized functions as prescribed by that Act.

4.5. Conclusion:

In conclusion, it is evident that data on educational costs in developing countries are not readily available and the dearth reported by international organisations may be unreliable and incomplete at all levels of aggregation (Eicher, 1984). In many cases the efforts to study the costs of education have been bedevilled by deficient relevant information. Previous research work and studies in this field, in contrast to those in other areas, were not published and "... many ... still remain as drafts or circulate as mimeographed reports" (Schiefelbein, 1983), rendering this information very difficult to retrieve or disseminate. This emphasises the importance of collecting data at the micro level where physical and financial resources are actually utilised and where expenditure from all sources of finance can be computed.

In the Sudan, it is evident that relevant cost data for accurate cost analysis is not available at any level. Cost estimations for educational development plans or projects were based on uninformed guesswork. Neither economists nor enough educational planners are interested in this field. The situation is similar to that which urged Woodhall (1972), three decades ago, to write that "cost analysis ... remains one of the most fruitful areas of research ...". Since that time Woodhall emphasised the importance of educational cost data at the individual school level and hoped that "the sophistication of information on costs will again be increased, particularly by means of detailed studies of institutional costs". Hence the need for this study which, it is hoped, will contribute towards filling the wide research gap in this area in the Sudan and will stimulate both educational planners and economists to undertake further studies in this field.

CHAPTER FIVE

COST: BASIC CONCEPTS IN ECONOMIC THEORY AND RELEVANCE TO EDUCATIONAL EXPENDITURE:

5.1 Introduction:

"A class in economics would be a real success if the students gained from it a real understanding of the meaning of cost in all its many aspects." (Clark, 1965)

To promote such an understanding, the basic concepts of the term cost and its various definitions in economic thought are reviewed, here. As this research is on school costs analysis it is necessary to relate the discussion on different aspects of economic cost to educational costs and examine its applicability. In doing so key standard text-books in economic theory and references to different topics on the economics of education have been consulted, quoted and referred to. Diagrams from these sources are used to illustrate different concepts.

This chapter aims, first, to discuss the evolution of cost concepts in relation to the production theory and how the economist measures cost; then, how far the criterion of economic cost analysis dominates educational cost analysis is verified.

5.2 Theory of Cost in Economics:

Economists, usually, relate the term "cost" to the production process; "the principles of production lay the foundation for the analysis of costs" (Eckert and Leftwich, 1988), as well as other economic concepts. The concept of costs of production, as used in economic analysis, differs from common usage; "the economic concept is more precise and consistent" (Eckert and Leftwich, 1988). In micro-economic theory of production the key concept is the production function of the firm; since the classics, economists stressed the firm as the basic economic unit of production.

The traditional theory assumes that the firm has two inputs: **labour** and **capital** and that "these two inputs, labour (L) and capital (K), are continuously variable and

continuously substitutable in production at all times; to each combination there corresponds a unique maximum quantity of output (Q)" (Wallis, 1973). This production function can be represented algebraically by the following equation:

$$Q = f(L, K),$$

which represents the technical relationship between the maximum amount of output that can be produced by each and every set of specified inputs (or factors of production) and is defined for a given state of technical knowledge (Samuelson and Nordhaus, 1985). In fact, the production function summarises the efficient production possibilities open to a firm, a technical maximisation problem having been solved (Wallis, 1973).

In this context of assumed flexibility and substitutability a firm can vary the combination of its resource inputs in one of the following ways:

a) increase or decrease output level within limits by increasing or decreasing the quantity used of one or more resource inputs, while the quantities of other resource inputs are held constant.

b) vary the quantities of all resource inputs used, to increase or decrease its output.

c) increase the output of one product by reducing its output of the other, in case of multi-product firms, depending on the amount of its resource inputs available.

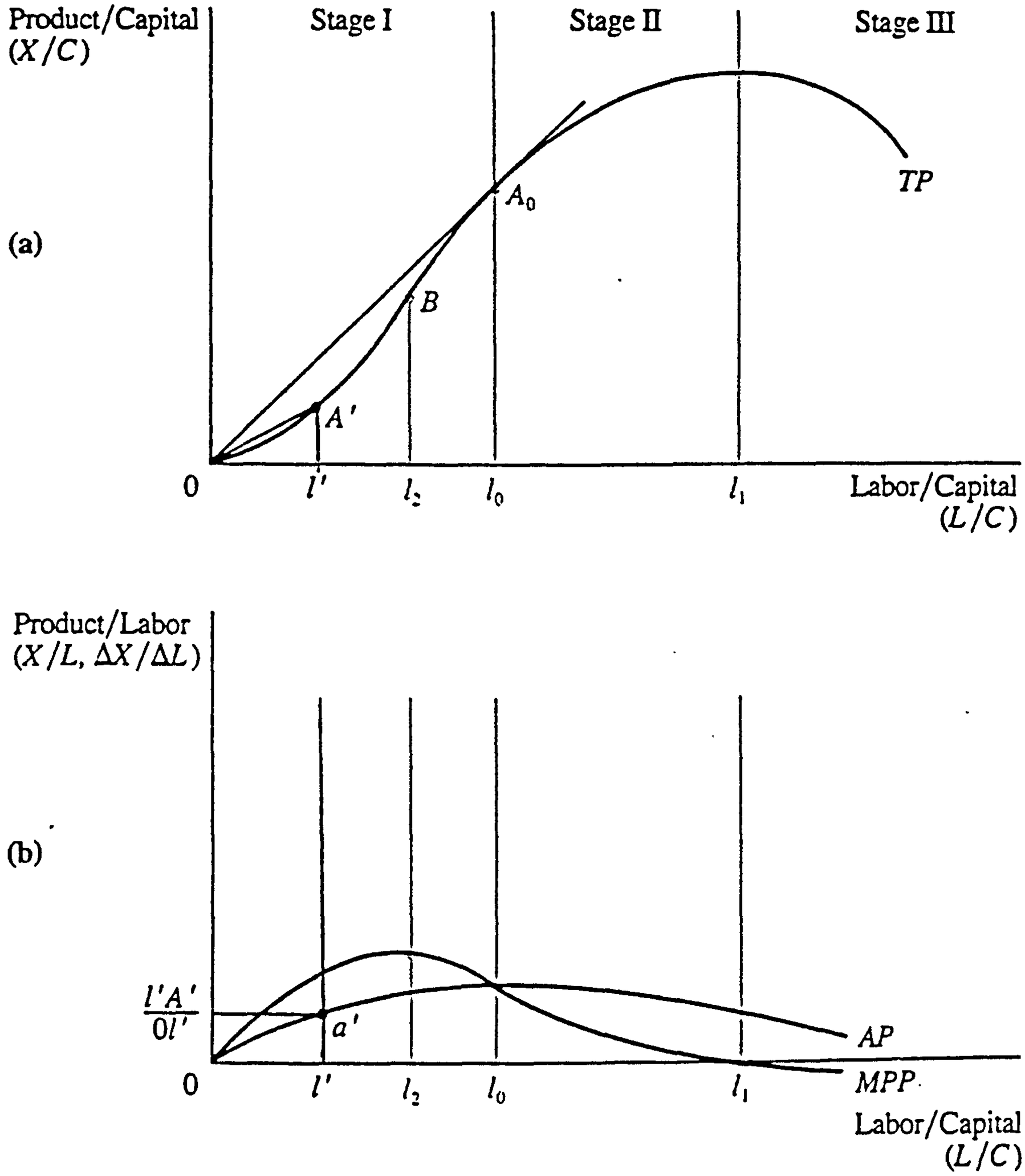
The decision of the firm as to which of these options to adopt depends on the state of technology; that varies directly with time. Here the distinction between the short-run and the long-run is important. Although no very precise chronological definition can be provided for these terms, the general purpose of the distinction is to differentiate between a short period, during which economic actors have only limited flexibility in their actions, and a longer period that provides greater freedom. However, the first option is possible in both the short-run and the long-run, the second applies only to the long-run, while the third can survive both.

In the short-run some resource inputs, generally fixed plant size or capacity, are fixed while others are variable. In this case an increase in some varying inputs relative to other fixed inputs will, in a given state of technology, make total output increase but after a point the extra output resulting from the same additions of extra inputs is likely to become smaller and smaller. Diagram 5.1, panel (a) confirms that adding more of a variable input, such as labour (L) to a fixed input such as capital (C), increases total product, as implied by the rise in total product curve (TP). This increase is due to the increase in the marginal physical product and consequently the average product, as shown by the marginal physical product curve (MPP) and the average product curve (AP) in panel (b). Beyond point B successive increase of labour units decreases the marginal product, though the average product and the total product are increasing. Beyond point A additional units of labour further decreases the marginal product and decreases the average product, but the total product continues to increase. In the next stage, the total product reaches a maximum at 1, beyond which it starts to decrease, causing a decrease in the average product while the marginal product tends to be negative (Stage III).

As demonstrated, in the short-run, the firm's behaviour is bound by its past commitments and its fixed plant size and capacity. In this production period it is limited by the alternative output that its 'fixed' inputs can produce with the aid of its 'variable' inputs. Thus, its production function is said to obey the law of non-proportional returns (Ryan and Pearce, 1977). The law of non-proportional returns (or, as it is commonly known, the law of diminishing returns) states that if the input of one resource is increased by equal increments per unit of time while the quantities of other inputs are held constant there will be some point beyond which the marginal physical product of the variable resource will decrease (Eckert and Leftwich, 1988).

The conventional view is that a firm acquires factors and sells products, its aim is to maximise the difference

Diagram (5.1)


Product/Capital
(X/C)
Stage I
Stage II
Stage III
TP
A0
B
A'
(a)
0
l'
l2
l0
l1
Labor/Capital
(L/C)
Product/Labor
(X/L, ΔX/ΔL)
(b)
l'A'/0l'
a'
AP
MPP
0
l'
l2
l0
l1
Labor/Capital
(L/C)

between their values. In its efforts to achieve this objective the firm will have to: a) maximise profits and b) minimise costs for a given output level (Ryan and Pearce, 1977).

In the short-run, as capital or plant capacity is held fixed, the firm does not have the flexibility of choice assumed for varying its output level. Thus, the firm has to use 'non-optimal' input combinations to vary the level of its output.

Taking into consideration the objective of profit maximisation and cost minimisation the firm responds to changes in relative input prices. As prices of the variable input labour (L) falls it is substituted for capital (K). In the long-run the range of production possibilities open to the firm is wider and almost all resource inputs are potentially variable; the choice of the production function depends on the level of the technical efficiency of its resource combinations. The technically efficient combinations of resources relevant to the production decisions can be identified to maximise output for a given cost outlay. As the long-run expansion path assumes that both inputs are variable, the firm responds to a change in inputs prices by a substitution effect. A fall in the prices of labour relative to capital, for instance, means that more labour is employed and less capital; a substitution in favour of labour and against capital. As the firm grows larger it prefers the substitution of more capital to that of more labour. Contrary to the long-run situation, in the short-run, the firm can only vary its output level by using non-optimal input combinations. A firm is also at a disadvantage, in the short-run, because of its fixed plant size and its past commitments. Another option open to the firm is that of increasing one product, at the expense of another; that is substituted for another at the margin.

It is clear that costs are the critical element behind the supply of goods. Economists assume that costs of production constitutes a major determinant of the quantities

(supply) of goods and services that will be placed in the market. John Stewart Mill (quoted in Samuelson and Nordhaus, 1985) argued that "cost of production would have no effect on competitive price, if it could have none on supply". Dependence of supply decisions on cost is true not only for perfect competition, the case assumed in the current discussion, but also for firms in the vast terrain of monopoly, oligopoly and imperfect competition (Samuleson and Nordhaus, 1985).

The concept of costs of production makes a clear distinction between the short-run and the long-run viewpoints. In the short-run the firm has fixed resources and variable resources, but in the long-run all resources are variable, including the plant size. A firm operating in the short-run period of partial adaptation has fixed costs (the costs of its fixed resources) and variable costs (the costs of its variable resources).

Fixed costs, or 'overhead costs,' 'sunk costs' or 'unavoidable costs' as they are sometimes called, refer to costs that cannot be traced back home and attributed to particular units of business in the same direct and obvious way in which, for example, leather can be traced to the shoes that are made from it (Clark, 1965). These are the costs that the firm is obliged to pay regardless of how much it produces, or whether it produces at all. They are the alternative costs of the fixed resources, which include the firm's short-run commitments such as top managers' salaries, maintenance, contractual rentals, guards' wages and costs of keeping investments in plant and equipment from shifting away from the firm. They depend on the size of the firm's operations and its plant size. Hence, in the short-run, the firm's total fixed costs are constant for all levels of output, given its size of plant. It is interesting to note that early studies of overhead costs claimed that labour as an overhead cost and the maintenance of the labourer's health and working capacity should be borne either by the community or the employers, otherwise both would suffer. The community bears the loss due to the deterioration of its

working force and the industry loses in the shape of reduced production, productivity and damaged morale. Referring to the unused productive capacity or 'idle overhead cost', Watkins (1915), in estimating the load factor (ratio of average output to maximum output), included a discussion of the load factor of labour, indicating that the waste involved was as real as in the case of capital. Wherever a labourer has invested time and money in specialised training the result is, in a certain sense, fixed capital which is useful in one occupation and in no other, and which must earn whatever return it can because the investment cannot be withdrawn and moved into some other line of business (Clark, 1965).

Variable costs are the alternative costs or total obligations that a firm incurs for its variable resources. Unlike fixed costs variable costs vary directly with the level of output. It is the part of total costs that increases with output and begins at zero when output is zero. Total costs is the summation of the above two; total fixed costs and total variable costs:

Total costs (TC) = Total fixed costs (FC) +
Total variable costs (VC)

It represents the lowest total expense needed to produce each level of output and it increases as output increases. The change in total costs due to one unit change in output is the firm's marginal cost. Marginal cost (MC), at any output level, denotes the extra or additional cost of producing another unit of output (Samuelson and Nordhaus, 1985). Other per unit costs which are used extensively in price and output analysis are derived from the total costs and its components. These are:

$$\text{Average Cost (AC)} = \frac{TC}{N} \text{ (where N equals total output)}$$

$$\text{Average Variable Cost (AVC)} = \frac{VC}{N}$$

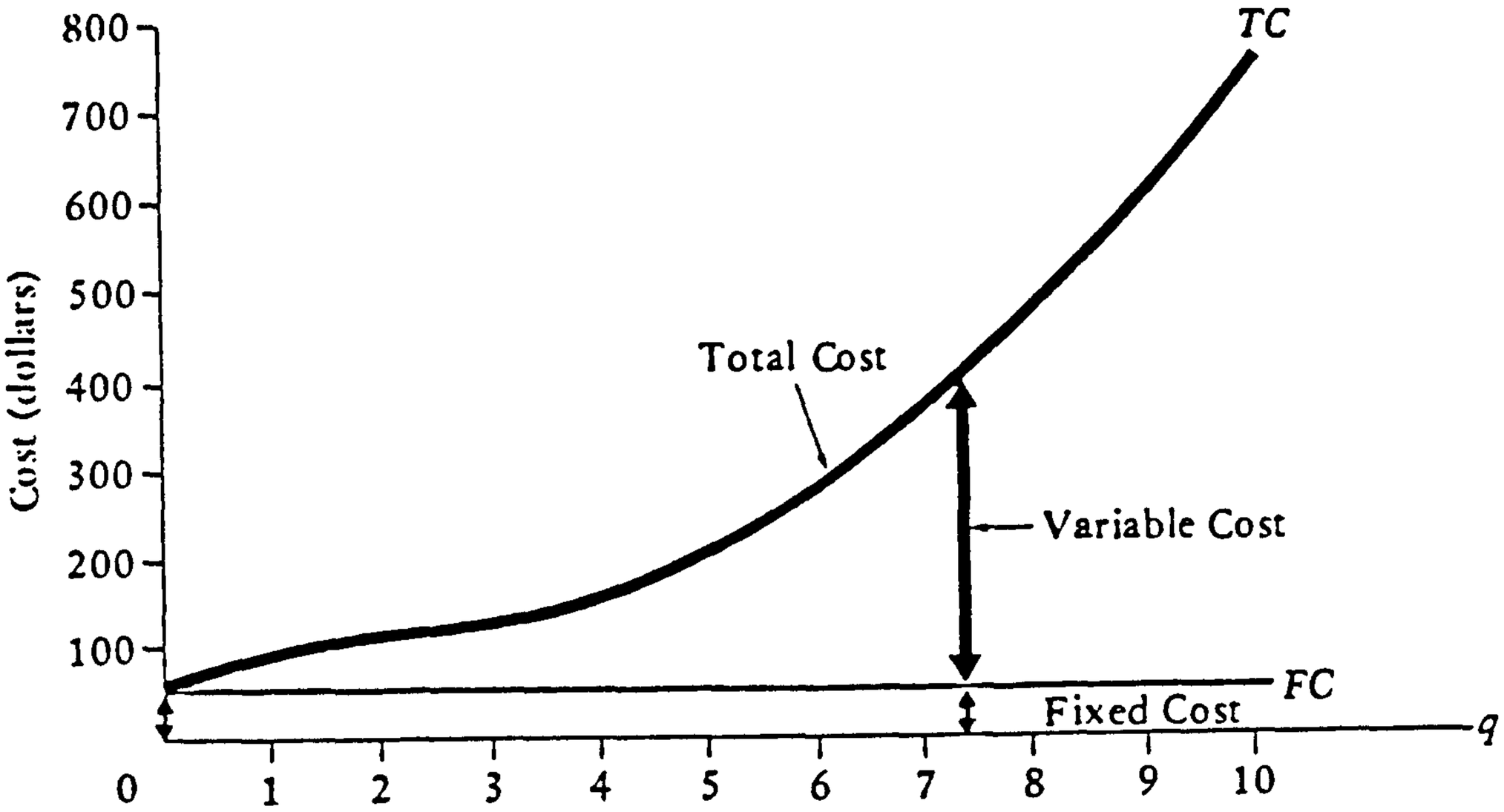
$$\text{Average Fixed Cost (AFC)} = \frac{FC}{N}$$

Diagram 5.2, panel (a) shows the constant fixed costs curve, the total cost curve and the relationship between these two and the total variable cost. In panel (b), average fixed cost curve is steadily falling and slopes downward to the right throughout its entire length. It indicates that the greater the output of the firm the smaller its average fixed costs. Average variable cost curve (AVC), diagram 5.2 (b), falls at first and ultimately rises, usually having a U-shape. This is explained by the principles of production in the short-run, mentioned earlier. The average cost curve, being by definition the summation of the average fixed cost and average variable cost curves, also has a U-shape. This depends on the efficiency with which both the fixed and variable resources are used (Eckert and Leftwich, 1988). At first, when both resources are used efficiently, average cost curve is decreasing but eventually when decreases in the efficiency of variable resources more than offset the increases in the efficiency of the fixed resources, the average cost curve rises. It is important to note that this is the widely assumed trend, but it is questionable whether it is always the case (Hough, 1981). Empirical evidence shows that in different industries, for different levels of output, average cost can reach a minimum and rise, or stay at the minimum level for a large range of output or even continue falling for a given level of output. Professor Lipsey (1975) argues that although the law of diminishing returns implies that average costs will **eventually** rise, **eventually** may not mean that they rise whenever output is increased. He noted that empirical evidence does show rising costs but, often, the shape of the curve is very flat - more like a saucer than a cup - in the relevant range of outputs.

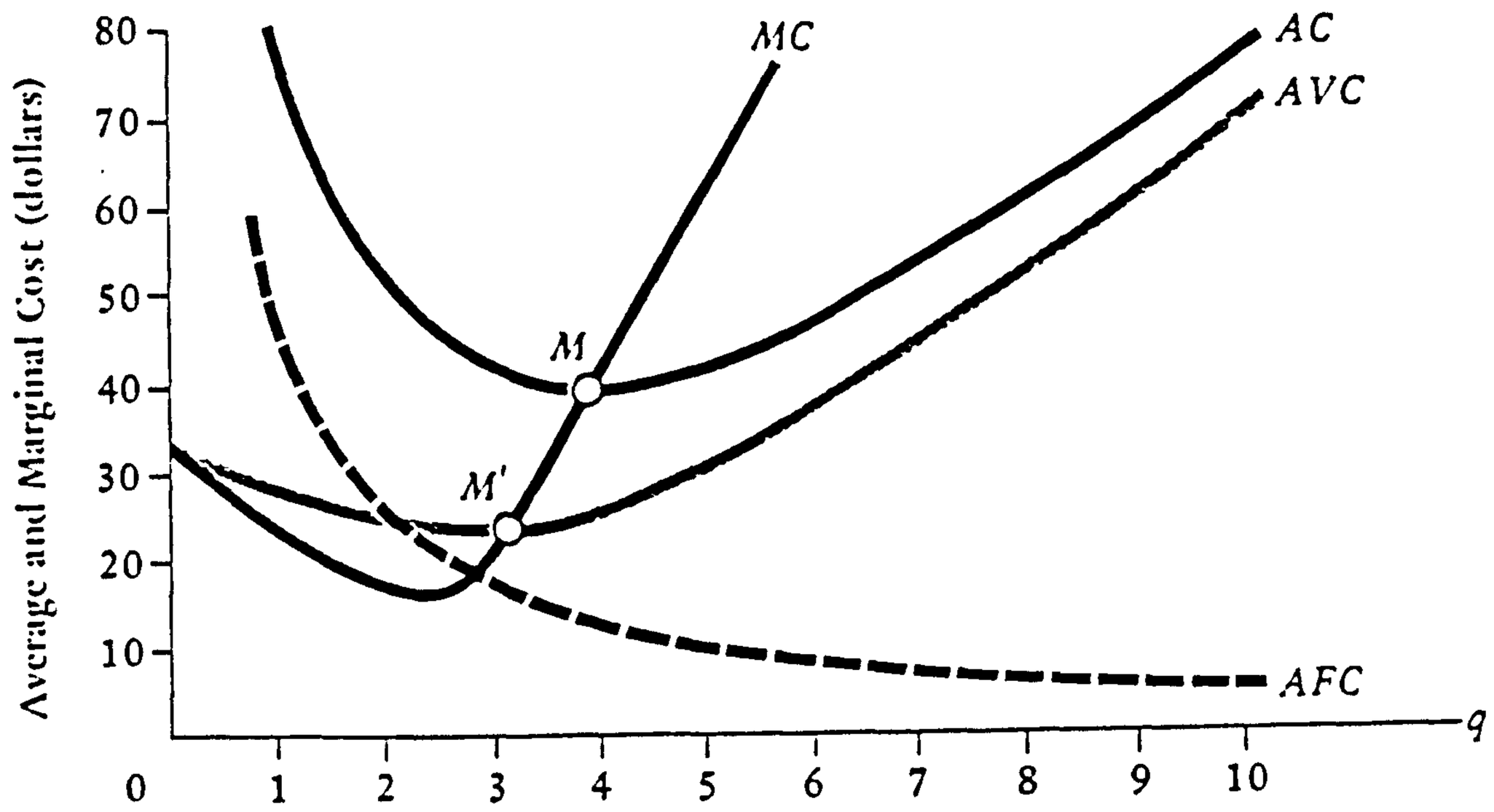
Panel (b) shows that the minimum point of the average variable cost curve is at a lower output than the minimum point of the average cost curve. The marginal cost curve is also a U-shape in the short-run. It increases as output increases, reaches a minimum and starts to increase. The increasing marginal cost intersects first the average

Diagram (5.2)

(a) TOTAL, FIXED, AND VARIABLE COST



(b) AVERAGE COST



variable cost curve at its minimum point and then the average cost curve at its minimum, while further increasing. The relationship between marginal and average costs curves is a purely formal, mathematical one and not a matter of economics (Lipsey, 1975). So long as marginal cost is below average cost it is pulling average cost down. If marginal cost gets to be just equal to average cost, average cost is neither rising nor falling and is at minimum; after marginal cost is above average cost it is pulling the average cost up (Samuelson and Nordhaus, 1985). However, Stigler (1966) observed that a series of statistical studies have found that short-run marginal cost is approximately constant until "capacity" is approached; capacity is defined as the output at which marginal costs become very inelastic. Diagram 5.3 illustrates a marginal cost curve, typical to this literature, which denies the validity of the short-run diminishing returns concept. Hans Apel (quoted in Friedman, 1976) points out that the statistical evidence for this conclusion is quite limited and not particularly representative.

In the long-run, contrary to the short-run where the firm's basic concern is the optimal utilisation of a given plant size, the producer is able to adjust the scale of operations to produce any given output at the lowest cost. Diagram 5.4 shows how different plant sizes can be chosen to produce different levels of outputs in the most efficient way. The plant sizes which give the minimum production cost for the outputs X, X', X(1), X(3) are SAC(1), SAC(1) and SAC(2), and SAC(2) and SAC(3) respectively. The long-run cost curve is the black 'envelope' of the short-run curves, or the lower frontier of the three possible choices of plant.

Diagram 5.5 demonstrates the relationship between the long-run and short-run average cost curves and the long-run and short-run marginal cost curves. The long-run average cost curve is tangent to each short-run curve at the output for which the short-term curve in question represents optimum plant size; it touches each and intersects none

Diagram (5.3)

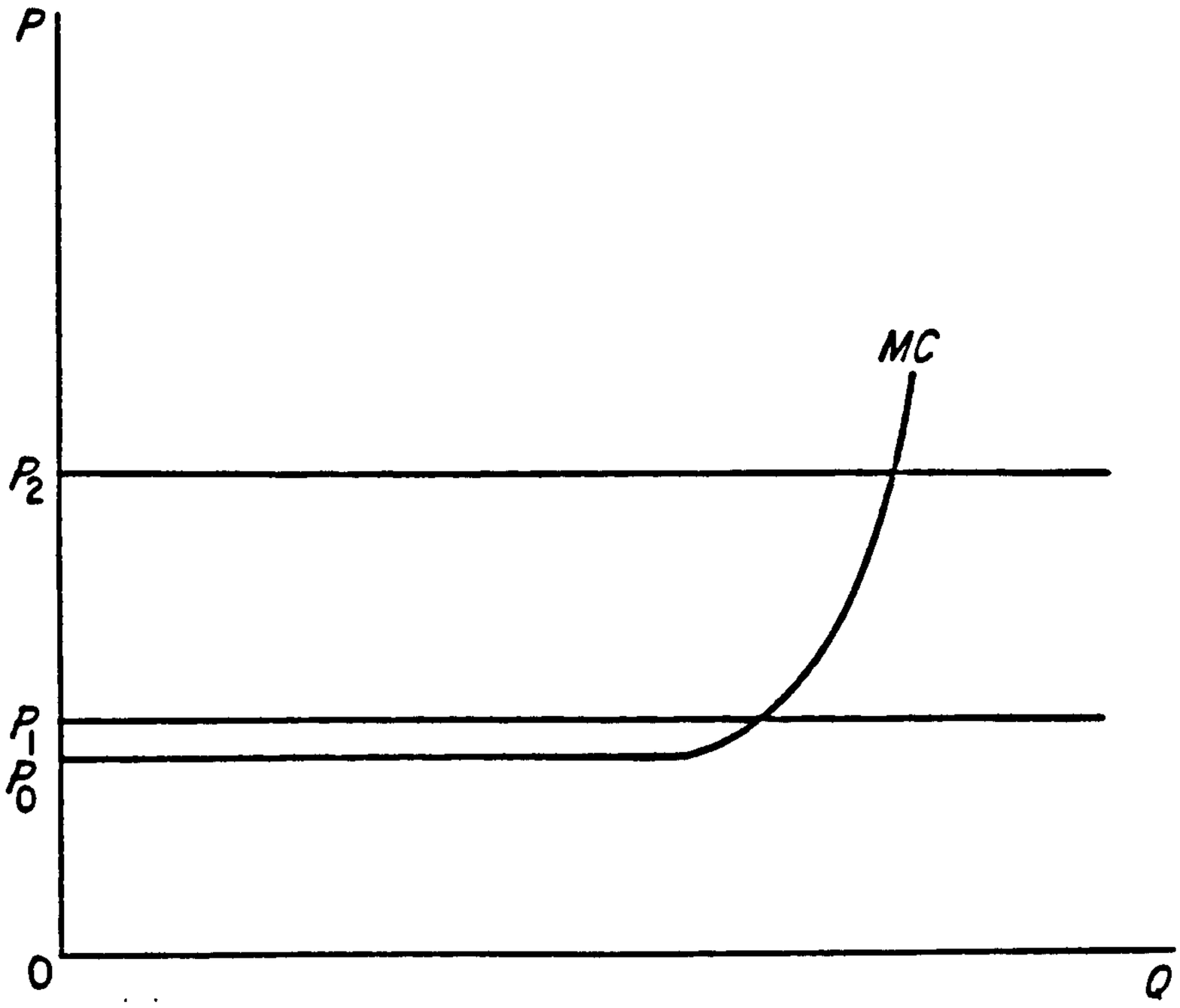


Diagram (5.4)

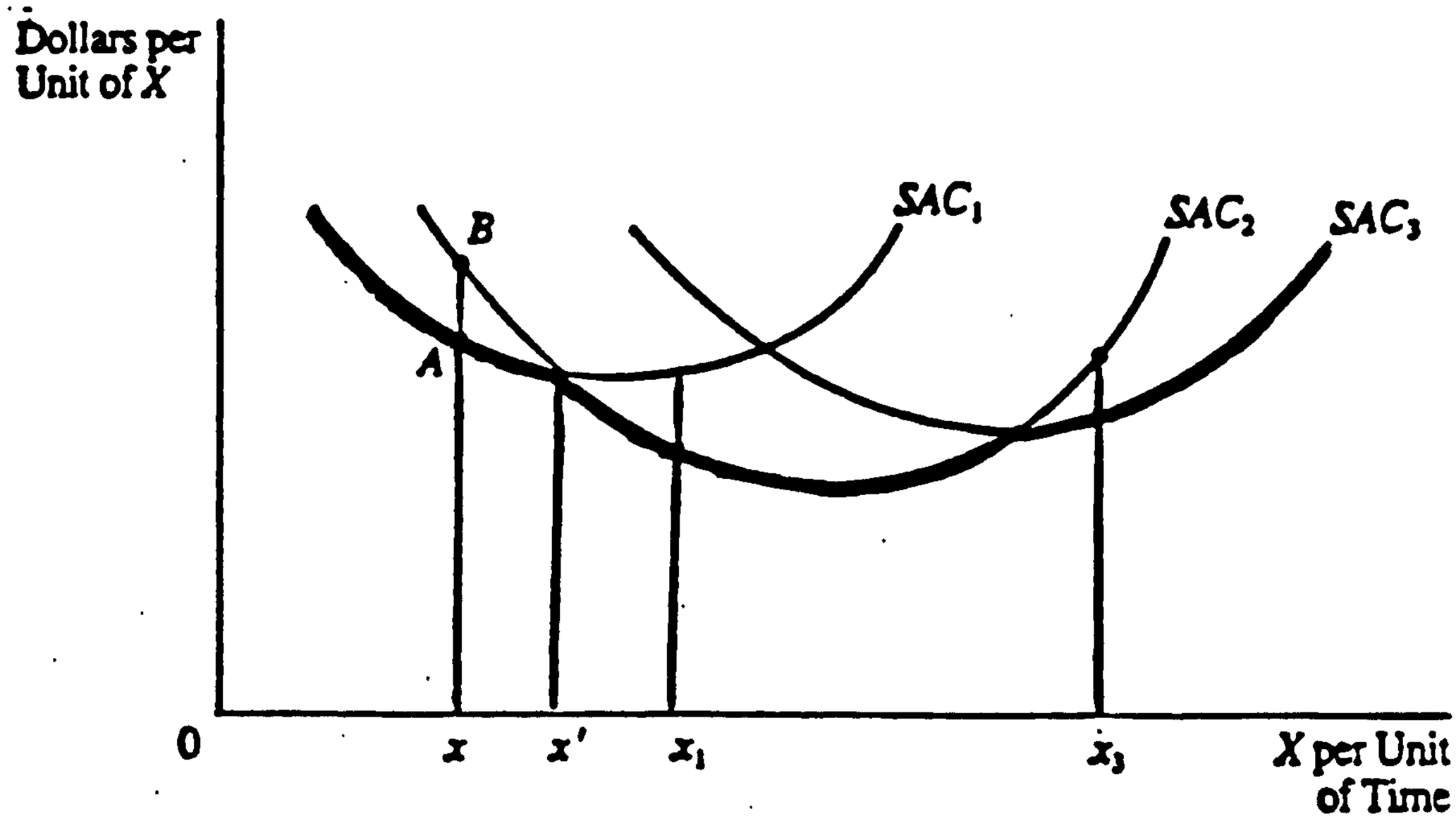


Diagram (5.5)

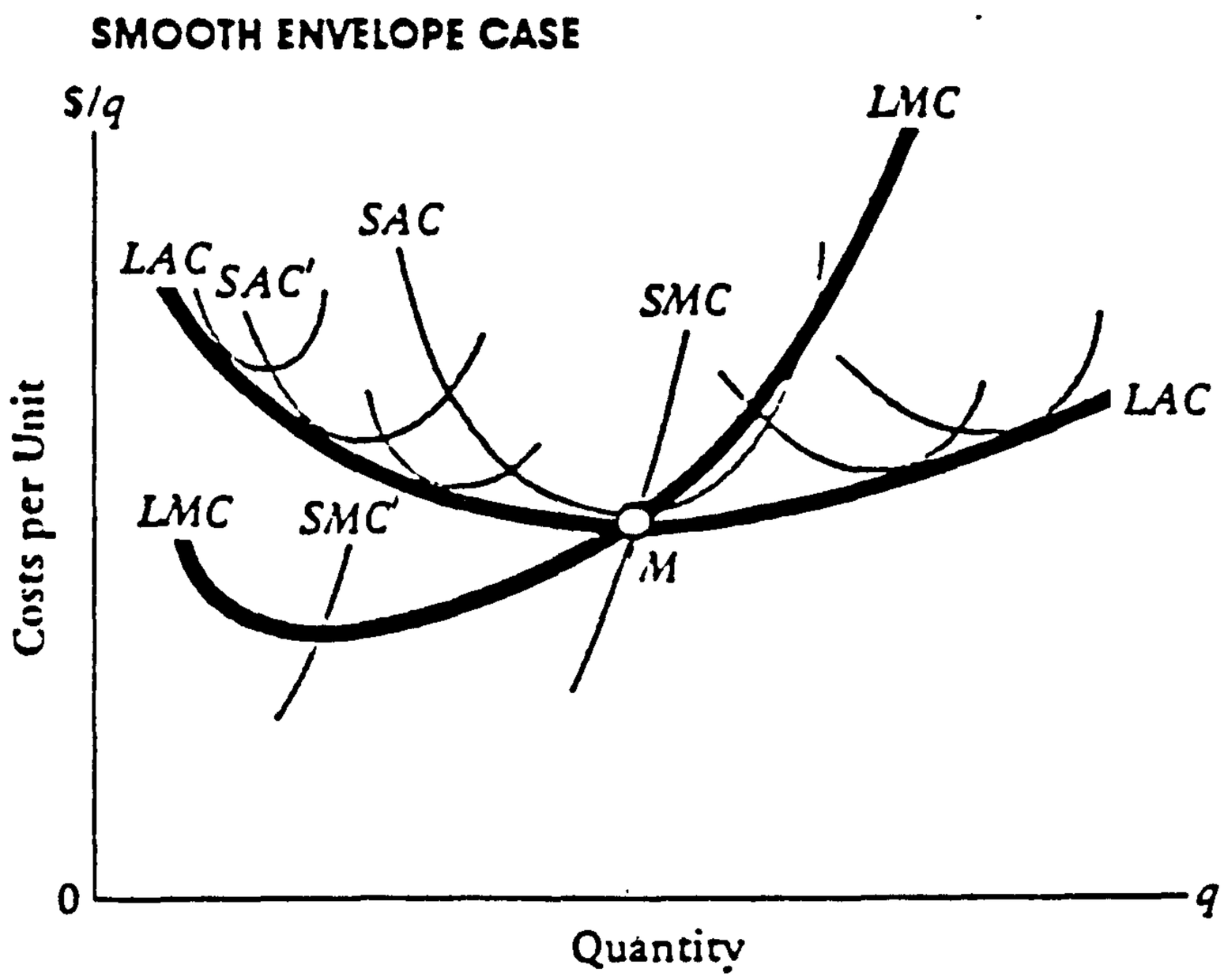
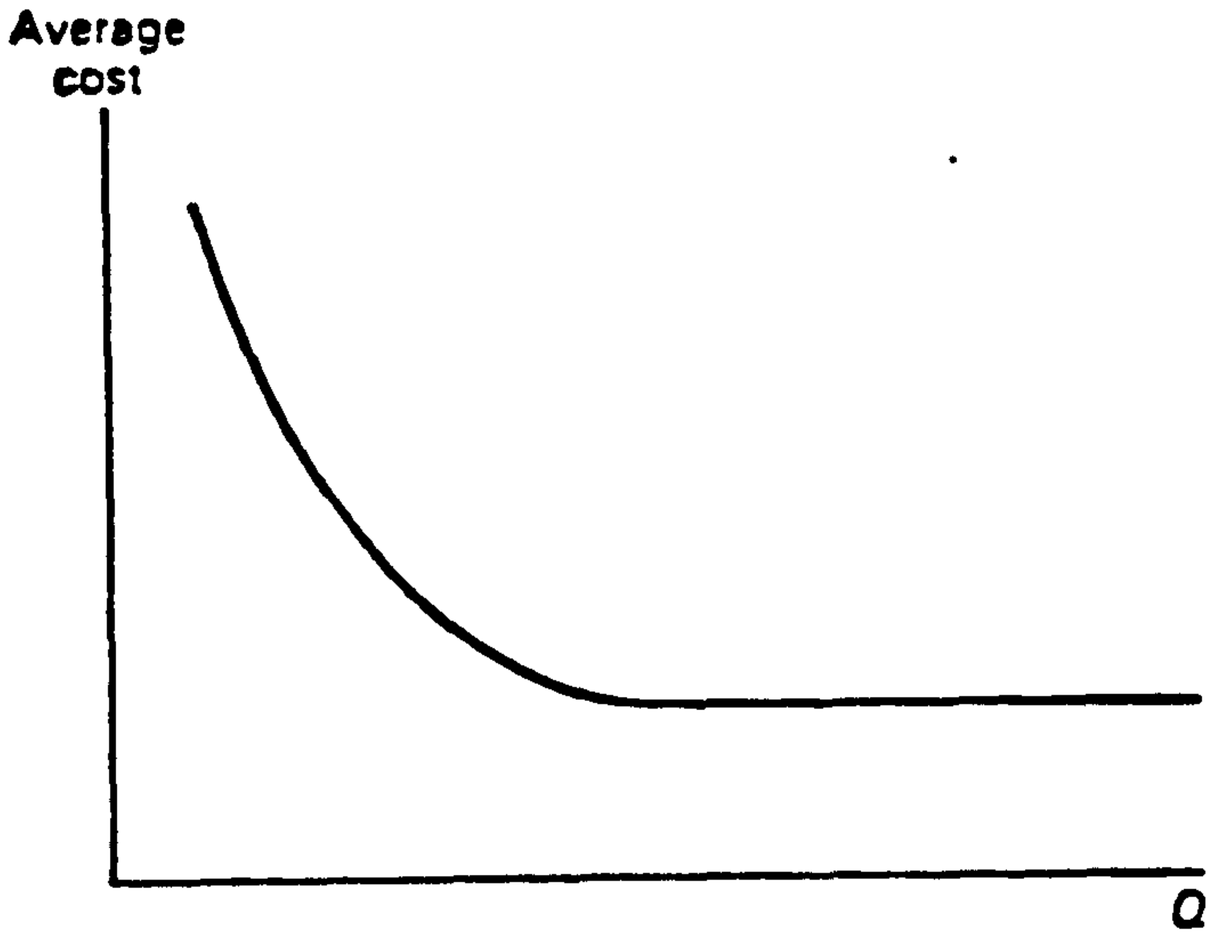


Diagram (5.6)



(Henderson and Quandt, 1971). The minimum point of long-run average cost curve is an important equilibrium point. As diagram 5.5 shows, greater efficiency as a result of economies of size causes the short-run average cost curves of larger plant sizes to lie at lower levels to the left of point M. Below M more larger plant sizes lie at higher levels, to the right as a result of diseconomies of size. Economies and diseconomies of size give the long-run average cost curve its U-shape (Eckert and Leftwich, 1988). Stonier and Hague (1964) admitted that long-run average costs curve will usually be U-shaped, but this U-shape will not be so pronounced as in the short-run curves. There is a wide consensus that average costs (in total adaptation or the long-run) descends like the left hand branch of a capital U, swiftly at first and then more gently (Wiles, 1961) and eventually rises. Ryan and Pearce (1977) pointed out that there is nothing 'sacred' about this result: costs might well be constant over the whole range of output, or they might fall continually, or even rise without stop. This is an interesting point; nowadays firms and some times whole industries may be located not only nearer to sources of raw materials but where cheaper labour could be hired. The initial decrease in average costs is associated with mass production, specialisation of function and division of labour as the firm expands. The ultimate rise in costs is attributed to the limitation of entrepreneurial capacity as the scale of production grows but most studies of long-run average cost curves in developed countries have found that average costs decrease up to some particular output level and then remain relatively constant as in Diagram 5.6, (Nicholson, 1953). Adam Smith's hypothesis (quoted in Nicholson, 1953) about the difficulties of managing large size firms does not appear to be supported by the data. Wiles (1961) argued that decreasing costs with size are almost universal; the U seldom turns up again and long-run costs obey what we may call the law of L-shaped costs. However, the modern theory of long-run costs leads to the prediction that, except for changes in factor prices, firms

that are free to vary all factors of production should experience increasing or constant returns (Lipsey, 1975). Similarly, in the long-run, marginal cost curve is a subject of dispute. Diagram 5.5, above, shows that it emerges from the minimum point of the long-run average cost curve with a gentler slope than the short-run marginal cost curve there (Samuelson and Nordhaus, 1985). Some economists (Samuelson and Nordhaus; Stigler; and Nicholson) claim that if there are constant returns to scale, obviously marginal costs will be constant for all outputs forever. This phenomenon is justified by the long-run expansion of the firm where all economies of large-scale production have already been realised.

It is necessary to note that economists are interested in the most efficient way to produce a given level of output rather than the most efficient way to utilise a given plant. Lipsey (1975) argued that "if there are some gains (lower costs per unit) from building bigger plants there is always some underutilisation that is justified".

In the short-run as well as the long-run, it is the rising part of the marginal cost curve that lies above the average variable cost curve that constitutes the supply curve of the firm. In addition to the cost of production the demand for a firm's product is equally important in determining the quantities it supplies. The demand curve may be influenced by many factors in the short- and long-runs.

In the end it is the intersection of the Demand and Supply curves that delineate the price of goods and services in the market. At the equilibrium of the firm, the demand curve and the supply curve will determine the price of goods and services and when equated to the marginal cost the firm will maximise its profits. In conceptualizing the firm's costs of production, economists assume perfect competition, clear distinction between the short-run and the long-run and variable resource inputs.

There are many different concepts of costs. The most important are the accounting cost, the economic cost and the

opportunity cost. The accountant's view of cost stresses out-of-pocket expenses, historical costs, depreciation and other book-keeping entries while the economist's definition of cost is that payment necessary to keep a resource in its present employment (Eckert and Leftwich, 1988). These two views differ in calculating costs of various resources. Accountants stress actual historical costs as a technique for measuring capital costs whereas economists regard historical costs as 'sunk costs', bygones are bygones and should have no influence in deciding what is currently the most profitable thing to do (Lipsey, 1975). The implicit cost of a machine, for instance, is the rental rate for that machine in the best alternative use. Both points of view regard labour cost as the wage which is equivalent to the amount the labour services would earn in their next best alternative employment, but accountants would stress the total wage bill while the economists are interested in the cost of the marginal labour-hour (Nicholson, 1953). Profits, recognised by accountants as payment to the firm's owner, are entrepreneurial income to economists.

Accountants are concerned with monetary value or costs, but economists probe the underlying real value over time. During inflation monetary cost and real cost can have wide divergence. An important distortion arising from accounting practice during such period is depreciation and overstatement of real profits. However, accountants are reluctant to depart from their historical cost conventions because of the intrinsic difficulties involved in calculating the right price index for adjusting the values of assets or inventories for inflation (Samuelson and Nordhaus, 1985).

Economists generally include all costs of production, explicit and implicit, whether or not they reflect monetary transactions or not. The explicit costs of production are the costs of resources hired or purchased by a firm to use in its production process while the implicit costs are the costs of self-owned, self-employed resources used in the production process (Eckert and Leftwich, 1988). Business

accounts exclude the non-monetary transactions, the implicit costs.

The third concept of costs is the alternative cost, or opportunity cost principle, which is most important for economists. The principle states that the cost of producing a unit of any goods or service is the value of the resources needed to produce that item in their best alternative use (Eckert and Leftwich, 1988). In other words, the cost of anything is measured by the value of the foregone alternatives and the Opportunity cost of a decision is the value of the best available alternative (Lipsey, 1975). By definition the opportunity cost assumes that the alternative decision would have been efficient; it compares the effect with the best alternative decision (Samuelson and Nordhaus, 1985). It is a very important principle that extends beyond economics and is often ignored in these other areas as well (Lipsey, 1972). However, it is directly relevant to social decisions where items are not marketable.

Another important distinction in the concept of cost is private and social costs. The private costs of the individual firm have been discussed above but, within the firm itself, there may be social costs generated unwittingly by uncomprehensive perception of its policies and activities. Klein (1977) noted that "although the heightening interest among businessmen in the question of social costs is quite recent, there are strains of concern in the economic literature which date back to the eighteenth century". He summarized three ways in which social cost arose in micro-economic theory. "First, when competition is imperfect, monopoly profits may be viewed as a confiscation of social welfare. Second, imperfect competition may reduce market performance by reducing progressiveness, lessening choice, or leading to excess capacity. Third, the market may not reflect the public's interest in preserving the environment or in solving social problems". To day there is global concern about the externalities in manufacturing such as air, water, solid waste and noise pollution, as well as the depletion of natural resources and the degrading of

attractive natural environments by man and by nature. Application of cost-benefit analysis based on economic and non-economic criteria for the evaluation of projects is recommended to widen the range of coverage of what is, recently, known as environmental accounting.

5.3 Cost in Education:

Theoretically, all the above concepts of cost can be applied to the education sector as 'the producer' of the service of education but Hallak (1969) argued that application of the economic concepts of cost to education revealed three types of difficulty inherent in the very nature of the activity of education. These arise more particularly out of: "a) the production of education which consists of either transmitting or ensuring the assimilation of, a body of knowledge, certain ways of behaviour, etc. b) the producers of education (which may be the education establishment, the teacher, the public authority, private agency or families); and c) education being a public service". Other education economists consider education as a part of a nation's knowledge industry (Kneller, 1968), or even an industry (Blaug, 1970) and sometimes the largest single industry (Cohn, 1972) or the single largest industry (Hartley, 1968). With this viewpoint, and in spite of analytical and statistical difficulties, the analogy of the educational process with the production function is always drawn by economists. As part of a series of analogies with other economic concepts - capital, returns and productivity among them - the production function is used to explain what determines the costs of education and what is the place of education in a modern economy (though) Vaizey argued that the analogy of education with industry was not an exact one (Leite et al., 1970). This is true for various reasons, as Mark Blaug (1970) indicated. "First of all, it pursues multiple objectives, none of which include maximization of profits or any proxy for profits. Secondly, it is burdened with an unusually long production cycle, which renders it necessary to build most of its facilities ahead of demand. Thirdly, it operates with a fairly rigid handicraft

technology, in large part self-imposed by custom and tradition and, fourthly, it purchases most of its inputs at administered rather than market-determined prices and feeds back an extraordinarily large part of its own output as subsequent inputs" (Blaug, 1970).

The production function relates the quantities of inputs employed to the quantities of output produced. Inputs in education can be delineated as school-related factors and non-school factors. Non-school factors include student characteristics and community or environment influences which are known to contribute substantially (positively or negatively) to the educational output (Rutter, 1979). On the other hand, school-related factors include human and physical inputs. The principal human inputs are teachers, administrators, non-teaching, secretarial, clerical, other auxiliary staff's services, workers' labour and students' time; "student time, perhaps the most significant of all school inputs, is the most difficult to measure in a satisfactory manner" (Cohn, 1975). The 'output' is something that is difficult to be precise about (Burkhead, Fox and Holland, 1967) and, contrary to industry, the education system cannot be assumed to produce a single output (Cohn, 1975). It can be measured mainly by the number of enrolments, the number of successes, or scholastic performance (Hallak, 1969) as well as the marginal rise or fall in the level of culture - if such a concept has any meaning (Leite, et al., 1970). Thus it is difficult to measure output in service industries for two reasons: first because the output is extraordinarily heterogeneous compared with that of, say, the steel industry and, secondly, very little of the service output is sold on the open market (Leite, et al. 1970). Moreover, the absence of an established theory of learning made it almost impossible to assert for sure that any one method of teaching in any field is better than another.

In industry, as discussed before, inputs and outputs are separable, produced in a separate process and the output is tangible, measurable and its price is determined by the

market mechanism. The specific methodology employed in analysis of industry needed to be modified somewhat (Cohn, 1975) to apply in education. In many spheres of human life it is possible to divide activities into inputs (things that go into a process), the process itself, and the outputs which follow the processing of the inputs (Leite, et al., 1970). Thus, the relevance and application of the concept to education may be perfectly proper and acceptable.

Similar to an entrepreneur, the educational administrator in the short-run, has fixed and variable costs to meet. The fixed costs in an educational institution or a school may include the head teacher's salary, the capital cost of the school buildings of the equivalent rent, the upkeep or maintenance of equipment and furniture, school guards' wages, etc. The variable expenses on the school level can be the salaries of teaching staff, non-teaching and other auxiliary assistants, wages of school workers, raw materials and supplies, text-books and exercise books and all other incidentals which running a school involves. If this principle is applied to the macro-level, the whole education system, then the fixed costs will include the salaries of the whole teaching and non-teaching staff, inspectors, supervisors, other administrators, as well as the upkeep or rent of all educational institutions, in addition to other miscellaneous obligations. Thus, the analysis of the education budget and its evolution from year to year, clearly shows the considerable effect of these fixed costs in public expenditure for education (Tibi, 1985).

In the near future the administrator is bound by the existing obligations but the further ahead he looks the greater is his range of choice (Vaizey and Chesswas, 1967). In the long-run he has a multiplicity of alternative uses for his resources. However, even the whole educational budget can be increased or scrutinised according to the level of priority the education services enjoy. It is important to note that fixed costs are independent of the

number of pupils, while variable costs tend to vary directly with the number of pupils, Similar to diagram 5.2.

At the school level, the total costs is, also, the summation of the total fixed and total variable costs that educating a given number of pupils incurs. The total costs increase as the number of pupils increases, contrary to average costs. The average total cost, or unit cost, is defined as equal to the total costs (TC) divided by the number of pupils (N).

$$\text{Average Cost (AC)} = \frac{TC}{N}$$

As total costs depends on the number of pupils, so does the average costs. The marginal cost is the addition to total costs which would have to be borne if one more pupil is accepted in the school concerned. When discussing the cost functions for instructional technology, Jamison (1979) observed that the average cost measured is most useful as an historical summary of the system's efficiency in doing its task, while the marginal cost measure is more useful for examining the cost consequences of expanding or contracting the system, in terms of the number of students served.

Wiles (1961) argued that "true marginal cost (in partial adaptation or the short-run) is only low when there is surplus capacity - a single passenger can always be crowded onto the bus, and neither relief buses nor newly acquired buses are required for marginal individuals". In this sense marginal cost in bus transport is always practically zero. Similarly, the cost of accepting one extra pupil in a teaching establishment is virtually nil. Tibi (1985) contended that "it is almost always possible to place an extra pupil in a section which already has teaching staff; where it will not be necessary to increase non-teaching staff and, possibly, no extra table or chair would be required. At the most only the necessary text-books and supplies are to be found". It is often feasible to assume that the marginal cost of adding one more student to a system is constant, that is, it is independent of the number of students already served. If the marginal cost is not one

but several (passengers who need transport in the first case or a large group of pupils has to be accepted in a school in the second case) then the whole phenomenon disappears and marginal cost rises instantly as in diagram 5.3 above. In the case of pupils placement above, the marginal cost depends upon the solution selected to place them; that is, whether to:

i) **integrate** them into sections already existing and with the necessary resources

ii) **create** new sections in schools already existing, **without** building new classrooms

iii) **create** new sections in schools already existing, **with** the building of new classrooms

iv) **create** new schools (Tibi, 1985)

Thus marginal cost concept is very useful to measure efficiency and under-utilisation of capacity. Many decisions and many costs are best conceived as marginal, that is, as adjustments to an already existing situation (Coombs and Hallak, 1972).

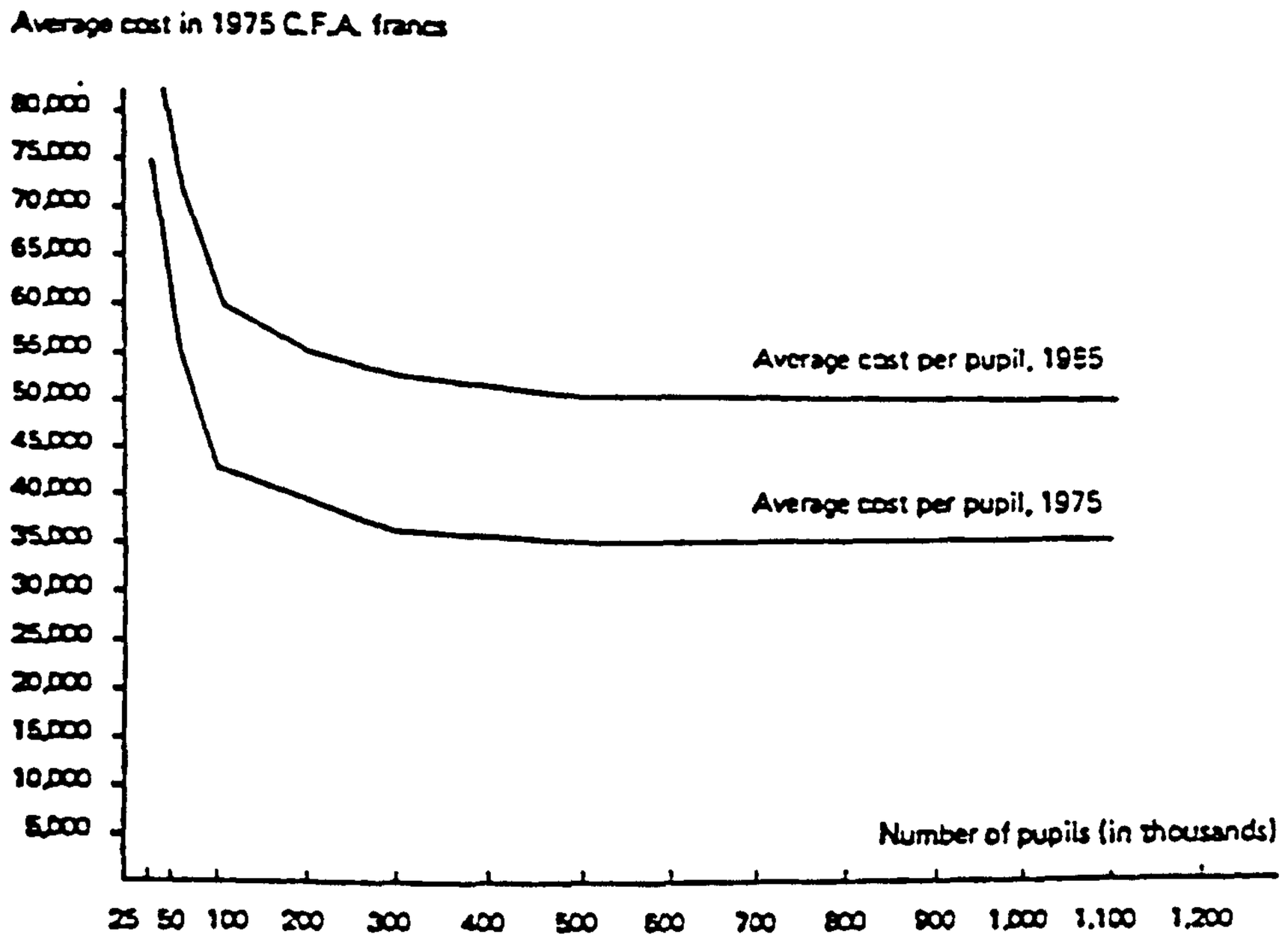
All the above cost concepts are illustrated in the case study of "Cost analysis of primary education by television in the Ivory Coast". Diagram 5.7 shows (Eicher and Orivel, 1980) how the average cost curve per pupil in 1975 and 1985 decreases as the number of pupils increases and then remains constant, similar to the viewpoint demonstrated by diagram 5.6 above. Analogous to the long run average cost curve of the firm, there will be:

i) "economies of scale" if the average cost decreased with an increase in the number of pupils;

ii) constant returns to scale, if the average cost remains constant for any number of pupils;

iii) decreasing returns to scale (diseconomies of scale), if the average cost increases with an increase in the number of pupils (Tibi, 1985).

Diagram (5.7)



Average cost per pupil

Most economists argue that decreasing costs with size are almost universal, as noticed earlier in the discussion, but it is evident that "... the managerial optimum sets ... not only a lower but also an upper limit to the scale of operations" (Wiles, 1961). Economies of scale or economies of size in school operations is an area in which considerable research has been undertaken recently. The research has been hampered, however, by the lack of a comprehensive output measure that must be used in the analysis to take account of varying education qualities (Cohn, 1975). The other important difficulty is the absence of school-by-school data which compelled some researchers to look at economies of scale at the local education authority level, the school district or even at the national level. Nevertheless, there is considerable interest in the question of how expenditures vary by size of school, even in the absence of any reliable information regarding possible qualitative variations to outputs (Hough, 1981). In spite of that many studies have shown that costs rise rapidly in very small schools (Nash, Williams and Evans, 1976). In large schools with more facilities the evidence is that any economies are utilised to improve quality rather than reduce cost (Ilett, 1981). However, efficiency is mostly identified with economies of large scale operations in economics, where large fixed costs are distributed among a larger number of output, this can logically be true of large schools also. On the other hand, the existing studies in the economies of scale in education confined themselves to current expenditure only. Although at the moment analysis of capital costs seems extremely problematic, it can be proved that in capital expenditure, economies of size do exist.

On the other hand, that there is diseconomies of size, or diseconomies of large scale management may be true also in education. Although there is no research data to back it, there is some evidence at the micro-level (educational institutions) and at the macro-level (different levels of education administration). At the micro-level the

disintegration or dismantling of very large schools into two proves that the law of diminishing returns applies to the person (headmaster) who takes the ultimate decision when he becomes more and more overloaded with decisions. At the macro-level the decentralization of educational administration at different levels indicates the common experience of bureaucracy, red tape, administrative bottlenecks and lack of co-ordination applies to large administrative bodies in education.

However, it would be interesting to know if there is an optimum organisation of schools which has, as one of its features, schools of the most economic size, given a specific set of educational objectives and considerations (Cumming, 1971). In an attempt to set up an optimum school size, the O.E.C.D. (1971) suggested the size of the educational unit should be small enough for one person - the headmaster - to be able to co-ordinate the activities of the teacher staff efficiently; large enough for the number of pupils to prevent service and equipment costs proving too heavy for the establishment's budget.

Although the economist's concepts of cost are emphasized here, the accountant classification is equally important. An important classification of the educational budget is capital expenditure and current expenditure. Capital expenditure refers to the expenditure on those goods needed by the education establishment and their duration, or where renewal requires more than one year at least. These include equipment, machines, furniture and school buildings. Current expenditure is the expenditure on the day to day requirements of operating the educational system and usually lasts for one year or less. These include teachers' and non-teaching staff salaries, workers' wages, transport, stationary, water, minor maintenance, boarding-house supplies, etc. The difference between current expenditure and capital expenditure corresponds to the distinction drawn by economists between consumption and investment (Tibi, 1985). However, the division between capital and current expenditure is arbitrary and depends on the accounting

conventions in use at the time and place in question (Vaizey and Chesswas, 1967). Expenditure on books used in the library is capital expenditure, that on books for the classrooms use is current expenditure.

As in economics, capital goods wear out over time and have to be maintained or replaced. Usually they are bought at a very high cost or rented. In education some capital investments have a life-span which extends for decades, for instance, school buildings. Thus, education economists calculate an annual cost of utilization for these buildings. This amount of annual repayment, or the annual rent equivalent to capital expenditure, as it is commonly known, is calculated as follows:

$$A = ic \frac{(1 + i)\ n}{(1 + i)\ n - 1}$$

where A represents the annual rent repayment equivalent, assuming that the construction cost of the building be c, that its working life be n years and that the market interest rate be i (Tibi, 1985). Such a calculation would be meaningful if, for each educational institution, it is possible to know what cost limits were in operation at the time of construction, prevailing rate of interest, whether the debt was borrowed at fixed or fluctuating interest rate and over how long a period the debt is being amortized (Hough, 1981). However, the sum of the corresponding annual repayments and current expenses will represent the total annual cost of the establishment (Tibi, 1985).

On the other hand, to project future educational costs, it is necessary for the administrator to assess the general tendency of any changes in the financial flow in recent years (Hallak, 1969). In this case, it is important to differentiate between education expenditure in current prices and constant prices. Prices of educational inputs, that is, goods and services used by the education system, tremendously increased because of inflation. In such times the purchasing power of a monetary unit tends to decrease with time; a given sum of money will therefore not purchase the same quantity of goods or services at different periods

in time (Tibi, 1985). A large increase in monetary units means little in an examination which aims at finding the rise (or fall) in real input over time (Cumming, 1971). It is constant prices, rather than current prices, that help to assess the trend of the flow of educational finance in volume (Hallak, 1969). As in most countries, especially in the developing world, there are no published price indices specifically for the education sector, it is desirable to construct a separate education price index to adjust current prices statistics. The use of the general price index is fraught with difficulty. For one thing, that index is more heavily weighted for goods than for labour and since the price of labour has risen more rapidly than prices of goods over the last decade, the effect of the index is to underestimate inflation in the education sector (Cumming, 1971).

In education real resources such as school buildings, teaching and non-teaching staff, equipment and student time have alternative uses as factors of production and thus have opportunity cost. The opportunity cost, or real cost of an activity, represents the lost revenue accepted by the fact that one has decided not to use the goods and services required for one activity for other activities (Tibi, 1985). Jamison (1977) defines the opportunity cost of a choice from among a limited set of alternatives as the value to the decision maker (or to the society) of what he or she turned down in order to be able to choose what he or she did. In attending college (or high school) a student foregos present income in the hope of receiving a higher income in the future. Pickford (1975) calculates that imputed costs amounted to 57.6 per cent of the cost of a student at Sussex University in 1970-71, or a third as much again as the total recurrent cost of the University. Samuelson and Nordhaus (1985) estimated that the opportunity cost of attending college for a public school student, in 1984, was $16,000; $5,000 for tuition, books and expenses and $11,000 for revenue lost from holding a full-time job. The concept of alternative uses of capital or real resources and of student

time suggests that the costs which are normally considered by administrators and teachers are far from the whole picture (Ilett, 1981). However, the inclusion of the income foregone in educational costs is more debatable. Schultz (1963) pointed out that in estimating the value of investment in high school education for the nation as a whole it is necessary to include not only the costs of direct inputs but also such imputed costs as the value of the tax exemption on school buildings; the value of services provided 'free' by the municipal government, the value of earnings foregone by students in high school. Blaug and Woodhall (1967) suggested that the imputed money value of pupils' time must be deflated by an index of juvenile wage rates to provide an estimate of the real value of pupils' time. However, Vaizey believes that if time spent in school is valued for its own sake, then earnings foregone or earnings actually earned are irrelevant on input and output sides alike and should be excluded from both (Leite, et al., 1970).

Costs of education are divided into private and social costs. Private, direct costs include tuition fees, examination fees, supplies, transport, school uniform, outlays of books in some countries and all extra expenses incurred by attending school. The private indirect costs are the income foregone or lost in order to attend school. Social costs are those borne by the community as tax payers. These include all current educational expenditures such as salaries of employees and workers, supplies, raw materials, minor maintenance etc. and the cost of utilization of capital and equipment absorbed by education, as well as the income foregone by students as part of its labour force. Social costs are defended on the grounds that since the educated man benefits society, society ought, by providing educational subsidies, to compensate him for expenses incurred in educating himself. Nevertheless, many people frequently object to an increase in tax rates in order to spend more money on education unless it can be shown that in the long run such an increase will actually augment real

income. Hard-pressed tax-payers are, actually, trying to win more value for (their) money. "The public is demanding, under the general rubric of 'accountability' an accurate assessment of educational assessment but there are some educators who would argue that a concern with efficiency is a mistaken approach and that the emphasis should be placed simply on 'more resources', (though) the constraints on funds are, and will continue to be, severe" (Kneller, 1968). But one has, as in economics, to be concerned not only with the amount of resources consumed (inputs) in the educational process, but also with the results obtained by it (outputs) (Leite, et al., 1970). An educational system may thus be said to be efficient if the quantity and/or quality of education are at a maximum from the use of a given volume of resource inputs (Burkhead, Fox and Holland, 1967). This implies the concept of 'internal' efficiency which is described as the ability to produce the highest result with the lowest expenditure (Leite, et al., 1970) but it is well proved that good education is expensive. The increase in educational effectiveness causes costs to rise. This can be explained by the example of a reduced pupil/teacher ratio which means better quality of education normally, but higher costs eventually. Thus, wise investment in education calls for careful appraisal not only of the value of the particular educational goals for which public money is spent but also of the costs of alternative ways of achieving them (Kneller, 1968). This trend in the field of education nurtured the evolution of concepts such as 'productivity' (defined in terms of a production function for education) measurement of inputs, outputs and processes, as well as the use of input-output analysis, a discipline used for a long time in the for-profit, manufacturing organisations.

CHAPTER SIX

RESEARCH DESIGN,

ORGANISATION AND METHODOLOGY OF THE SURVEY

6.1 Research Design:

This Research is based on a survey and its design is both descriptive and analytical. It is descriptive (or quantitative) in the sense that the description and diagnosis of the socio-economic environment and of the educational system indicate clearly that the lack of cost data in these inter-related contexts has adversely influenced effective educational planning. Hence the need for accurate cost information and closer insight into efficiency of resource utilization to control or reduce costs is more urgent now than ever before. On the other hand, the research is also analytical (or qualitative) because a questionnaire was structured to gather data of school cost and expenditure, mode of real resource use and sources of finance according to headings of expenditure in a sample of individual institutions in the regions of Northern Sudan. It is mainly analytical in the sense that has been defined by Cochran (1953) as one where "comparisons are made between different sub groups of the population, in order to discover whether differences exist among them and to form or to verify hypotheses about the reasons for these differences".

6.2 Organisation and Methodology of the Survey:

The methodology and organisation of this study are divided into four sections in the following sequence: the population, sample and sampling technique; the research instruments; the questionnaire administration and data collection; and, finally, the procedure of data processing and the techniques of data analysis.

6.2.1 The Population, Sample and Sampling Technique:

6.2.1.1. Introduction:

In the Sudan, it is difficult to find up to date expenditure data on education; it is either unavailable or incomplete. Even at the regional level it is almost impossible to extract expenditure data by school as individual school records are not disaggregated and different administrative sections deal with students, teachers, other staff, workers and the allocated budget for salaries and wages and services for the entire region. The Unesco Mission (1978), which visited the Sudan to prepare a report for the proposed Third IDA Educational Project, required information on actual expenditure on education. As "Information is not available to show the exact amount of expenditure ... at the provincial level ... it was, therefore, decided to undertake field surveys in the provinces ... to study actual expenditure on education ... classified by level of education, types of education and by sources of finance". More recently, the Educational Planning Under-secretariat noted that one of the major difficulties in planning educational development was a lack of relevant cost data. "In many cases, it was necessary to conduct field surveys ... that cost a lot of money, time and effort" (Status Quo in Education, 1985). Furthermore, non-budgetary resources mobilized and/or collected by schools, such as donations and pupils' families optional contributions, do not appear in the public accounts. These non-budgetary resources represent a significant source of finance. These problems rendered public records on educational expenditure incomplete and inaccurate. Thus the few empirical studies that have been conducted had to rely on sampling techniques.

All the above factors make it imperative that, to achieve the short and long-run objectives of this study, cost data has to be collected through a survey of a sample of schools.

6.2.1.2 Population:

In this case the population from which the sample has been drawn or, more specifically the sample frame, consisted of 184 "complete" public (state) academic secondary schools in Northern Sudan. It was important to include only complete (three grades) schools, as new schools would have very high unit costs due to their low enrolment figure; inflating the average unit costs. The target population of single-sex schools is scattered all over the four regions in Northern Sudan and Metropolitan Khartoum; the Darfur Region could not be included because of security problems. The schools sizes ranged from under 400 pupils to 800 and over, located mainly in urban centres with a few in semi-urban and rural areas. Sanyal and Yacoub (1975) wrote that "Higher secondary education in the Sudan is all urban". The location of Secondary schools are constrained by administrative requirements. The official norm is that for every eight primary schools there is an intermediate school and for every four intermediate schools there is a secondary school. The non-automatic promotion policy in the educational system and the selective, competitive examination between levels justify this rule. Thus a very small percentage of rural areas in the Sudan can qualify for a secondary school. These schools were day-schools and mixed day and boarding, with only three completely boarding; the latter are the traditional national schools which are planned to be spread throughout all the regions' capital cities. Such population characteristics were taken into consideration when selecting the sample.

6.2.1.3. The Sample and Sampling Technique:

Entwhistle and Nisbet (1976) noted that "There is no single correct procedure for sampling. The method chosen depends on the purpose of the inquiry, on the type of analysis to be made, and on certain restrictions - time, staff, facilities - which have to be accepted as external constraints". It was impractical to survey all the target population for this study (184 schools in this case) and in

fact it was impossible, taking into consideration the time within which the survey had to be completed and the limitation of resources. Alternatively, a large representative sample was chosen to enable the researcher to make valid generalisations. It was designed to cover about 26% of the population. A total of 48 schools was therefore fixed initially as a target for the sample size (Table 6.1). These schools were selected from the 184 schools and distributed between the regions according to the number of institutions in each using the "probability proportional to size" (PPS) method. The stratum, here, is the region and the size is the number of schools in each region.

Table (6.1)

Number of Complete Schools by Region and the Number in The Sample

Region	No. of Schools	No. in Sample	% in Sample
Northern	37	6	16.2
Eastern	15	4	26.7
Central	59	13	22.0
Kordufan	23	6	26.1
Khartoum	50	19	38.0
Total	184	48	26.1

The selection process followed the following formula:

$$N = R - T * S$$

where

N = Number of schools in the sample from each region.
R = Total number of schools in each region.
T = Total number of complete schools in Northern Sudan.
S = Total number of schools included in the sample.

Table (6.2) below shows the number of complete public academic secondary schools in each region, the number that **should** have been included and the number **actually** included

in the sample. It is clear from Table (6.2) that the Northern Region seems under represented while Khartoum (which had a larger quota to make up for the loss from this region and the Central) is over represented. It was almost impossible, due to the floods of 1988, to visit more schools in the Northern Region by rail or road and even efforts to travel by air proved unsuccessful. However, discussions with educational administrators, planners and school directors in the Northern Region revealed that the schools included in the sample are representative of the situation in secondary education. Khartoum, on the other hand, due to pressure of social demand, has witnessed rapid expansion.

Table (6.2)

Complete Schools by Region,
Number Specified and Those in The Sample

Region	No. of Schools	No. Specified	No. in Sample
Northern	37	10	6
Eastern	15	4	4
Central	59	15	13
Kordufan	23	6	6
Khartoum	50	13	19

Schools in different areas mirrored the diverse socio-economic conditions of a metropolitan city in a developing country. Nevertheless, to make the sample more representative, the quota of schools for each region was chosen by loose stratified random sampling with respect to the four characteristics of the target population (where available), these being size, location, type and gender; Tables (6.3), (6.4), (6.5), and (6.6) display the sample schools accordingly. Table (6.3) shows that large schools predominate in Khartoum whereas, only Khartoum and the Central Region can sustain a large number of small schools; middle size schools dominates all the region. As Table (6.4) illustrates academic secondary education is found in

Table: 6.3

Sample Schools Pupils by Region and Size.

Region / Size	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum
up to 400 pupils	722 (2)	319 (1)	1340 (4)	330 (1)	1730 (5)
401 to 800 pupils	2144 (3)	443 (1)	2820 (5)	2590 (4)	2827 (5)
over 800 pupils	1101 (1)	1621 (2)	4938 (4)	980 (1)	9923 (9)

* Number of Schools between brackets.

Table: 6.4

Sample Schools Pupils by Region and Location.

Region / Location	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum
Urban	3517 (6)	2383 (4)	6059 (8)	2920 (5)	13340 (16)
Semi-Urban			1221 (3)		
Rural			1818 (2)	980 (1)	1140 (3)

* Number of Schools between brackets.

Table: 6.5

Sample Schools Pupils by Region and Type.

Region / Type	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum
Day School	1471 (3)	443 (1)	4460 (6)	2143 (4)	13463 (17)
Boarding School			1484 (1)	980 (1)	469 (1)
Day & Boarding School	3967 (3)	1940 (3)	3154 (6)	777 (1)	548 (1)

* Number of Schools between brackets.

Table: 6.6

Sample Schools Pupils by Region and Kind.

Region / Kind	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum
Girls	1436 (2)	1134 (2)	3547 (5)	1379 (2)	6162 (9)
Boys	2531 (4)	1249 (2)	5551 (8)	2521 (4)	8318 (10)

* Number of Schools between brackets.

urban centres but in the Central Region there are schools in semi-urban and rural areas and in the outskirts of Khartoum. Only the traditional national schools are 'Boarding schools' other schools are mixed 'Day and Boarding' or, where, possible 'day' schools were established in conformity with the government policy of abolishing the boarding facility (Table 6.5). Table (6.6) shows roughly the distribution of schools by gender in the regions; only Khartoum has an almost equal number of schools for girls and boys. An examination of these Tables shows, also, that the classified data refer in some cases to averages of a large number of schools and in others relate to only a few, even down to only one school in some instances. These characteristics of the distribution of the resulting sample should be remembered when the results from the tables are discussed. Taking into consideration the dispersion of secondary schools in the various regions and the difficulty of transport in a vast country like the Sudan, complicated by a scarcity of petrol at the time of the field survey, the choice was governed by the possibility of access to these schools; Map (6.1) shows the area covered by these schools.

6.3. Research Instruments:

The research instruments for gathering the data include:

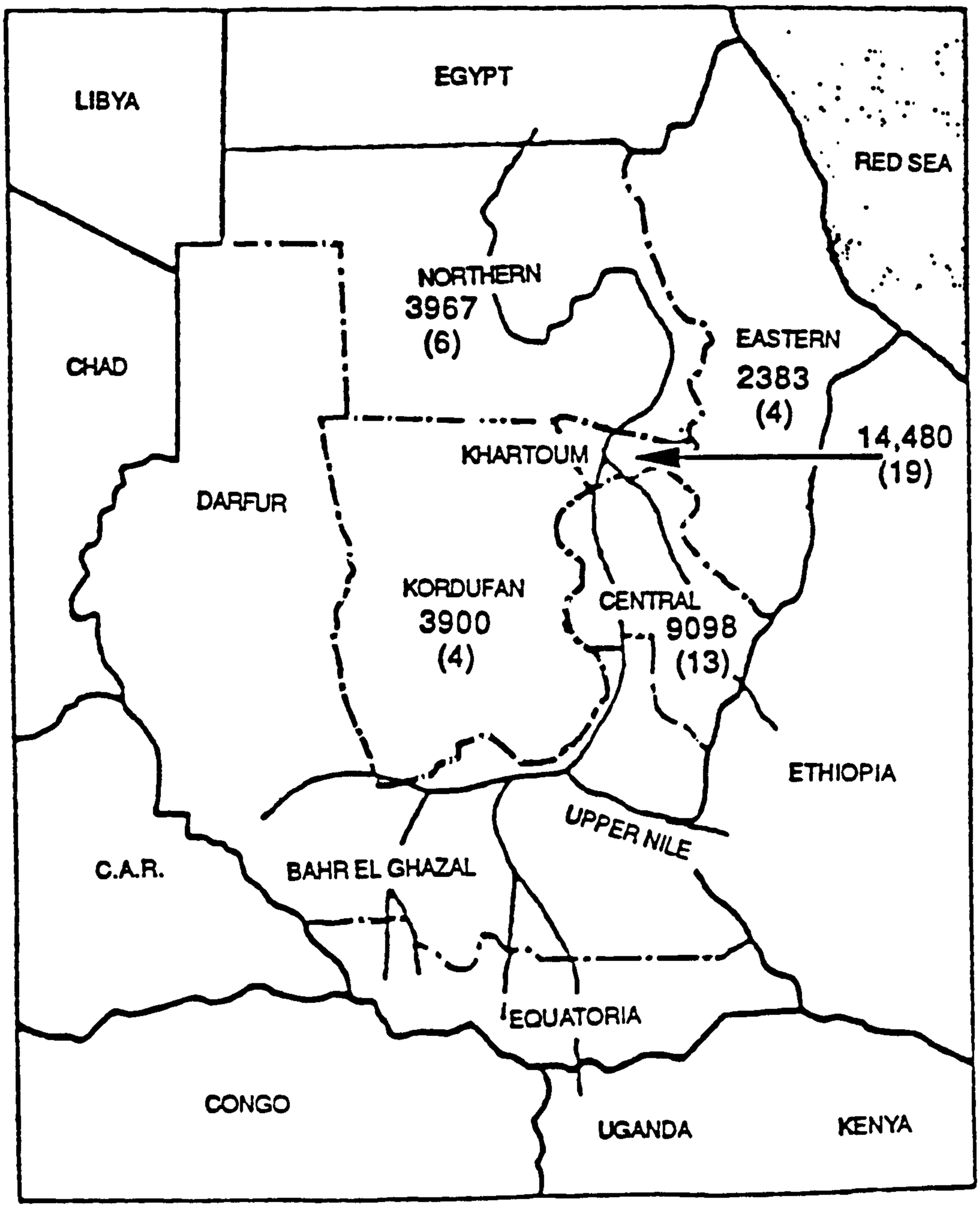
1) A questionnaire addressed to the school director, his assistants and the teaching staff (Appendix 3).
2) Primary and secondary sources.
3) The results of the Sudan School Certificate Examination for the sample schools, in the academic year 1988/89, was collected from the "Sudan Examination Council" offices, Ministry of Education, Khartoum.

6.3.1. The Questionnaire:

This study is based on educational cost at the individual institution level where actual teaching and learning take place. Due to the lack of the necessary school-by-school data in a useable form, even at the school

Map: 6-1

Distribution of Sample Schools and Pupils by Region.



Regional Boundaries ----------
Number of Pupils
Number of Schools between brackets

level, it was decided to conduct a sample survey to collect such data. A comprehensive questionnaire was constructed to collect the large amount of diverse factual data required. It is a specific form of questionnaire; the tabular questionnaire. Casley and Lury (1981) pinpointed that "This type of questionnaire may contain no actual question at all: it is in the form of a two- or three-way table to be filled in by the enumerator". It is an antithesis to the traditional questionnaire as the enumerator is frequently allowed to word the question and choose the explanation required in the situation. However, these authors noted that "If the questions relate to numeric information, the dangers inherent in this procedure may not be too great". Nevertheless, each heading was carefully designed to allow for a standardized approach and each item was specified to obtain information directly related to the research topic.

The components of this four-part questionnaire developed for the computation of unit expenditure and other indicators in the analysis of secondary school costs include: Identification and status of the school; Enrolment characteristics; Information on school personnel; Detailed analysis of non-salary expenses which include consumables and maintenance of buildings and furniture. These will be discussed in turn:

1 - **School identification:** This part requested general information about the school size, number of streams and number of classes, location, kind (gender served by the school), type (whether day, boarding or mixed day-boarding school) and management status.

2 - **Enrolment characteristics:** This part was planned to gather data on the enrolment of the school by grade/year and classified as day pupils or boarders. A part of this section collects data on repetition, dropouts, and dismissal by grade/year.

3 - **Personnel information and costs:** School personnel, for the purpose of this study, were classified as a) teachers for those who were actually teaching in the classrooms,

b) school administrators and staff, c) non-teaching staff, and d) school and boarding-house workers. This part was divided into four sections accordingly. The first aimed to collect detailed data on individual teachers pertaining to date of recruitment, basic qualification, subject of specialization, subject and grade taught, teaching load by grade/year, types of training (pre- and/or in-service), years of teaching experience, position, basic and gross annual salary, allowances, deductions, expenditure on additional (extra) periods, the school curriculum load etc. Information on the qualitative aspects of school inputs was necessary to relate the allocation and use of real resources (teaching staff) with expenditures. The other sections enquired about the school administration staff, non-teaching staff (librarians and laboratory technicians) and school workers. The required information was distributed by gender, function, qualification, training, position, basic and gross annual salary, allowances etc.

4 - **Non-salary expenses:** This part was designed to collect detailed expenditure data corresponding to the receipt or use of resources in cash or in kind (expressed in monetary terms) from various sources, though channelled through and used at the school level. These sources include the government, donations, registration fees, endowment, income generating activities etc, foreign aid and assistance. The inputs purchased include mainly text and exercise books, stationery, teaching aids, school equipment, raw materials, sport and home economics equipment and maintenance costs for buildings and furniture. An exhaustive list of items of expenditure by source of finance is included in this part, as well as a detailed list of text-books and exercise-books to cover the whole range of the school recurrent expenditure. As each item is specified separately and listed or recorded in the table it is less likely to miss expenditure on them and thus facilitates accurate and complete computing of expenses.

6.3.1.1. Validation of the Questionnaire:

The questionnaire employed for this survey was an updated version of the questionnaire designed by the researcher for the study "Costs of Primary, Intermediate and Secondary Schools in the Sudan" launched with the co-operation of IIEP, (Salih 1986). The original questionaire was developed to suit the level of education under study and the relevant characteristics of its schools. After a series of discussions with the Supervisor of this study, consultation with the Data Preparation Department in the Computer Centre (D.P.D.), Loughborough University, and the statisticians and researchers in the Educational Planning Under-secretariat in Khartoum, some parts of each section were restructured. Furthermore, the objectives of the investigation were closely related to the items on the questionnaire to ensure its content validity. Then the final version was pre-tested in a pilot survey in three schools (which were not part of the final survey) in Khartoum and its outskirts. The results, as discussed with these schools' directors, were satisfactory. The data from these schools were used to prepare a partial tabulation programme to clarify ambiguities and examine the appropriate form of showing the survey results.

6.3.2. Other sources of data:

These include published and unpublished national financial records and related relevant files and documents from the Ministry of Finance and National Planning, the Ministry of Education, and the regional education authorities. Other published and unpublished documents, including those from international organisations such as Unesco, Unicef, the World Bank, IBE and ILO, are cited, as well as published references and unpublished Ph.D. Theses, where relevant to the main theme of the study. All of the above were consulted for diagnosing the socio-economic context and how its spill-over, the financial stringency, had moulded the present educational system. These clearly demonstrated the existence of the problem of lack of

complete accurate cost data and how that bedevilled effective educational planning and hindered the identification and adoption of feasible targets and, hence, their implementation.

6.3.3. The Questionnaire Administration and Data Collection:

The whole exercise of administering the questionnaire and collecting the data was completed in four months. The fieldwork took place between December 1988 to March 1989. This period was important for fulfilling the prime objective of the study - to collect expenditure data. The school budgets had been or were about to be, almost fully spent by the last term of the academic year. The data collected covered the entire school year, from July 1988 to March 1989.

At the outset, the researcher asked for permission to conduct a field survey for collecting the necessary data for the study using a questionnaire. The First Under-Secretary of the Ministry of Education, after granting his permission, wrote to the General Director of Education in the relevant regions and to Khartoum Commissioner, explaining the purpose of the study and its importance and asking for their co-operation and help (A copy of the Under-Secretary's letter is in Appendix 1). Each region was visited for two weeks (Northern, Eastern and Kordufan) or more (Central Region and Metropolitan Khartoum). On arrival in each region the researcher visited the Director General of Education, equipped with the letter of introduction signed by the First Under-Secretary of the Ministry of Education, to explain further the nature and purpose of the field survey and to seek permission to administer the questionnaire in the secondary schools. After permission was granted the Director wrote to each school director highlighting the objectives of the survey and calling for full co-operation with the researcher (A copy of the director's letter to schools in one of the regions is in Appendix 2). The regional educational planning unit helped in selecting the most accessible of the schools prescribed by the researcher.

In a vast country like the Sudan, with its underdeveloped postal system, postal techniques would not be successful. The researcher visited the schools for the first time to establish rapport with, and explain the objectives of the research to, the school director and the staff. The questionnaire was left with the director to read and understand and to prepare the required data, which is not normally recorded on a systematic basis. The researcher pursued her aim of more effective data collection by personally visiting the 48 chosen schools and filling in the questionnaire herself as the 'very busy' school director might not have the time, or even the classified data, to complete all the diverse sections of the questionnaire. The researcher's own experience in this field dictated the use of personal administration of the questionnaire for more accurate and complete data collection. Oppenheim (1975) observed that this technique was used because "This method of data collection ensures higher response rate, accurate sampling, ... while permitting interview assessment, providing necessary explanations ... and giving the benefit of a degree of personal contact". Hence, the researcher had to return to each school to administer the questionnaire herself with the assistance of the school director, her/his deputy, school bursar and store keeper (where available). Although some schools keep records of their enrolment and expenses the majority did not; no school director could readily compute how much her/his school cost. Frequently, the researcher had to check the number of pupils, boarders and number of teaching hours from the classrooms and the school time-table respectively. School records, when available, varied in format from one school to another. Where schools had no bursar the researcher had to compute the expenditure data from scattered sources, adding up individual invoices for text-books, stationery and supplies etc. The situation was worse for teachers' and other school personnel's basic and gross salaries, which have to be worked out from the general financial records in the regional administration. In the absence of computers and

individual school records, the researcher had to cull and select staff salaries data from records comprising a number of schools; a tedious, time consuming job. It was also problematic to calculate all expenses and consumables by sources of finance. Despite the researcher's assurance of anonymity and confidentiality of the information and that it would be used only for research purposes, some directors were very reluctant to supply information on expenditure, especially from non-budgetary sources. It is understandable, given the prevailing situation of financial squeeze, that they were concerned that their future budgets might be reconsidered to incorporate the amount of self-help each school received. Moreover, donations and self-help in kind or labour were very difficult to estimate, accurately, in money equivalent due to escalating inflation, as discussed earlier. In the absence of systematic recording of data, and almost complete reliance on memory in many schools it took at least three visits to collect all the required information of expenditure data. During each visit the researcher had to be very persuasive, sympathetic and reassuring that the information would be treated as "strictly confidential", and only for research purposes and that the schools would be anonymous. Apart from all that, it was problematic to classify expenditure, particularly by purpose; the cost of supplies which were used by both administration and instruction had to be estimated. It was also difficult in most schools to tie all expenditures to their source of finance, in the absence of separate records, as non-budgetary funds as well as the school budget were spent together.

6.4. Data Proccessing and Analysis Techniques:

The methods and techniques used in processing and analysing the data were determined, at the outset, during the research design, and were taken into consideration concurrently in selecting the sample, in choosing the data collection methodology and while constructing the questionnaire. At this latter stage the D.P.D. was

consulted and their suggestions were incorporated in the final draft. After the questionnaires were sucessfully completed, despite all the difficulties encountered, they were brought to Loughborough for data processing and analysis. The number of schools included in the sample and the quantity and diversity of information collected justified computer processing. Prior to that, the data were tabulated, manually, under seven headings for the purpose of the study, namely school information; pupils' data; teachers' qualification, status of training and years of teaching experience; teachers' basic and gross salaries; school administration and non-teaching staff basic and gross salaries; school and boarding house workers' basic and gross wages; and total school expenditure by item and source of finance. The researcher had to prepare seven tables for summarising these data for the 48 schools from the forms before typing them, under the supervision of the D.P.D., using Lotus. After the tabulation stage, the D.P.D. typed the results and placed them on files in the computer mainframe. These data files were transferred to PC for preliminary analysis, validation and verification and finally the raw data were printed for inspection purposes. Then a programme of SPSS-X (Statistical Package for Social Sciences) was written for analysing the data, including recoding and creating variables for the purpose of the research.

Using summary (descriptive) statistics the data were analysed and tabulated. A cross tabulation including percentages, the mean and standard deviations were used to compare results between the regions and among the different sizes, locations, types and kinds of institutions. The first part is analysed through comparing the mean and percentages for the various institutions in the different regions and the standard deviation as an indicator of intra- and inter-regional disparities. Pearson correlation was employed to examine the extent (type and strength) of the relationship between the dependent and independent variables, as well as among the independent variables taken

together to predict any multi-collinearity (chapters 7, 8, 9 and 10). In the subsequent investigation regression analysis was used to establish the determinants of unit costs and the magnitude of the contribution of each as well as to predict the factors which influence school output. Various mathematical models were used to investigate the size-cost relationship (chapter 11), including quadratic and polynomial equations.

CHAPTER SEVEN

ACADEMIC SECONDARY SCHOOL COSTS

7.1. Unit Costs:

7.1.1. Introduction:

The unit cost "... is the device which is used by governments and businesses throughout the world for their costing procedures" (Vaizey and Chesswas, 1967). It can be denoted as the ratio between the total cost of production (current and capital) of a certain quality of goods or services and the quantities produced. Application of this concept to the education industry assumes a computed set of inputs and outputs; despite the difficulty of quantifying all inputs and the problematic nature of accurate measurement of all outputs. Gern (1967) defined unit costs in education as 'the cost of an educational unit'. He visualised the educational unit ideally to be the ability acquired by the educated to participate in the development of the economy and of civilization. This definition identifies the graduate of the system, the diploma or certificate-holder, as the educational unit to the detriment of those who failed to obtain such a qualification. However, for the sake of convenience, he adopted the unit of educational effort, which is the enrolment unit, instead. Interestingly, Nair (1981) estimated what he defined as 'effective' costs i.e. costs per a successful completer of a given level of education, and found it much higher than the 'normal' or per pupil costs; the former includes costs due to repetition and drop-outs. However, the widely used unit for analyzing schools recurrent expenditure is 'the pupil' and 'the average cost per pupil', or 'unit cost' as it is commonly known, becomes the conventional yardstick for measuring the level of resource allocation in individual schools. It represents the ratio of operating costs or expenditure of an educational level per academic year divided by the number of pupils enrolled at that level.

Educational cost may be related to a variety of units as there is not yet a full consensus about which unit to adopt. Education economists often discuss partial measurement of 'the educational effort' such as the unit cost of one educational input (for instance the teacher) or one component of the per pupil expenditure (for example the cost of instructional materials per student). In different costing situations other units, such as 'the school', 'the class', or 'per pupil place', may be used. As no one unit is suitable for all purposes (Vaizey and Chesswas, 1967) a composite group is sometimes recommended.

Unit costs can be defined in multiple ways and may differ dramatically according to the elements they include. "If, in addition to the institutional costs, personal or family expenditures are included as well as the amount of foregone salaries, then the unit costs may be quite different from those computed from book-keeping figures" (Schieflbein, 1983). It is important to note that, in itself, the computation of unit costs is not really meaningful unless it is used as a tool for comparison. Coombs and Hallak (1987) asserted that "... it is a very useful measurement for many purposes, such as comparing costs between different educational levels, institutions, geographical areas, in times ... such differentials provide important insight that broader composite cost figures conceal".

Cross-country comparisons reveal that unit costs on the same level of education differ greatly between countries but, interestingly, "... differences in unit costs among countries may be less marked than differences within countries" (Schieflbein, 1983). Nevertheless, they all share common patterns in all settings. Coombs and Hallak (1987) observed that the higher the level of education the higher the unit costs; they are dominated by teachers and other personnel salaries, susceptible to increase without a corresponding increase in quality of the service because of the nature of their components, such as the creep in

teachers' salaries and the competition from other industries with higher pay scales for the same qualification level.

Unit costs or per pupil expenditure is often identified as a general indicator of school quality as represented by student achievement. This global indicator "more directly indicate the concentration of school resources on each student enrolled at school" (Fuller, 1985). The lower level of unit costs on primary education in Sub-Saharan Africa has been responsible for constraining educational achievement in this region. "One explanation for this low quality is that expenditure per student, a highly aggregated proxy for educational inputs, is very low by world standards" (World Bank, 1988). A majority of studies in developing countries found a positive relationship between per pupil expenditure and student achievement. In the Colombian study of 4,233 secondary school graduates' academic achievement, Psacharopoulos and Loxley (1986) found that the influence of this indicator was exceeded only by the youths' verbal ability. However this same study on Tanzanian secondary school graduates found significant, though more moderate, effects on performance. On the other hand, Thias and Carnoy's (1969) study of Kenyan schools examined the magnitude of the achievement effect from expenditure per pupil. They found the per pupil expenditure had no effect on achievement in primary schools, but did have a strong influence at the secondary level. They estimated that to raise the national exam scores among the sample secondary students by 5% would require a 50% boost in per pupil expenditures.

Unit costs or expenditure is also used frequently as an indicator of efficiency. Reduction in an educational level's unit costs may imply improved efficiency due to gains in economies of size and hence better utilisation of scarce resources. Critics of this line of thought argue that expenditure per pupil "... fail to capture variations in how resources are spent, particularly as distributed among administrative costs, teachers' salaries and instructional materials" (Fuller, 1985). A decline in unit

costs in less developed countries may simply indicate a diminishing level of expenditure; thus available resources have to be spread thinly. Coombs and Hallak (1987) observed that lower costs per pupil, in such countries, may be because classes are becoming increasingly overcrowded, the proportion of unqualified teachers is rising, and the provision of textbooks and other essential inputs and support services is declining. Gern (1967) even warned that low per pupil costs sometimes mask a poor organisation and faulty administration of education. Moreover, a reduced unit cost due to a diminishing level of expenditure, which results in a thinning of educational quality, is not a sign of efficiency. Rieff (1972) claimed that per unit expenditure is not a reliable indicator of educational efficiency since a decrease in unit costs and a simultaneous increase in wastage rates may well be due to inefficiency in the education system. "Hence, 'the cost per graduate of the system' is preferred as a better index of school efficiency" (Longe, 1982).

As revealed by the related literature review earlier, many studies on unit costs analysis used statistics of expenditure at the national level or the school-district, "although it can hardly be doubted that the closest analogy to the economist's 'production unit' is the individual school's level" (Hough, 1981). Some researchers justify their choice by the absence of the necessary school-by-school data, while others believe that the school district is the more appropriate level for such analysis.

However, for the schools' recurrent expenditure the widely used unit is 'the pupil' and 'the average cost per pupil', or 'unit costs' as it is commonly known, becomes the conventional yardstick for measuring the resource allocation in individual schools. Hence, this unit, 'the pupil', will be adopted to analyze the data on secondary schools costs in the Sudan. It is hypothesized that the unit expenditure or per pupil expenditure, its components and indicators, in the various regions or districts vary according to the Size, Location, Type and Kind (or gender) of schools.

Administratively, it is believed that schools are allocated the necessary resources according to 'needs', as represented by the number of pupils enrolled or number of classes or sections. If this hypothesis is true then schools of the same size are supposed to have equal amounts of resources. Tibi (1987) noted that if resources are distributed to establishments in an equitable manner and in accordance with precise criteria ... variations in unit expenditure, for establisments of similar sizes, will be quite limited. Location is another determinant of resource allocation and, hence, unit expenditure. Although location may be a function of size, many schools can get more funds or better quality of resources or mobilize more self-help because of their unique place. Hence, "the degree of equality achieved between individual educational establishments is never very complete: wide variations persist in the levels of funding, usually expressed per pupil in different schools within the same localities and taking the same age-ranges of pupils" (Hough, 1984). The Type of school (whether it is a Day School, full Boarding or mixed Day and Boarding) may have an impact on the quality and quantity of allocated resources. For instance a Boarding School may even redeploy real or financial resources (or both) originally earmarked for boarding maintenance to serve school purposes. The fourth determinant of resources at school level may be the kind or gender served by the school. In countries where co-education is the exception, single sex schools may have access to certain resources, or can even generate more funds than the other, just because they serve only girls or only boys.

However, it is important to verify how far these externally determined factors may influence the level of resource allocations at the school level and, further, investigate which policy variables within the school may explain the variations in the level of unit expenditure on academic secondary schools and its components in the different settings.

Global unit expenditure, or unit cost, as Cumming (1971) noted, is not used here, nor subsequently, as an economic term for a measure of economic efficiency, thereby implying that output is related to the total value of input. It is used to represent the recurrent expenditure per pupil at the individual school level, from the total outlay controlled by each school authority. The unit costs here will be analysed first by school size (Small - up to 400 pupils, Medium - 401 to 800 pupils, Large - over 800 pupils), location (Urban, Semi-urban, Rural), type (Day, Boarding, Day and Boarding) and kind or gender of school (Girls', Boys'), then the analysis of its components will follow in the same sequence.

7.2. Analysis of Global Unit Expenditure:

7.2.1. Analysis of Global Unit Expenditure by Region and Size of School:

Table 7.1 shows that the national average per pupil costs is £s 617.34; officially equivalent* to US $154.26, 44% of the GNP per capita. Interestingly, the mean unit costs by size discerns a decreasing costs trend. The difference between the mean costs per pupil in Small and that in Large Schools is 19%. In Chapter 11 the existence of economies of size is thoroughly investigated.

Disparities in per pupil costs are noticeable within each size; marked in the Medium School Size. The Eastern Region Medium School, extremely high, unit costs (£s 901.15) is 1.6 times the lowest in Khartoum (£s 556.35). The Northern Region has the highest per pupil expenditure in both the Smallest (£s 745.19) and the Largest School Sizes (£s 687.87) each 1.2 times as high as those in Eastern Region and Khartoum respectively. One would wonder why the Northern Region could spend £s 136 and £s 134 more per pupil in these schools sizes and how the Eastern Region is able to afford a unit cost 1.6 times that in Khartoum. Further analysis of the components may shed more light on this

* US $ = £s 4.5 (official rate) 1988/89.

TABLE: 7.1

Total Unit Expenditure (£s) by Region and Size of School

School Size	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		745.1896	609.6285	639.1640	720.3333	705.4062	684.9253
up to 400		2	1	4	1	5	13
		1490.38	609.63	2556.66	720.33	3527.03	8904.03
		102.3373	.	137.0683	.	81.8177	99.2779
2		660.2574	901.1482	564.0253	620.5110	556.3543	609.2146
401 to 800 pupils		3	1	5	4	5	18
		1980.77	901.15	2820.13	2482.04	2781.77	10965.86
		71.4412	.	47.4300	59.4894	134.7492	113.8073
3		687.8719	612.2654	564.4259	607.6167	553.8701	574.2679
over 800 pupils		1	2	4	1	9	17
		687.87	1224.53	2257.70	607.62	4984.83	9762.55
		.	40.9167	103.8600	.	63.5343	73.8941
Column Total		693.1706	683.8269	587.2682	634.9990	594.4018	617.3426
		6	4	13	6	19	48
		4159.02	2735.31	7634.49	3809.99	11293.63	29632.44
		76.6427	146.7994	97.1611	62.4313	109.3750	104.9754

situation. In each region the extent of discrepancy varies considerably. In Kordufan, Khartoum and Eastern Region it is as high as 1.2 times, 1.3 times, and 1.5 times respectively. The Eastern Region's exceptionally high per unit costs deserve further investigation. Apart from that the Northern Region has the highest expenditure per pupil in all sizes, whereas Eastern Region Small Schools and Khartoum's Medium and Large sizes have the lowest costs. These extreme cases may be explained later, in the discussion of the components.

7.2.2. Analysis of Unit Expenditure by Region and Location of Schools:

As Table 7.2 reveals, the Urban location's mean unit costs is almost identical to the national average, whereas those for the Semi-urban and Rural areas are well below it. It is interesting to note that disparity in per pupil costs within the Rural areas is more marked than that in the Urban Sector. In the Rural area, Khartoum Schools unit costs £s 628.75, is 1.3 times that in the Central Region's £s 483.52. On the other hand, the Northern Region's per pupil expenditure in the Urban Centres (£s 693.17) is almost 1.2 times as high as that in Khartoum (£s 587.96).

In the individual regions the Central and Kordufan regions have the highest per unit costs in the Urban location, as expected. On the face of it the situation can be explained by the urban/rural dialogue. Prior belief asserts that the Urban Sector, in developing countries, normally gets the better services and the farther away from the Urban circle the worse the quality of service. Surprisingly, Khartoum secondary schools in the Urban Centres are less costly than rural schools. This peculiar trend in urban/rural expenditure may be explained by the high density of school population in the urban sector of the Capital, contrary to the rural localities. However, the variations in unit costs within Kordufan and Khartoum are very limited, but in the Central Region it is considerable. The Urban Schools' unit costs in this region is almost 1.3

TABLE: 7.2

Total Unit Expenditure (£s) by Region and Location of School

Location of School	Mean / Count / Sum / Std Dev	REGION 1 Northern Region	2 Eastern Region	3 Central Region	4 Kordufan Region	5 Khartoum	Row Total
1 Urban		693.1706	683.8269	627.0873	640.4755	587.9621	628.7385
		6	4	8	5	16	39
		4159.02	2735.31	5016.70	3202.38	9407.39	24520.80
		76.6427	146.7994	97.8618	68.1700	118.1093	109.2145
2 Semi-urban				550.2496			550.2496
				3			3
				1650.75			1650.75
				62.6642			62.6642
3 Rural				483.5194	607.6167	628.7467	576.8159
				2	1	3	6
				967.04	607.62	1886.24	3460.90
				8.2355	.	30.6823	75.3634
Column Total		693.1706	683.8269	587.2682	634.9990	594.4018	617.3426
		6	4	13	6	19	48
		4159.02	2735.31	7634.49	3809.99	11293.63	29632.44
		76.6427	146.7994	97.1611	62.4313	109.3750	104.9754

times that in Rural areas. The most expensive unit costs, as observed above, is to be found in the Northern Region Urban Sector, whereas the lowest expenditure is in the Central Region Rural schools. Further analysis may give a better explanation.

7.2.3 Analysis of Unit Expenditure by Region and Type of Schools:

The mean per pupil expenditure in Day Schools is almost identical to the national average, Table 7.3, whereas those for Boarding Schools and Day and Boarding types are slightly below the national average, though all cluster around it. These similar averages conceal considerable variations within each type of schools.

Inter-regional variations in unit expenditure are considerably more pronounced within Day Schools and Boarding Schools types. In Day Schools, the Eastern Region's per pupil costs (£s 901.15) is 1.5 times that in Khartoum (£s 588.06), whereas Khartoum's Boarding School unit costs (£s 702.34) is 1.5 times as high as the Central Region's (£s 477.70). On the other hand, the Northern Region's per pupil expenditure on Day and Boarding Types of schools (£s 648.16) is 1.2 times that in the Central Region (£s 551.58). This may imply that resource allocation follows an ad hoc pattern, not a standard criterion.

Inter-type comparisons show that in all regions Day Schools are the most expensive type of school, except in Khartoum, but Boarding Schools are more expensive than the Day and Boarding type, except in the Central Region. Generally, disparities in most regions are limited. However, the Eastern Region Day School (£s 901.15) is 1.5 times as high as that in Day and Boarding type and the Central Region Day school (£s 641.22) is 1.3 times that in the Boarding Schools. It is important to note that the Eastern Region Day School has the highest per pupil cost while the Central Region Boarding School has the lowest; both extreme levels of expenditure are observed above and further discussion may furnish an explanation.

TABLE: 7.3

Total Unit Expenditure (£s) by Region and Type of School

Type	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School		738.1769 3 2214.53 73.3757	901.1482 1 901.15 .	641.2202 6 3847.32 111.8243	656.7058 4 2626.82 66.6337	588.0584 17 9996.99 112.6380	631.8328 31 19586.82 119.9507
2 Boarding School				477.6960 1 477.70 .	607.6167 1 607.62 .	702.3412 1 702.34 .	595.8846 3 1787.65 112.7812
3 Day & Boarding School		648.1643 3 1944.49 56.7851	611.3865 3 1834.16 28.9725	551.5782 6 3309.47 52.2424	575.5544 1 575.55 .	594.2993 1 594.30 .	589.8554 14 8257.98 57.0964
Column Total		693.1706 6 4159.02 76.6427	683.8269 4 2735.31 146.7994	587.2682 13 7634.49 97.1611	634.9990 6 3809.99 62.4313	594.4018 19 11293.63 109.3750	617.3426 48 29632.44 104.9754

7.2.4 Analysis of Unit Expenditure by Region and Kind of School:

Table 7.4 indicates that the mean per pupil expenditure in Girls' Schools (£s 618.09) and that of Boys' Schools (£s 616.81) are identical and equal to the national average.

Inter-regional comparisons reveal that disparities within Girls' Schools and Boys' Schools are considerable, more marked in Boys' Schools. In Girls' Schools, the Northern Region per unit expenditure (£s 698.83) is 1.3 times as high as that in the Central Region (£s 550.87), whereas the Eastern Region Boys' Schools' costs per pupil (£s 771.17) is 1.4 times that in Khartoum (£s 542.94).

Variations in the level of per unit costs between Girls' and Boys' Schools differs from one region to another. For instance, the Northern Region has identical expenditure per pupil in both kinds of school but Khartoum spends 1.2 times as high in Girls' Schools. On the other hand, Eastern and Kordufan Regions Boys' Schools' per pupil costs is 1.3 times and 1.2 times as that in Girls', respectively. Whether this phenomenon is a mere coincidence or whether it is a policy trend, further analysis can reveal.

Interestingly, Boys' Schools have the highest unit costs and the lowest; in the Eastern Region and Khartoum. The systematic pattern of high per pupil spending is in the Northern and the Eastern Regions and, contrary to that the extremely low costs are in the Central Region and Khartoum.

To sum up the analysis of total unit expenditure on secondary schools it is evident that the mean per pupil costs by size indicates a decreasing costs pattern; that may imply economies of size in these schools operations. Chapter Eleven on economies of size may give a clearer perspective. Inter-regional variations in per unit costs within the same size, location, type and kind of schools are striking. Disparities are more marked in the Medium Schools size, the Rural areas, Day Schools, Boarding Schools and Boys' Schools. It may imply an absence of a standard criterion for allocating real and financial resources among similar schools.

TABLE: 7.4

Total Unit Expenditure (£s) by Region and Kind of School

Kind of School	REGION Mean / Count / Sum / Std Dev Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Girls	698.8253 2 1397.65 35.8163	596.4808 2 1192.96 18.5937	550.8729 5 2754.36 40.7219	569.2745 2 1138.55 8.8811	651.5805 9 5864.22 91.9888	617.3875 20 12347.75 81.9009
2 Boys	690.3432 4 2761.37 96.5949	771.1730 2 1542.35 183.8126	610.0152 8 4880.12 117.0395	667.8613 4 2671.45 46.3692	542.9409 10 5429.41 100.9565	617.3105 28 17284.70 120.2597
Column Total	693.1706 6 4159.02 76.6427	683.8269 4 2735.31 146.7994	587.2682 13 7634.49 97.1611	634.9990 6 3809.99 62.4313	594.4018 19 11293.63 109.3750	617.3426 48 29632.44 104.9754

The extent of disparities in per pupil expenditure varies from one region to another. It is more marked in the Eastern Region by Size, Type and Kind of Schools, whereas Central Region schools differ greatly by locations. This confirms that even within the same region resources for education are not distributed equally. The following analysis of the unit expenditure by components may give a clearer picture.

7.3. Analysis of the Unit Expenditure Components:

The components of the total unit expenditure can be grouped under different headings. For instance they can be divided into Salaries and Wages (Chapter One) and Services (Chapter Two) or referred to, more comprehensively, as Salary and Non-salary expenditure. In this study the unit costs are delineated as salary and non-salary expenditures. The salary expenditure part includes unit expenditure on teachers' salaries (UETS), on additional periods (UEAP), on school administration salaries (UEAS), on non-teaching staff salaries (UEN-TS), and on workers' wages (UEWW). The non-salary expenditure per pupil (UEN-S) is mainly costs of text- and exercise books, instructional materials, petty cash for day to day operation, outlays on school building and furniture maintenance and any special allocation provided by either the central or the regional government, self-help from the community and parents and foreign aid and donations for this purpose, especially during a national disaster (flood, drought, etc.). This analysis by purpose or by components aims to delineate, first, the contribution of each sub-unit to the total unit costs and then to verify the role of each in the observed inter- and intra-regional variations by size, location, type and kind of schools.

However, these components are analysed first as homogeneous groups, the combination of salary and non-salary expenditure, before embarking on examining them separately in an attempt to find explanatory factors for the differences observed above in the total unit costs.

Figure (7.1) shows the combination of salary and non-salary costs plotted graphically. It displays the percentage contribution of these sub-units costs to the total unit costs. A close examination of this figure reveals interesting and important aspects. The most important point to note is that the salary component amounts to 74% of the total per unit costs. This indicates that it is the major sub-unit costs and has the lion's share of the total unit expenditure - as expected. The dominance of teachers' and non-teachers' salaries units costs is not "... unusual - education is a labour-intensive activity" (Coombs and Hallak, 1972). Such a fact occasions little surprise in a developing country like the Sudan. Actually, it may be a desirable feature if it reflects an improvement in the quality of the education system. However, the latter usually depends on a balanced mix of resources, mainly between the salary and non-salary components. The detailed study of these components, later, may reveal whether this balance is achieved in all settings.

As Figure (7.2) displays, unit cost on teachers' salaries amount to 52.5% of the total unit expenditure, whereas additional periods costs per pupil is 1.6%. Although the percentage contribution of addditional periods is quite small, nevertheless it indicates the serious teachers shortage in many schools in most regions at this level. However, the per pupil costs on teachers salaries and that on additional periods together raise the total teaching cost to 54.1%. It shows that class-room teaching cost, or instruction cost, is the largest single item. Unless more in-depth analysis indicates otherwise, the percentage of unit expenses on teaching cost (or, mainly, the modest percentage of teachers' salaries), can indicate a balanced combination between teachers' salaries and educational facilities. At least it does not "reflect a situation where teachers are hired but are not in fact provided with the facilities necessary for effective teaching" (Coombs and Hallak, 1972).

Figure 7. 1

UniT Expenditure: Salary and Non-Salary Components

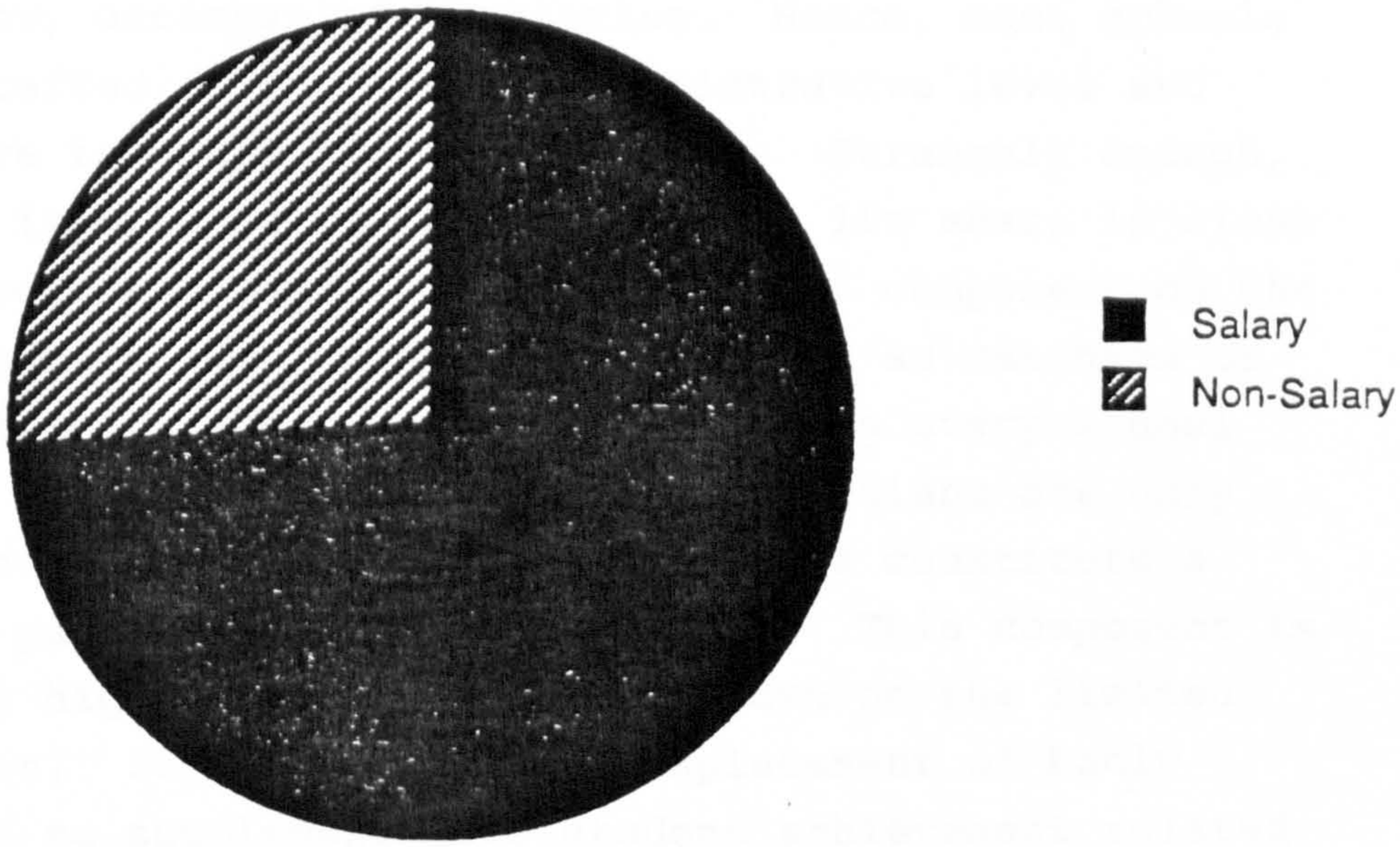
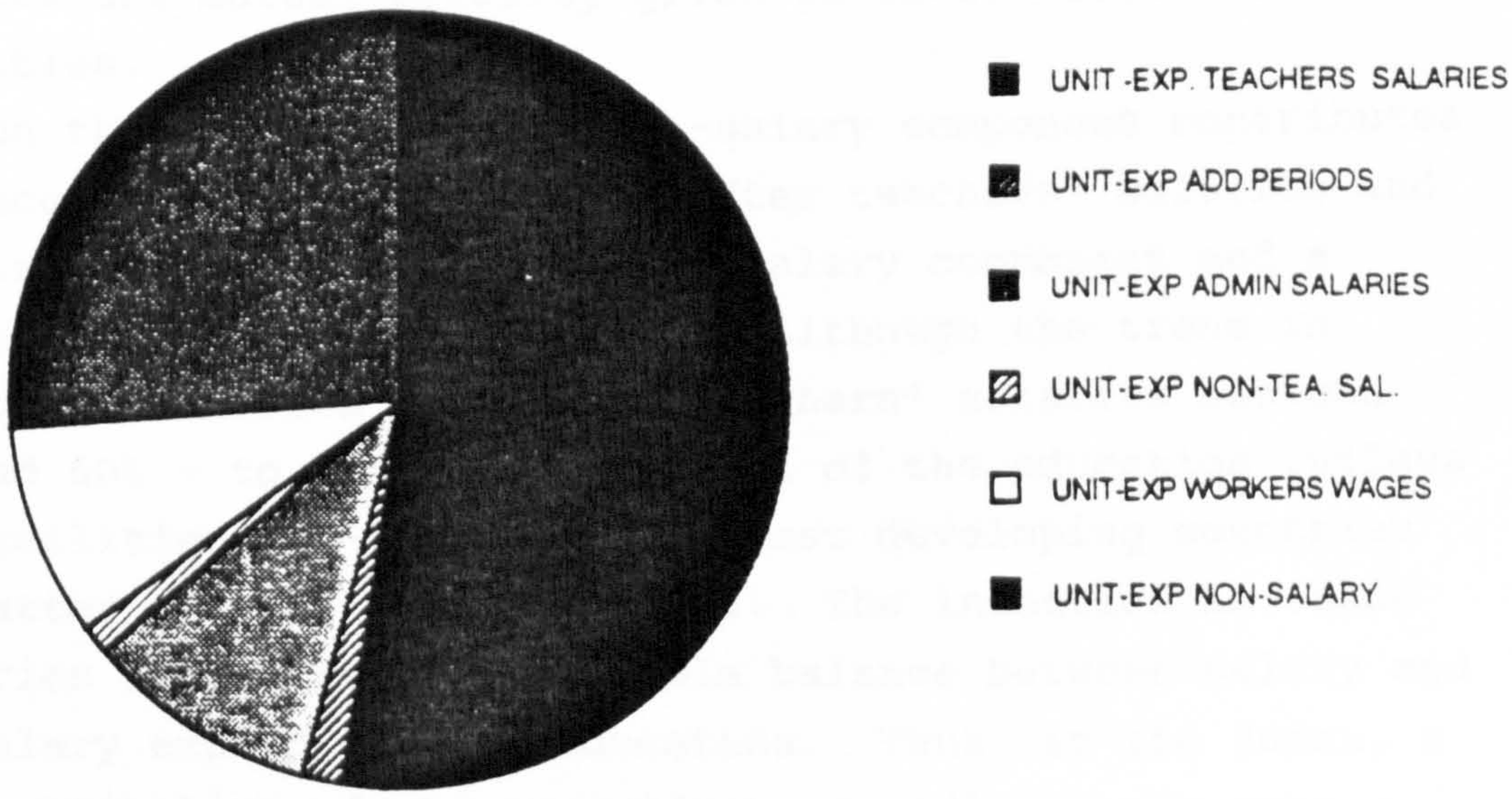


Figure 7.2

PERCENTAGE BREAKDOWN OF SALARY UNIT EXPENDITURE BY HEADINGS



The per unit costs on school ádministration salaries is 9.8%. This component is relatively high as it is bolstered by the high salaries of the director and deputy director of the school, while most of the other administrative staff have very low, uncompetitive salaries. Hence, most schools are under-staffed at the junior administrative level and teachers have to undertake their duties. Strangely enough, despite the importance of this component, its share is close to that on workers' wages; the next highest component on the salaries sub-unit, 9%. School workers such as watchmen or guards, messengers and cleaners are found in every school whereas bus drivers, carpenters and electricians are only found in the larger schools. These workers constitute a significant part of the school personnel. This component is particularly high and seems a heavy burden on the limited school budget. It may indicate a misplacement of badly needed funds to supplement more student achievement related components. As such it requires further examination later. A very small percentage, 1.1, is the contribution of the unit expenditure on non-teaching staff salaries. As non-teaching staff in academic secondary schools are mainly librarians and science laboratories technicians and assistants, their percentage contribution shows the limited number of supportive staff in these categories. In fact it reflects the actual priority given to these vital education facilities.

On the other hand, the non-salary component contributes the second largest single item after teachers' salaries and amounts to 26%; one third of the salary component and a quarter of the total unit costs. Although the trend in developed countries is to hold teachers' salaries between 50% and 60% - to spare at least 40% of the education outlays for facilities and equipment, in most developing countries the latter are kept at around 25%. The intention in these countries is to have a reasonable balance between salary and non-salary expenditure on education. Thus, in the Sudan, a 26% contribution of the non-salary expenditure may seem a valid point of balance. However, only the composition of

this component can reveal whether this assumption is true or false.

The breakdown of the non-salary component by headings is displayed in Figure (7.3). It is evident that the non-salary item is dominated by the text-books and exercise books headings which amount to 57.4%, but 24.1% (almost a quarter) of this sub-unit goes towards minor maintenance of school buildings and furniture. Although expenditure on these items is typical of the annual school budget expenses it is inflated by the high expenditure on schools destroyed by floods at the time of this study. It is also notable that the usual maintenance budget at the school level is assumed to consolidate the already existing places and does not aim to create new places for pupils. The total outlay for stationery, raw materials, chemicals and library books amounts to only 5.1% of this component. Petty cash for the day to day running of the school is 6.2% of the total, whereas transport, extra-curricular activities, home economics and cadets, sport and drama and the school garden expenses together constitute 7.2% of this item. Figure (7.4) presents graphically the Education and Non-education expenditures components of the non-salary items. As Cumming (1972) noted "although such a decision encounters both conceptual and practical difficulties but it can assess rapidly whether the educational outlays reflect a higher status for school teaching or simply a host of ancillary social and welfare services". This figure shows that education expenditure amounts to 71%, slightly less than three quarters of this sub-unit costs. On the other hand non-education expenditure consumes 29% of this item. However, it is necessary to delineate which sub-headings are considered to be directly education expenditure, in the non-salary component, and which are non-education. Usually items such as stationery, raw materials, chemicals, petty-cash, extra-curricular activities, home economics, cadets, library, text books and exercise books are treated as directly educational, therefore expenditure on them is education expenditure. But buildings and furniture

Figure 7.3

NON-SALARY EXPENDITURE BY COMPONENTS

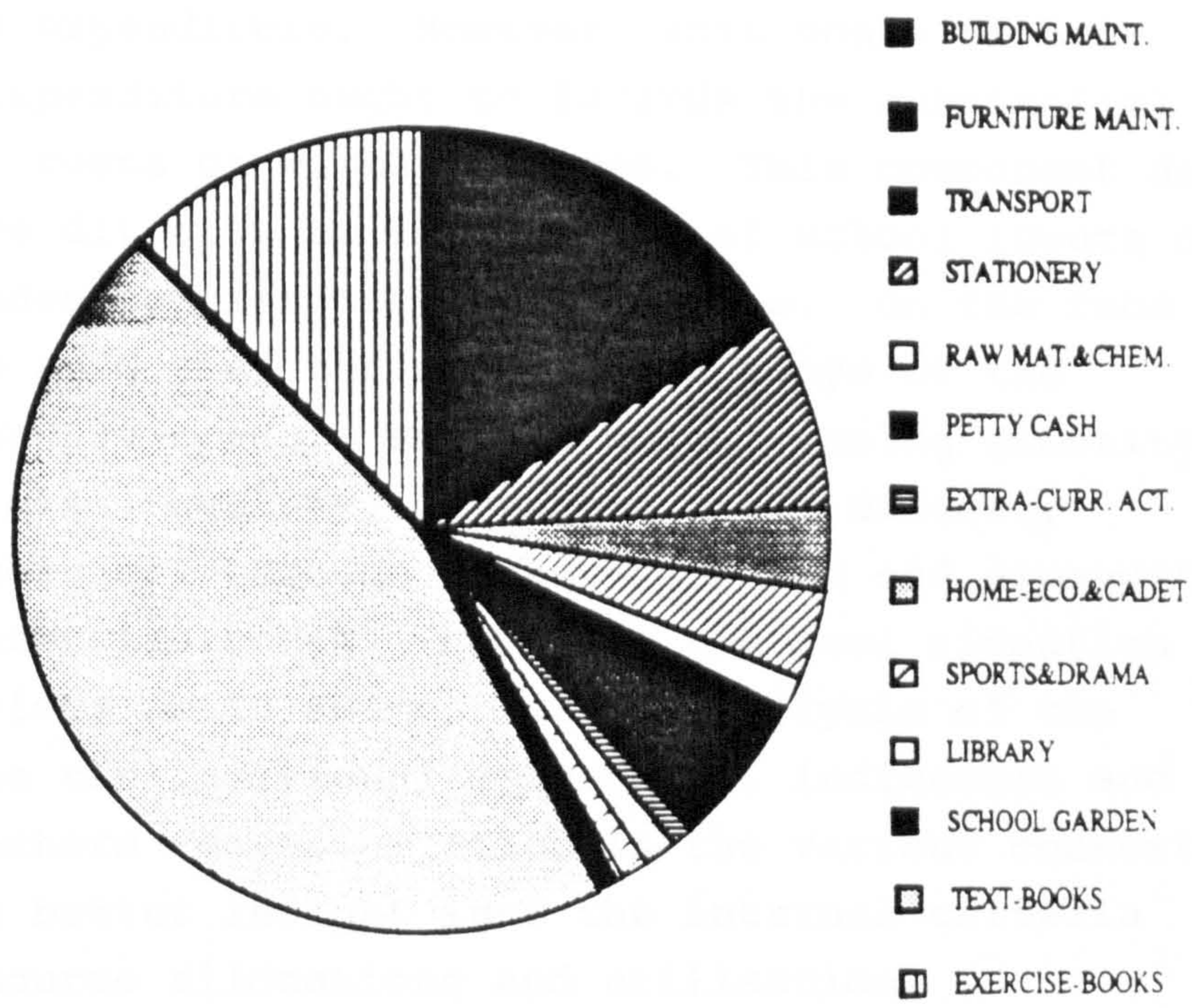
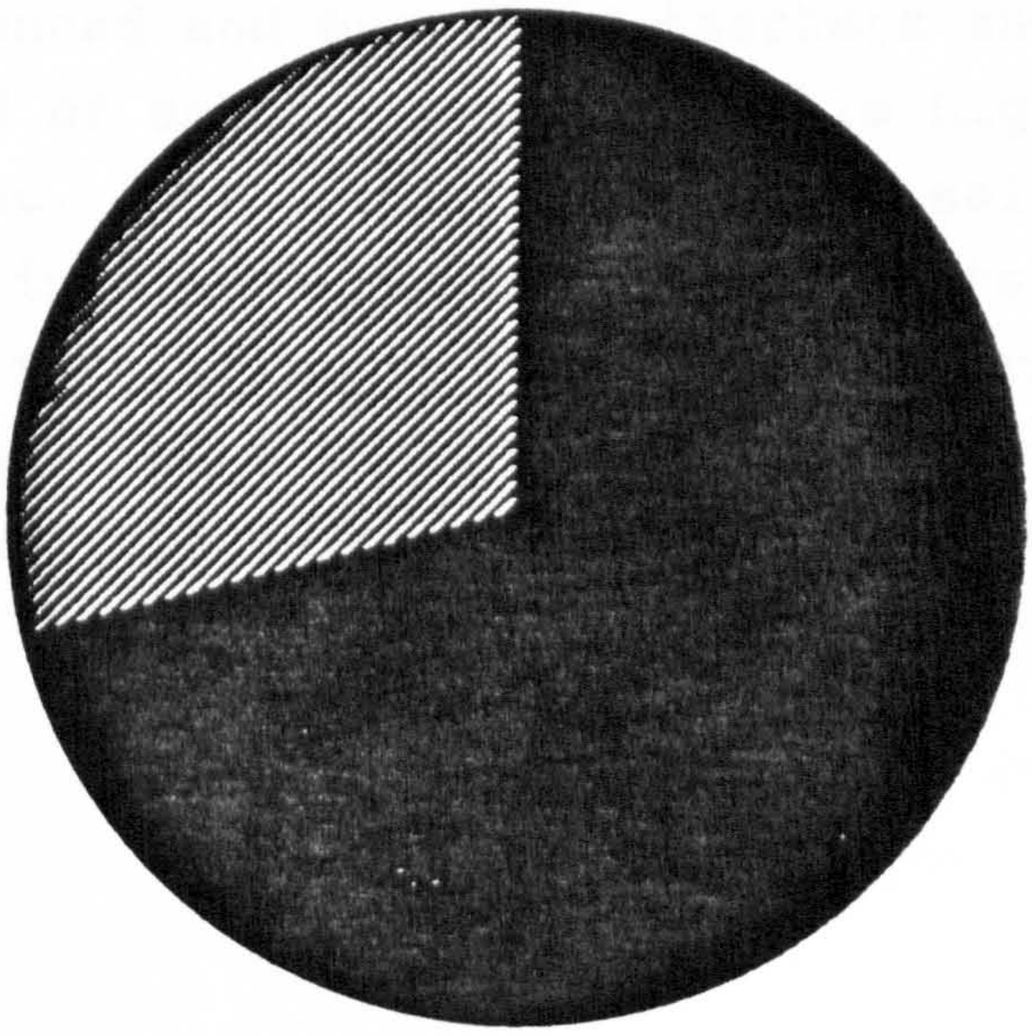


Figure 7.4

NON-SALARY EXPENSES BY EDUCATION AND NON-EDUCATION EXPENDITURI



maintenance, transport, supervision of school garden, sports clubs and drama societies in the school are seen as not being, directly, education expenditure and so constitute the non-education expenditure. However, unit costs on non-educational expenditure ought to include the substantial share of unit costs on workers' wages. This component does not contribute directly to the quality of school inputs or outputs - student achievement, for example. On the face of it, it can be said that the education outlays of the academic secondary schools support an increasing quantity (and may be, also, quality) of teachers and directly educational services through higher salaries and expenditure on text and exercise books. However, the real situation may not be as obvious as it seems; further analysis of the expenditure on the individual components, indicators and later the teachers characteristics in the various contexts may provide a better insight into the internal criteria governing resource allocations and utilisation.

The most important component, and the first to be analysed, is the per pupil costs on teachers' salaries.

7.3.1. Unit Expenditure on Teachers' Salaries:

Teachers' salaries are known, in developed as well as developing countries, to appropriate the largest share of the education budget. A higher proportion of the budget devoted to teachers' salaries may indicate the recruitment of more experienced and qualified teachers and, hence, a higher standard of school teaching. This higher percentage on one component, unit costs on teachers' salaries, can cause a severe imbalance between qualified teachers and expenditure on facilities to help them perform their duties.

The analysis below extends to cover the variation in per pupil expenditure on teachers' salaries by region and size, location, type, and kind of school as mentioned above.

7.3.1.1. Analysis of Unit Expenditure on Teachers' Salaries by Region and Size:

Table 7.5 shows that the national average per pupil costs on teachers' salaries is £s 324.36; 52.5% of the total unit expenditure; a lower percentage compared with other developing countries, especially those in the Sub-Saharan Region of Africa.

The mean costs on this component by school size indicates that the Small School Size (up to 400 pupils) is the most expensive, whereas lower costs per pupil are discerned in the larger sizes; an expected trend as teachers are generally under-utilised in small institutions.

Disparities within each school size are considerable, but minimal in Large Schools (over 800 pupils). In Small School Size Khartoum's expenditure on this component (£s 409.21) is 1.4 times that in the Central Region (£s 285.29). Eastern Region's Medium Schools unit costs on teachers' salaries (£s 358.38) is almost 1.3 times as high as the identical costs in the Central Region and Khartoum (£s 287.60 and £s 290.08). This may indicate that, not only the quantity of resources and the pupil-teacher ratio, but even the quality of teacher level of qualification and seniority are not distributed in an equitable manner to similar school sizes. The Large Schools enjoy more or less the same level of provision, as indicated by the small variation in unit costs on this component.

The regional mean unit costs on teachers' salaries range from as high as £s 343.77 in Kordufan and Eastern Region to only £s 291.14 in the Central Region. Discrepancies within each region are limited in the Northern, Eastern and Central Regions. In Khartoum and Kordufan Small School per pupil costs on teachers' salaries (£s 409.21 and £s 387.22) are 1.4 times and 1.2 times as high as that in the Medium Schools, respectively. Both have a lower teachers' cost per unit in Medium and Large Schools.

The Central Region has the lowest per unit costs on teachers' salaries in all school sizes, whether this is attributable to a lower average salary in this region, a

TABLE: 7.5

Unit Expenditure (£s) on Teachers Salaries by Region and Size of School

School Size	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		322.7168	353.7555	285.2892	387.2182	409.2135	351.8178
up to 400 pupils		2	1	4	1	5	13
		645.43	353.76	1141.16	387.22	2046.07	4573.63
		36.4159	.	61.8357	.	74.4580	77.5131
2		309.8943	358.3747	287.5991	334.8616	290.0750	306.4375
401 to 800 pupils		3	1	5	4	5	18
		929.68	358.37	1438.00	1339.45	1450.37	5515.87
		76.0631	.	48.1654	26.4837	96.3408	63.7824
3		327.0082	329.5338	301.4245	335.9816	327.9765	322.3261
over 800 pupils		1	2	4	1	9	17
		327.01	659.07	1205.70	335.98	2951.79	5479.54
		.	34.8399	101.0294	.	64.8225	65.0949
Column Total		317.0207	342.7994	291.1423	343.7744	339.3806	324.3552
		6	4	13	6	19	48
		1902.12	1371.20	3784.85	2062.65	6448.23	15569.05
		51.4087	25.3535	65.8243	29.5635	85.1883	69.1451

higher pupil-teacher ratio or class size is not clear. The analysis of the educational indicators may verify the situation.

7.3.1.2. Analysis of Unit Expenditure on Teachers' Salaries by Region and Location of School:

As Table 7.6 indicates, the Urban Sector has the highest mean unit expenditure on teachers' salaries, £s335.69, almost identical to the national average. At this stage it can be said that the higher total unit costs in the Urban Sector (Table 7.2) can be explained by the highest unit expenditure on teachers' salaries in this location. The mean per unit cost on this component in the Semi-urban and Rural areas are well below the national average; a similar situation is displayed by the corresponding locational means of total unit expenditure. Empirical studies well documented the variations in educational costs between Rural and Urban areas.

Inter-regional comparisons of the per pupil expenditure on teachers' salaries reveals that disparity is limited in the Urban Sector but marked in Rural areas. In the Rural location, Kordufan's and Khartoum's identical highest unit expenditure on teachers' salaries (£s 335.98 and £s 336.55) are more than 1.6 times as high as the Central Region's (£s 204.71).

However in all regions the highest teachers' salary per pupil is in the Urban Sector. Although unit costs on this component is almost identical in the Urban and Rural locations in Khartoum and Kordufan, the discrepancy in the Central Region is considerable. In this region the per unit cost on teachers' salary in the Urban Sector is more than 1.6 times that in the Rural areas. The extremely low expenditure per pupil on teachers' salary in the Central Region Semi-Urban and Rural locations needs further investigation.

TABLE: 7.6

Unit Expenditure (£s) on Teachers Salaries by Region and Location of School

	REGION					
Location	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Urban	1	317.0207	342.7994	331.6736	345.3329	339.9105	335.6909
		6	4	8	5	16	39
		1902.12	1371.20	2653.39	1726.66	5438.57	13091.94
		51.4087	25.3535	46.6787	32.7762	90.4567	65.0103
Semi-urban	2			240.6821			240.6821
				3			3
				722.05			722.05
				12.9088			12.9088
Rural	3			204.7074	335.9816	336.5544	292.5099
				2	1	3	6
				409.41	335.98	1009.66	1755.06
				26.1830	.	62.6979	79.5936
Column Total		317.0207	342.7994	291.1423	343.7744	339.3806	324.3552
		6	4	13	6	19	48
		1902.12	1371.20	3784.85	2062.65	6448.23	15569.05
		51.4087	25.3535	65.8243	29.5635	85.1883	69.1451

7.3.1.3. Analysis of Unit Expenditure Teachers' Salaries by Region and Type:

Table 7.7 indicates that the Day School type has the highest mean unit cost on teachers; salaries, £s 340.66, (almost identical to the national average) whereas those of Boarding Schools and Day and Boarding Types are identical to each other but below the national average (£s 297.84 and £s 293.94).

Inter-regional analysis reveals that variation in unit costs on teachers' salaries within Day Schools is limited, wider in Day and Boarding Schools and extremely wide in the Boarding type.

Per unit costs on this component in Day and Boarding Schools in the Eastern Region (£s 337.61) is 1.3 times as high as that in Khartoum (£s 264.41). In Boarding Schools the Khartoum per pupil expenditure on teachers' salaries (£s 371.35) is almost twice that in the Central Region (£s 186.19).

On the other hand, all regions except Khartoum have the highest per pupil cost on salaries in Day Schools. Discrepancies in the level of this component within the individual regions are noticeable. In the Eastern Region and Kordufan disparities in per pupil costs on this component are limited but in the Northern and Central Regions and Khartoum they are marked. Central Region's Day Schools costs on this sub unit is 1.7 times that in Boarding Schools.

7.3.1.4. Analysis of Unit Expenditure on Teachers' Salaries by Region and Kind of Schools:

As Table 7.8 reveals the overall mean costs per pupil on Teachers' Salaries is higher in Girls' Schools; above the national average.

Variations in this component within Girls' and Boys' Schools are considerable; wider among Girls' Schools. Khartoum Girls' Schools' per pupil costs on teachers' salaries (£s 384.71) is 1.4 times the lowest in Central

TABLE: 7.7

Unit Expenditure (£s) on Teachers Salaries by Region and Type of School

Type	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		347.4115	358.3747	322.9066	352.4596	341.9105	340.6570
		3	1	6	4	17	31
Day School		1042.23	358.37	1937.44	1409.84	5812.48	10560.37
		49.9255	.	64.7616	33.0723	87.9896	72.1195
2				186.1933	335.9816	371.3475	297.8408
				1	1	1	3
Boarding School				186.19	335.98	371.35	893.52
				.	.	.	98.2933
3		286.6300	337.6077	276.8695	316.8263	264.4051	293.9401
		3	3	6	1	1	14
Day & Boarding School		859.89	1012.82	1661.22	316.83	264.41	4115.16
		36.6578	28.3280	50.4646	.	.	44.7655
Column Total		317.0207	342.7994	291.1423	343.7744	339.3806	324.3552
		6	4	13	6	19	48
		1902.12	1371.20	3784.85	2062.65	6448.23	15569.05
		51.4087	25.3535	65.8243	29.5635	85.1883	69.1451

TABLE: 7.8

Unit Expenditure (£s) on Teachers Salaries by Region and Kind of School

Kind of School	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		326.1211	353.9624	283.4202	319.0078	396.7154	349.2861
Girls		2	2	5	2	9	20
		652.24	707.92	1417.10	638.02	3570.44	6985.72
		99.9566	.2926	44.2127	3.0852	70.9065	73.6027
2		312.4706	331.6365	295.9687	356.1577	287.7792	306.5474
Boys		4	2	8	4	10	28
		1249.88	663.27	2367.75	1424.63	2877.79	8583.33
		31.4882	37.8136	79.0032	28.9847	61.6372	61.0007
Column Total		317.0207	342.7994	291.1423	343.7744	339.3806	324.3552
		6	4	13	6	19	48
		1902.12	1371.20	3784.85	2062.65	6448.23	15569.05
		51.4087	25.3535	65.8243	29.5635	85.1883	69.1451

Region (£s 283.42). On the other hand, Kordufan Boys' Schools' expenditure on teachers' salaries per unit (£s 356.16) is 1.2 times as high as the Central Region's (£s 295.97).

In individual regions unit costs on teachers' salaries are almost identical in Northern, Eastern and Central Regions, whereas it is slightly higher in the Eastern Region's Girls' Schools and in Boys' Schools in Kordufan. In Khartoum per pupil expenditure on teachers' pay in Girls' Schools is 1.3 times as high as that in Boys' Schools. This may be explained by the high concentration of female teachers in the Capital who are difficult to redeploy or transfer.

To sum up, it should be noted that Khartoum and Kordufan have the highest sub-unit costs in Girls' and Boys' Schools respectively, while Central Region has the lowest cost in both kinds of school.

It is particularly interesting that, although Khartoum has the highest unit expenditure on Teachers' Salaries in Girls' Schools, it has almost the lowest unit cost on this component in Boys' Schools. However, the Northern, Eastern and Central Regions spend equally high per unit on teachers' salaries in both Girls' and Boys' Schools, though relatively higher in Girls.' But Kordufan's unit expenditure on this item in Boys' Schools is higher than that in Girls' Schools.

7.3.2 Unit Expenditure on Additional Periods:

Additional or extra periods is an indicator of teacher shortages and employment of part-time teachers. Empirical studies on teacher classroom behaviour, such as continuous assessment of pupils performance, higher expectations for student achievement, close evaluation of homework, and more time spent on preparing lessons have positive relationship with student academic achievement in many developing countries (Fuller, 1985). Intuitive judgement asserts that part-time teachers, assigned for a temporary period on an hourly basis would not be motivated or even have the time to pursue such long term activities closely related to student

achievement. A unique study by Sembiring and Livingstone (1981) investigated the question of full-time and part-time teachers in Indonesia secondary schools. They found that the hypothesis that full-time teachers possess more motivation and teaching effectiveness had a positive relationship with the study of Arts, but not science. Tibi (1987) noted that "the number of pupils per class in large establishments is partially compensated by a larger relative number of full-time teachers, ... that assumes, however, that full-time teachers have higher motivation than their part-time colleagues". Hence, part-time teachers may be less effective and constrained by the limited contact hours they spend with their temporary students. However, the prevalence of teachers shortages and employment of part-timers may be an indicator of low school quality; better schools attract more teachers.

In the Sudan secondary schools, the rapid teacher turnover during the school year, compels the school director to resort to part-time teachers, or for a member of staff from the department which suffered the shortage to take over the time-table of the absent teacher until a replacement is found. Thus, the remaining staff would be overburdened by the additional workload, frustrated and hence less effective. Recently, the Teachers' Unions demanded that teachers should teach only their 'required' load, as delineated according to their position in the salary scale. For anything above this required load they should be remitted per period.

The extent of teacher shortages in the various regions, as indicated by the expenditure per pupil on additional periods, are presented in the following tables. Yet there is no indication as to which subjects suffer this shortage or in which areas it is more acute. However, except for all the statistics in the Northern Region and a few in the Central Region all the other data are non-significant. Nevertheless, it seems important to document the phenomenon of teachers shortages in secondary schools in an attempt to estimate its magnitude in the different regions.

7.3.2.1. Analysis of Unit Expenditure on Additional Periods by Region and Size of Schools:

Table 7.9 shows that the national average unit costs on additional periods is £s 10.03; including the Eastern Region and other schools which have no expenditure on this component.

The regional mean per pupil costs on additional periods varies from as high as £s 21.56 and £s 20.82 in Central and Northern Regions respectively, to as low as £s 0.81 in Khartoum. The Eastern Region either does not pay for extra load or has adequate staff for all subjects taught; further discussion may explain the situation.

On the other hand, the mean per unit costs on extra periods by school size reveals that, whereas the Small and Medium School sizes have almost identical costs, the Largest Size has the lowest costs. It confirms the notion that large schools are well established and, as such, are well staffed.

The Northern and the Central Regions' Small Schools have the highest expenditure per pupil on additional periods (£s 22.08 and £s 25.82), while Khartoum has the lowest (£s 0.94). In Medium and Large Schools Size the Central and the Northern Region, respectively, have the highest costs on this component and Khartoum has the lowest per unit in the respective sizes. It is noticeable that the Northern Region has the highest unit expenditure while the Central has almost the lowest.

Kordufan has no additional periods in the Largest Size whereas Central Region and Khartoum have the lowest per unit costs on additional periods in this Size, as expected; contrary to the situtation in the Northern Region. The high costs on extra periods in the Northern and Central Regions and the extremely low expenditure in Khartoum raise many questions. Are teachers' shortages in the former regions more severe than all the others? Or are these regions particularly conscientious about compensating for their shortage of staff?

TABLE: 7.9

Unit Expenditure (£s) on Additional Periods by Region and Size of School

School Size	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		22.0770	.0000	25.8242	15.2727	.9391	12.8784
up to 400		2	1	4	1	5	13
		44.15	.00	103.30	15.27	4.70	167.42
		2.5310	.	8.5347	.	2.1000	12.8013
2		15.9112	.0000	27.1192	11.4004	1.1247	13.0308
401 to 800 pupils		3	1	5	4	5	18
		47.73	.00	135.60	45.60	5.62	234.55
		5.8046	.	20.4925	14.9970	2.5149	16.0031
3		33.0463	.0000	10.3486	.0000	.5650	4.6780
over 800 pupils		1	2	4	1	9	17
		33.05	.00	41.39	.00	5.09	79.53
		.	.0000	10.7391	.	1.1743	9.7092
Column Total		20.8223	.0000	21.5606	10.1457	.8107	10.0313
		6	4	13	6	19	48
		124.93	.00	280.29	60.87	15.40	481.50
		7.7295	.0000	15.7435	12.7299	1.7494	13.5136

On the other hand, has Khartoum an adequate level of teaching staff, or is it not paying for all the missing periods? However, all regions, except the Eastern suffer shortage in teaching staff to a different extent; worst in the Northern and the Central Regions. Further analysis can give a better explanation.

7.3.2.2. Analysis of Unit Expenditure on Additional Periods by Region and Location:

Table 7.10 shows that the mean per pupil costs on additional periods in Urban and Rural areas are identical and below the national average, though all these values are non-significant. The Semi-urban's mean costs is significant and four times as high as the national average.

In the Urban Sector the regional disparity in per unit costs on additional periods ranges from as high as £s 20.82 in the Northern Region to only £s 0.67 in Khartoum. Similarly, in the Rural areas, it varies from £s 21.71 in Central Region to only £s 1.57 in Khartoum.

In individual regions the lowest expenditure per pupil on this sub-unit is in the Urban Sector, except in Kordufan. This implies that Urban Schools suffer fewer teacher shortages than other locations.

Semi-urban Schools' (found only in the Central Region) per pupil costs on additional periods, £s 40.15, is almost three times that in the Urban Sector and twice that in the Rural areas. It may indicate severe shortage of teachers in these schools. They are next door to the Urban centres but may not have the same facilities. On the other hand, Khartoum schools in both locations have the lowest expenditure per pupil on this component, though in the Rural areas is over twice that in the Urban Sector.

7.3.2.3. Analysis of Unit Expenditure on Additional Periods by Region and Type of School:

As Table 5.11 indicates, the mean costs per pupil on additional periods in Day Schools (£s 7.451) and Boarding School types (£s 8.44) are identical (almost equal to the

TABLE: 7.10

Unit Expenditure (£s) on Additional Periods by Region and Location of School

Location	Mean / Count / Sum / Std Dev	REGION 1 Northern Region	2 Eastern Region	3 Central Region	4 Kordufan Region	5 Khartoum	Row Total
1 Urban		20.8223	.0000	14.5532	12.1749	.6693	8.0242
		6	4	8	5	16	39
		124.93	.00	116.43	60.87	10.71	312.94
		7.7295	.0000	11.7869	13.1027	1.5992	10.9175
2 Semi-urban				40.1445			40.1445
				3			3
				120.43			120.43
				16.5352			16.5352
3 Rural				21.7143	.0000	1.5652	8.0207
				2	1	3	6
				43.43	.00	4.70	48.12
				5.1003	.	2.7110	11.0008
Column Total		20.8223	.0000	21.5606	10.1457	.8107	10.0313
		6	4	13	6	19	48
		124.93	.00	280.29	60.87	15.40	481.50
		7.7295	.0000	15.7435	12.7299	1.7494	13.5136

TABLE: 7.11

Unit Expenditure (£s) on Additional Periods by Region and Type of School

Type	Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School		17.8154	.0000	16.8771	15.2186	.9061	7.4512
		3	1	6	4	17	31
		53.45	.00	101.26	60.87	15.40	230.99
		7.5951	.	14.0170	12.9285	1.8306	10.8524
2 Boarding School				25.3208	.0000	.0000	8.4403
				1	1	1	3
				25.32	.00	.00	25.32
				.	.	.	14.6189
3 Day & Boarding		23.8292	.0000	25.6173	.0000	.0000	16.0851
		3	3	6	1	1	14
		71.49	.00	153.70	.00	.00	225.19
		8.0345	.0000	18.6946	.	.	17.3100
Column Total		20.8223	.0000	21.5606	10.1457	.8107	10.0313
		6	4	13	6	19	48
		124.93	.00	280.29	60.87	15.40	481.50
		7.7295	.0000	15.7435	12.7299	1.7494	13.5136

national average), though non-significant. That for the Day and Boarding Type, £s 16.09, is almost twice as high as each of those for the other types; but is also non-significant.

It is evident that the Day schools in all regions, except the Eastern, have a problem with finding adequate numbers of teaching staff for all the subjects taught. The per pupil costs on additional periods is highest and identical in the Northern, the Central and Kordufan Regions and extremely low in Khartoum. This problem is more serious in Northern and Central Regions Day and Boarding Schools and only in the Central Region Boarding Type. As the latter is a national school and similar schools in the other regions have succeeded in attracting adequate staff, it deserves further analysis and examination. On the other hand, in the Day and Boarding Type, only the Northern and the Central Regions pay for extra periods; the highest unit costs in each region.

7.3.2.4. Analysis of Unit Expenditure on Additional Periods by Region and Kind of School:

Table 7.12 reveals that the mean unit costs on additional periods in Boys' Schools is almost twice that in Girls' Schools, both hold around the national average, though all are non-significant.

Disparities within Girls' and Boys' Schools in per pupil expenditure on additional periods are marked; even more marked in the latter kind. The Central Region's Girls' Schools per pupil costs on this component is £s 18.16, whereas Khartoum's is £s 0.83. Boys' Schools in the Northern and Central Region have the highest and identical expenditure on this sub-unit, £s 24.33 and £s 23.69, whereas Khartoum's costs per pupil is only £s 0.79. This may indicate the ability of the various regions to attract adequate teachers.

Taking each region separately, the level of staffing within the same region differs greatly. Generally, Girls' Schools seem to have less severe problems of teacher shortages, as implied by the lower per unit expenditure on

TABLE: 7.12

Unit Expenditure (£s) on Additional Periods by Region and Kind of School

Kind of School	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Girls		13.7990	.0000	18.1581	6.0930	.7266	6.8557
		2	2	5	2	9	20
		27.60	.00	90.79	12.19	6.54	137.11
		6.3734	.0000	14.4410	8.6168	1.6085	10.6082
2 Boys		24.3340	.0000	23.6871	12.1721	.8865	12.2995
		4	2	8	4	10	28
		97.34	.00	189.50	48.69	8.86	344.39
		6.0588	.0000	17.0967	15.1297	1.9514	15.0298
Column Total		20.8223	.0000	21.5606	10.1457	.8107	10.0313
		6	4	13	6	19	48
		124.93	.00	280.29	60.87	15.40	481.50
		7.7295	.0000	15.7435	12.7299	1.7494	13.5136

this component. It may indicate that this kind of School is more adequately staffed than Boys' (or at least equally staffed, as in Khartoum). Otherwise it implies more response to teacher shortages in Boys' Schools than in Girls'. In the Northern and Kordufan Regions Boys' Schools expenditure per pupil on additional periods is almost twice that in Girls' Schools.

Summing up the discussion on unit expenditure on additional periods, it is evident that teacher shortages prevail in all regions, except the Eastern, although the intensity of the problem varies to an astonishing extent. Variations in per pupil cost on this component are extremely wide among regions within the same size, location, type and kind of school. The Northern and the Central Region's schools of all sizes and types for Boys and Girls in the respective locations suffer from shortage of teaching staff. Similar, though, to a far lesser extent, is the magnitude of this problem in the Kordufan Region. Teacher shortages may be more serious in Boys', Day Schools and the Urban Sector rather than in the other locations or more catered for in these settings. Khartoum, from its expenditure on this component, can hardly be counted among the areas with a serious shortage of teaching staff.

Even within the same region discrepancies can be striking. The Central Region's Semi-urban location has the highest unit cost on this component whereas Khartoum has the lowest in the Large School size.

However, it is important to be cautious in this situation as higher expenditure on additional periods can be a sign of better response to the shortage in teaching staff. Nevertheless these issues can be better explained by the detailed analysis of the educational indicators in the next chapter.

7.3.3 Unit Expenditure on School Administration Staff Salaries:

Administration has always been thought of as an art, but today it is both an art and a science. The contemporary administrator must have the technical knowledge and skills to enable him to work effectively with and through others to accomplish the goals of the organisation. School administrators are no exception and need to deal knowledgeably with many technical areas of vital concern to the operation of the schools: "from the intricacies of property taxation to methods of grouping children for instruction, from the ever-changing law on education to school-community relations, from tests and measurements of learning to the latest thinking on the cognitive development of children" (Owens and Steinhoff, 1988). The Sudanese school administrator, in addition to the above, is expected to have a problem-solving attitude to make a success of the job he is entrusted with despite the meagre resources which have to be stretched and supplemented to effect the ordinary running of the school. The tightly-squeezed school budget motivates the school director to tap other sources of finance for running his school and to find better ways and means to mobilize and redirect his existing resources into new and/or more productive channels. As these resources, both human and material, are finite; their effective deployment and utilisation are persistent central concerns for him. In spite of their crucial position as top administrators most of the secondary schools' directors are not professionally trained administrators. Many directors lack sufficient technical knowledge and skills to enable them to work effectively, and to exercise leadership in their work with other individuals and groups. Because of this fact they frequently call upon their own past experience, or simply intuition, to guide them. However, it depends solely on the school director's personal contacts and relationships with the community as to how much self-help in cash or in kind he can secure for the benefit of the

school. Surprisingly, this is also a crucial element in procuring even government funds in some regions.

7.3.3.1.Analysis of Unit Expenditure on Administration Salaries by Region and Size of School:

As Table 7.13 shows, the national average per pupil costs on school administration is £s 60.46, or 9.8% of the total unit expenditure. The variations in the regional mean costs on this sub unit are surprisingly limited but they conceal marked disparities within the regions. The mean expenditure per unit on this component by size reveals a decreasing cost pattern; the Small School size costs is 1.9 times as high as that in the Large Size. Chapter 11 on economies of size can give a more comprehensive picture. Variations within each size are extremely wide. In the Small School size, the Northern and the Central Regions have the highest costs per pupil on administration salaries; 1.6 times as high as the Eastern Region's. Kordufan's Medium Schools costs, £s 67.07, and Northern Region's Large Schools sub-unit costs, £s 54.34, are 1.4 times and 1.8 times that of the Central Region respectively. It seems that administrative staff are not distributed to the same size of school according to a supposedly standard criterion for all regions. Otherwise, it may well be that some schools cannot secure all the categories of staff prescribed because they cannot compete with other sectors, especially when hiring accountants and trained secretaries.

Disparity in per pupil costs on this component within each region is marked. Although the difference between the Eastern Region's unit expenditure on administration salaries in Small and Large School sizes is only 19%, that within Khartoum is 1.5 times, in Kordufan 1.6 times (almost twice as high in Northern Region) and, astonishingly, 3.3 times in the Central Region.

However, one would wonder whether the extremely low costs on this component in the Central Region Large Schools are due to economies of size or to meagre resources thinly

TABLE: 7.13

Unit Expenditure (£s) on Administration Salaries by Region and Size of School

School Size / REGION	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1	99.3544	61.9185	99.3746	82.0545	70.6049	84.0927
up to 400	2	1	4	1	5	13
	198.71	61.92	397.50	82.05	353.02	1093.20
	12.1330	.	30.3286	.	4.2149	21.9529
2	53.8024	59.4582	48.6801	67.0665	61.4518	57.7661
401 to 800 pupils	3	1	5	4	5	18
	161.41	59.46	243.40	268.27	307.26	1039.79
	2.0370	.	16.9392	15.0921	19.1376	15.6826
3	54.3406	51.9095	30.5903	53.1245	48.3761	45.2371
over 800 pupils	1	2	4	1	9	17
	54.34	103.82	122.36	53.12	435.39	769.03
	.	6.4305	7.3017	.	14.5764	13.8789
Column Total	69.0761	56.2989	58.7123	67.2408	57.6668	60.4589
	6	4	13	6	19	48
	414.46	225.20	763.26	403.44	1095.67	2902.03
	24.1083	6.3626	34.5778	14.8469	16.5349	22.7740

spread. The discrepancy is so large in this region that it may not be justified by each size's needs for this resource.

The Small School Size has the highest unit cost on administrative salaries whereas the Large Size, as expected, has the lowest in all sizes.

7.3.3.2. Analysis of Unit Expenditure on Administration Salaries by Region and Location of School:

Table 7.14 indicates that the mean per pupil costs on administration salaries in all locations are similar to the national average, and cluster around it. Interestingly, the Semi-urban and Rural mean costs on this component is higher than that for the Urban Sector. It may be accounted for by the high concentration of students in the Urban schools.

Inter-regional comparison reveals considerable variations in unit costs on this component in both Urban and Rural locations; wider in the latter. In the Urban Sector, Kordufan and the Northern Regions have identical, highest per unit costs on administrative salaries (£s 70.06 and £s 69.08), 1.3 times as high as Khartoum (£s 53.89) and the other similar costs in the Central and the Eastern Regions. On the other hand, Khartoum Rural Schools' expenditure per pupil on this sub unit (£s 77.82) is almost 1.5 times as high as that in Kordufan (£s 53.13).

Interestingly, unit costs on administration salaries differ greatly within individual regions. Khartoum's per pupil costs on this component in the Rural areas is 1.4 times as high as that in the Urban centres, whereas Kordufan and the Central Regions spend 1.3 times more in Urban and Semi-urban Schools respectively. However, the higher expenditure per unit may be explained by a higher level of administrative staff salaries or smaller class size in these locations. The discussion on educational indicators later, can give a better explanation.

TABLE: 7.14

Unit Expenditure (£s) on Administration Salaries by Region and Location of School

	REGION					
Location	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Urban	1	69.0761	56.2989	55.4417	70.0641	53.8878	58.8644
		6	4	8	5	16	39
		414.46	225.20	443.53	350.32	862.20	2295.71
		24.1083	6.3626	40.4774	14.6887	14.3989	23.0780
Semi-urban	2			69.1986			69.1986
				3			3
				207.60			207.60
				26.7774			26.7774
Rural	3			56.0653	53.1245	77.8214	66.4532
				2	1	3	6
				112.13	53.12	233.46	398.72
				31.8588	.	13.4949	20.7864
Column Total		69.0761	56.2989	58.7123	67.2408	57.6668	60.4589
		6	4	13	6	19	48
		414.46	225.20	763.26	403.44	1095.67	2902.03
		24.1083	6.3626	34.5778	14.8469	16.5349	22.7740

7.3.3.3. Analysis of Unit Expenditure on Administration Salaries by Region and Type of School:

As Table 7.15 demonstrates, the mean per pupil cost on administration salaries in all types of schools clusters around the national average. However, Day Schools have the highest mean costs on this sub-unit; more than 1.2 times that in the Boarding Type.

Disparities in per pupil expenditure on this component are marked in each type; more so in the Boarding Type. The Northern Region Day Schools spend £s 84.10; 1.5 times as Khartoum sub-unit, £s 55.09. Khartoum per unit costs on Day and Boarding Schools and Boarding Type are even more expensive (£s 91.86 and £s 67.29), almost 1.7 times and twice, respectively, those in the Central Region. This shows that the Boarding Schools, and Day and Boarding Types, can obtain more physical resources than the Day Type. However, the boarding schools' administration in Khartoum is the most expensive.

Variations in per pupil costs on administration salaries within the individual regions are considerable. Kordufan, the Northern and the Central Regions have the highest cost per pupil on this component in Day Schools; 1.4 times, 1.6 times and twice as high respectively, whereas Khartoum Rural Schools' per unit cost on this sub-unit is 1.7 times that in Day Schools.

It is interesting to note that in all types of Schools regions spend on average around £s 55.00 per unit on this component but Khartoum and Northern Region spend £s 91.86 and £s 84.10, whereas the Central Region's expenditure can be as low as £s 33.54. However, it may be a matter of concern that the Central Region could afford twice this per unit cost in Day Schools. Further analysis of educational indicators may explain whether this is due to economies of size or crowded classes.

However, the Northern Region, as before, has the highest per unit expenditure on this component in Day Schools and Khartoum has that in Boarding Schools and, Day and Boarding School Types, whereas, the Central Region has

TABLE: 7.15

Unit Expenditure (£s) on Administration Salaries by Region and Type of School

Type	Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School		84.1009	59.4582	67.9548	72.6477	55.0895	62.7936
		3	1	6	4	17	31
		252.30	59.46	407.73	290.59	936.52	1946.60
		27.7779	.	47.2333	15.5941	14.8883	25.7583
2 Boarding School				33.5377	53.1245	67.2857	51.3160
				1	1	1	3
				33.54	53.12	67.29	153.95
				.	.	.	16.9465
3 Day & Boarding		54.0513	55.2458	53.6655	59.7297	91.8613	57.2483
		3	3	6	1	1	14
		162.15	165.74	321.99	59.73	91.86	801.48
		2.0443	7.3532	19.4597	.	.	16.0140
Column Total		69.0761	56.2989	58.7123	67.2408	57.6668	60.4589
		6	4	13	6	19	48
		414.46	225.20	763.26	403.44	1095.67	2902.03
		24.1083	6.3626	34.5778	14.8469	16.5349	22.7740

the lowest expenditure per pupil on this item in both these types of schools.

7.3.3.4. Unit Expenditure on Administration Salaries by Region and Kind of Schools:

Table 7.16 reveals that the mean costs per pupil on administration salaries for Boys' Schools is higher than that for Girls', 1.6 times as high; though both cluster around the national average.

Variations in Girls' and Boys' Schools are considerable but more pronounced in the latter kind. Girls' Schools have the highest per unit expenditure on this component in Khartoum (£s 59.64) 1.3 times as high as that in the Central Region (£s 45.46); both below the national average. It may imply either that Girls Schools do not have adequate administrative staff, or that classes in this kind of schools are more crowded. On the other hand, Boys Schools' highest expenditure on this sub-unit in the Northern Region, £s 77.25, is 1.4 times that in Khartoum,
£s 55.89. This high level of spending may be accounted for by the larger number of older, well established Boys Schools in each region that managed to retain their level of staffing despite the financial stringency.

It is interesting to note that, Khartoum and the Eastern Region expenditures on this sub-unit are identical in both Girls' and Boys' Schools; though both are below the national average. However, the Northern the Central and Kordufan Regions spend more in Boys' Schools; 1.5 times as high in the former regions and 1.3 times in the latter.

It is important to note that the Northern Region has the highest per pupil expenditure on administration salaries in Boys' Schools whereas, the Central Region's Girls' Schools have the lowest expenditure on this component.

Summing up the discussion on per pupil costs on administration salaries, it can be concluded that on the whole, unit costs are around and mostly below the national average in all settings. The exception are the expenditure on the Small School Size, the Northern and Kordufan Regions

TABLE: 7.16

Unit Expenditure on Administration Salaries by Region and Kind of School

Kind of School	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		52.7358	54.6405	45.4551	54.8217	58.7726	54.0313
Girls		2	2	5	2	9	20
		105.47	109.28	227.28	109.64	528.95	1080.63
		1.2135	10.2927	24.6145	6.9410	14.4448	15.9336
2		77.2462	57.9574	66.9980	73.4504	56.6715	65.0500
Boys		4	2	8	4	10	28
		308.98	115.91	535.98	293.80	566.72	1821.40
		26.4799	2.1225	38.7224	14.0389	18.9477	25.9177
Column Total		69.0761	56.2989	58.7123	67.2408	57.6668	60.4589
		6	4	13	6	19	48
		414.46	225.20	763.26	403.44	1095.67	2902.03
		24.1083	6.3626	34.5778	14.8469	16.5349	22.7740

Urban, Day, and Boys' Schools and in Khartoum the Rural and Day and Boarding Schools. Surprisingly there is no equitable distribution of this resource, even within the same region; except for the Eastern Region there are extreme levels of spending in all regions; this is worst in the Central Region.

7.3.4 Unit Expenditure on Non-Teaching Staff Salaries:

Non-teaching staff in secondary schools fall into two categories: librarians and science laboratories assistants or technicians. These ancillary staff were essential when the secondary schools used to have good libraries and well equipped science laboratories but, as the social demand for secondary education increased, libraries in old schools were transferred to classrooms and Preparatory science rooms, once the laboratory assistants' offices, are used as teachers' offices. Spelling out the consequences of continuous cuts in the education outlays and a squeezed school budget both have a bearing on the availability of science equipment and raw material and chemicals. Science teaching became more and more theoretical, with no room for practical work and experimentation.

In periods of financial stringency, self-help is called in for new school buildings and the government promises the support for operating the schools. Hence, to economise on construction costs, most new secondary schools are without library buildings and, sometimes, even without science laboratories.

Old established schools, too, suffer from the lowly position of basic scientific educational equipment in the struggle for resources, not to mention raw materials and chemicals. Thus the number of this type of staff decreased and their training and qualifications lagged behind. However, the variations in per unit costs on this component signpost the priority each region assigns to teaching science in secondary schools in an age of science and technology. The data in the following tables are more often statistically non-significant. However, the existence (or

non-existence) of well established science laboratories and libraries in secondary schools is a useful indicator of school quality, especially science teaching. The investigation, separately, of non-teaching staff at this level of education gives a better insight into this aspect of school quality.

7.3.4.1. Analysis of Unit Expenditure on Non-Teaching Salaries by Size:

Table 5.17 displays that the national average costs per pupil on non-teaching staff salaries is £s 6.99, only 1.5% of the total unit expenditure. The mean costs per unit by size of school are almost identical and cluster around the national average. The regional mean expenditure per pupil on this component reveals considerable variations, Northern Region's per pupil costs (£s 11.35) is more than twice that in Khartoum (£s 4.18). However, all these values are non-significant.

Disparities in per unit costs on non-teaching salaries are marked within each size. The Eastern Region's unit costs in Small and Medium Schools are almost four times and three times, respectively, that in Khartoum. Both values in Khartoum are non-significant. The Northern Region's Large Schools are more than six times as high as Khartoum's. The extremely low expenditure in Khartoum's schools may be attributable to the large expansion of this level of education.

Variations in individual regions are extremely high, extending from 4 times more in the Northern Region to 1.2 times within Khartoum; some values are non-significant. However, the Northern Region, Kordufan and Khartoum, retain the highest per pupil expenditure on this component in the Large School Size, indicating that this size is, relatively, better equipped and established.

Northern Region's extremely high costs on this sub-unit and Khartoum's extremely low expenditure deserve further investigation.

TABLE: 7.17

Unit Expenditure (£s) on Non-Teachers Salaries by Region and Size of School

School Size	REGION Mean / Count / Sum / Std Dev Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1	9.9174	15.0470	10.7398	7.7818	3.8207	8.0559
up to 400	2	1	4	1	5	13
	19.83	15.05	42.96	7.78	19.10	104.73
	6.8363	.	4.3020	.	5.2735	5.6853
2	6.2114	10.8352	6.0082	7.3197	3.8879	6.0127
401 to 800 pupils	3	1	5	4	5	18
	18.63	10.84	30.04	29.28	19.44	108.23
	2.1760	.	4.4781	3.7443	3.6340	3.7365
3	29.6022	6.1067	6.7889	12.5388	4.5503	7.2037
over 800 pupils	1	2	4	1	9	17
	29.60	12.21	27.16	12.54	40.95	122.46
	.	.1510	4.0621	.	1.5240	6.4455
Column Total	11.3452	9.5239	7.7043	8.2666	4.1840	6.9879
	6	4	13	6	19	48
	68.07	38.10	100.16	49.60	79.50	335.42
	9.7229	4.3051	4.4706	3.5814	3.2055	5.3049

7.3.4.2. Analysis of Unit Expenditure on Non-Teaching Salaries by Region and Location of School:

Table 7.18 reveals that the locational mean costs per pupil on non-teaching salaries in Urban and Rural areas are identical and cluster around the national average, whereas the Semi-Urban mean expenditure is only half the above; all these values are non-significant.

Variations in per pupil costs on this component are wider in the Urban Sector rather than the Rural Areas. The Northern Region's Urban Schools' per unit costs, £s 11.35, is more than 3 times that in Khartoum. In the Rural areas, Kordufan per pupil expenditure on this sub-unit, £s 12.54, is twice as high as Khartoum's; both values are non-significant.

Interestingly, all regions have the highest expenditure per pupil on non-teaching salaries in the Rural areas. This ranges from 2.7 times as high in Central Region, 1.7 times in Kordufan and 1.4 times in Khartoum.

It is noteworthy to record that Northern Region's Urban Schools and Kordufan's Rural Schools have the highest per pupil expenditure on this component, whereas Khartoum Urban Schools and the Central Region Semi-urban Schools have the lowest. However, the greatest expenditure on this sub-unit is three times the smallest.

7.3.4.3. Analysis of Unit Expenditure on Non-Teaching Salaries by Region and Type of School:

As Table 7.19 illustrates, the mean costs per pupil on non-teaching salaries for Day and Boarding Schools is 1.6 times that for Day Schools. On the whole, the mean costs for each type are more or less equal to the national average, though all values are non-significant.

Disparities are quite marked in each type of School. The Eastern Region Day Schools, Kordufan Boarding and Northern Region Day and Boarding Schools have the highest expenditure on this sub-unit, which are more than twice those in Kordufan, Central Region and Khartoum respectively; some values are non-significant.

TABLE: 7.18

Unit Expenditure (£s) on Non-Teachers Salaries by Region and Location of School

Location	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban		11.3452	9.5239	8.8385	7.4121	3.9215	7.0943
		6	4	8	5	16	39
		68.07	38.10	70.71	37.06	62.74	276.68
		9.7229	4.3051	3.9751	3.2492	2.8550	5.4322
2 Semi-urban				3.5329			3.5329
				3			3
				10.60			10.60
				3.0597			3.0597
3 Rural				9.4248	12.5388	5.5839	8.0233
				2	1	3	6
				18.85	12.54	16.75	48.14
				6.4873	.	5.2773	5.2906
Column Total		11.3452	9.5239	7.7043	8.2666	4.1840	6.9879
		6	4	13	6	19	48
		68.07	38.10	100.16	49.60	79.50	335.42
		9.7229	4.3051	4.4706	3.5814	3.2055	5.3049

TABLE: 7.19

Unit Expenditure (£s) on Non-Teachers Salaries by Region and Type of School

Type	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		9.0575	10.8352	8.5442	6.4003	3.9842	5.8905
Day School		3	1	6	4	17	31
		27.17	10.84	51.27	25.60	67.73	182.61
		5.0582	.	4.3127	2.6928	3.3374	4.0977
2				4.8376	12.5388	5.5011	7.6258
Boarding School				1	1	1	3
				4.84	12.54	5.50	22.88
				.	.	.	4.2677
3		13.6328	9.0868	7.3422	11.4595	6.2628	9.2810
Day & Boarding		3	3	6	1	1	14
		40.90	27.26	44.05	11.46	6.26	129.93
		13.9660	5.1628	5.1691	.	.	7.1809
Column Total		11.3452	9.5239	7.7043	8.2666	4.1840	6.9879
		6	4	13	6	19	48
		68.07	38.10	100.16	49.60	79.50	335.42
		9.7229	4.3051	4.4706	3.5814	3.2055	5.3049

Per pupil expenditure on non-teaching salaries on each type of school differs markedly from one region to the other. The Northern Region, and Khartoum spend 1.5 times, and 1.6 times respectively, in Day and Boarding Schools whereas the Central Region Day Schools are 1.8 times and Kordufan Boarding Type are about twice as high; some values are non-significant.

It is evident that the Northern Region Day and Boarding Schools and Kordufan Boarding Type have the highest per pupil expenditure on Non-Teaching Salaries, whereas Khartoum's Day Schools and Central Region's Boarding Type have the lowest costs on this component. However, this may imply, as discussed earlier, better equipped laboratories and good libraries in these types of schools in the Northern and Kordufan Regions and, in contrast, the standard of these facilities in Khartoum's Day Schools and the Central Region's Boarding Schools Types.

7.3.4.4. Analysis of Unit Expenditure on Non-Teaching Salaries by Region and Kind of School:

Table 5.20 shows that the mean costs per pupil on this component in Girls' and Boys' Schools are identical and cluster around the national average; all these values are non-significant.

Discrepancies in unit costs on non-teaching salaries within Girls' and Boys' Schools are large; even larger in the latter kind. The Eastern and the Central Regions' Girls' Schools' highest expenditure (£s 10.63 and £s 10.53) on this sub-unit are more than twice that in Khartoum, (£s 3.68). On the other hand, the Northern Region's Boys' Schools' costs on this sub-unit, £s 14.26, is three times as high as Khartoum's, £s 4.64; most of these values are non-significant.

The level of per pupil expenditure on non-teaching salaries in Girls' and Boys' Schools differs greatly from one region to another. Although the Eastern Region, Kordufan and Khartoum have more or less the same costs in Girls' and Boys' Schools, the Central Region spends almost

TABLE: 7.20

Unit Expenditure (£s) on Non-Teachers Salaries by Region and Kind of School

	REGION					
Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Kind of School						
1 Girls	5.5204	10.6303	10.5362	7.8128	3.9065	6.7883
	2	2	5	2	9	20
	11.04	21.26	52.68	15.63	35.16	135.77
	2.5701	6.2462	3.4447	5.1572	3.8118	4.6777
2 Boys	14.2575	8.4176	5.9343	8.4934	4.4338	7.1304
	4	2	8	4	10	28
	57.03	16.84	47.47	33.97	44.34	199.65
	11.0194	3.4190	4.2629	3.5080	2.7364	5.7914
Column Total	11.3452	9.5239	7.7043	8.2666	4.1840	6.9879
	6	4	13	6	19	48
	68.07	38.10	100.16	49.60	79.50	335.42
	9.7229	4.3051	4.4706	3.5814	3.2055	5.3049

twice as much in Girls' Schools, whereas the Northern Region's costs per pupil are more than two and half times as high in Boys Schools; these values are non-significant. However, this may give a clear indication of how public schools in the same region, offering the same level of education and identical curriculum options, can have different levels of provision.

To sum up the discussion on unit expenditure on non-teaching salaries, it is evident that this constitutes a very minor percentage (1.5) of the total unit expenditure. Although most of the values in all environments are non-significant, they draw attention to very important aspects. Variations are extremely large on this component among regions within each size, location, type and kind of school. Northern Region, Kordufan and Khartoum spend more per unit on Large Schools and the Day and Boarding Type, whereas the Eastern and the Central Regions favour Small Schools, Day Schools, Girls' Schools and the Urban Sector for the former region and the Rural areas for the latter. The extremely high unit costs on this sub-unit in the Northern and the Eastern Regions and Kordufan indicate that there are some old established and well equipped schools in these regions. Yet Khartoum's lowest expenditure in all settings may be explained by the large number of newly established schools with less-well-equipped laboratories and, in most cases, not even a library building. However, these extreme variations deserve further investigation.

7.3.5 Unit Expenditure on School Workers' Wages:

It is noticeable that almost all the secondary schools in Sudan have a number of redundant workers. As it is difficult for the large numbers of villagers who abandoned the land and migrated to the big cities and towns to find gainful employment many of them end up as guards, messengers or cleaners in schools, especially secondary schools. But, with the hard-pressed educational budget, men found that a school-worker's wage is no longer attractive. The encroachment of desertification and drought drove women from

the countryside to the urban areas. Nowadays women are replacing men in schools services, except as watchmen.

7.3.5.1. Analysis of Unit Expenditure on Workers' Wages by Region and Size of School:

As Table 7.21 shows, the national average unit expenditure on workers' wages is £s 55.32, 9% of the total unit expenditure. The mean costs on this component by size discloses a decreasing cost pattern; the Small School Size mean costs is 23% higher than that for the Large Size. Although this former mean expenditure is higher than the national average, those for the other school sizes are almost identical and cluster around it.

The regional mean per pupil expenditure on this component is highest in the Northern Region, £s 71.25 - 1.7 times the lowest sub-unit of £s 42.51 in Central Region. These averages conceal striking variations.

Disparities within each school size on this sub-unit are great; minimal in the Large Schools. The Northern Region highest per pupil cost on Workers' Wages in Large Schools (£s 65.51) is only 1.3 times that in Khartoum (£s 49.00), whereas the Small and Medium Schools, in the Northern and the Eastern Regions' sub-units are £s 92.59 and £s 85.24, over 2.2 times and 2.8 times as high as in the respective sizes in the Central Region (£s 42.03 and £s 30.80). Generally, the Northern and the Eastern Regions have the highest unit costs and the Central Region and Khartoum the lowest.

On the other hand, within individual regions discrepancy is great - though comparatively less pronounced. The highest per pupil expenditure on Workers' Wages in the Northern Region's and Khartoum's Small Schools is 1.6 times that in Large Schools. The Eastern and Central Regions spend even more in the Medium and Large School sizes respectively; almost twice as much. However, the next discussion of the educational costs indicators may explain these striking variations in per pupil costs on workers wages.

TABLE: 7.21

Unit Expenditure (£s) on Workers Wages by Region and Size of School

School Size	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		92.5935	45.9875	42.0302	77.0455	75.1240	65.5354
up to 400		2	1	4	1	5	13
		185.19	45.99	168.12	77.05	375.62	851.96
		3.7709	.	22.8897	.	20.6787	25.7311
2		58.9407	85.2379	30.8006	63.3800	46.2363	50.0425
401 to 800 pupils		3	1	5	4	5	18
		176.82	85.24	154.00	253.52	231.18	900.76
		17.1139	.	9.4121	5.5050	21.6885	20.3269
3		65.5095	54.9342	57.6246	55.8637	48.9991	53.1019
over 800 pupils		1	2	4	1	9	17
		65.51	109.87	230.50	55.86	440.99	902.73
		.	14.9809	12.4533	.	9.1647	10.4977
Column Total		71.2531	60.2734	42.5094	64.4048	55.1470	55.3220
		6	4	13	6	19	48
		427.52	241.09	552.62	386.43	1047.79	2655.46
		19.9930	19.2246	18.2385	8.0976	19.7153	19.9328

7.3.5.2. Analysis of Unit Expenditure on Workers' Wages by Region and Location of School:

Table 7.22 illustrates the unique situation of the Semi-urban mean costs on this component (£s 26.76); only half that for the Urban and Rural locations. Both the latter mean costs are identical and equal to the national average.

Disparities in unit costs on workers' wages are marked in all localities, but more so in the Rural areas.

In the Urban Sector, the Northern Region highest per pupil expenditure on this component (£s 71.25) is 1.5 times that in the Central Region (£s 49.13) whereas Khartoum's Rural Schools sub-unit (£s 67.41) is 1.7 times as high as that in the Central Region (£s 39.67); the latter is non-significant.

Individual regions have the highest expenditure on the Urban Sector (except Khartoum, which favours the Rural areas). Discrepancies in this sub cost are considerable within each region, greater in the Central Region; Urban Schools' costs is 1.8 times as much as the Semi-Urban's.

The Northern Region has the highest costs on this component in the Urban centres and the Central Region has the lowest expenditure in each location, particularly the Semi-urban. Later analysis of education costs indicators may verify the situation.

7.3.5.3. Analysis of Unit Expenditure on Workers' Wages by Region and Type of School:

Table 7.23 reveals that the Day Schools and the Boarding Types mean costs on Workers' Wages are identical, cluster round the national average and are almost 1.3 times as high as that for the Day and Boarding Type.

Disparities within the Day Schools and Day and Boarding Types of schools are great; even more so in the latter Type. Day Schools' highest and identical per unit expenditure on this component in the Northern and the Eastern Regions are almost 1.7 times that in the Central Region and Khartoum. Khartoum's Day and Boarding Schools' sub-unit costs

TABLE: 7.22

Unit Expenditure (£s) on Workers Wages by Region and Location of School

Location	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban		71.2531 6 427.52 19.9930	60.2734 4 241.09 19.2246	49.1272 8 393.02 17.2009	66.1131 5 330.57 7.7510	52.8470 16 845.55 20.2850	57.3781 39 2237.75 19.2177
2 Semi-urban				26.7575 3 80.27 9.9649			26.7575 3 80.27 9.9649
3 Rural				39.6658 2 79.33 24.7207	55.8637 1 55.86 .	67.4141 3 202.24 12.0046	56.2396 6 337.44 19.0969
Column Total		71.2531 6 427.52 19.9930	60.2734 4 241.09 19.2246	42.5094 13 552.62 18.2385	64.4048 6 386.43 8.0976	55.1470 19 1047.79 19.7153	55.3220 48 2655.46 19.9328

TABLE: 7.23

Unit Expenditure (£s) on Workers Wages by Region and Type of School

Type	Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School	Mean	87.9013	85.2379	53.2145	66.3672	53.8195	59.6332
	Count	3	1	6	4	17	31
	Sum	263.70	85.24	319.29	265.47	914.93	1848.63
	Std Dev	8.5535	.	18.0941	8.9260	20.2146	20.5072
2 Boarding School	Mean			57.1460	55.8637	57.1087	56.7061
	Count			1	1	1	3
	Sum			57.15	55.86	57.11	170.12
	Std Dev			.	.	.	.7298
3 Day & Boarding	Mean	54.6049	51.9520	29.3648	65.0965	75.7537	45.4793
	Count	3	3	6	1	1	14
	Sum	163.81	155.86	176.19	65.10	75.75	636.71
	Std Dev	9.7290	11.7854	9.1236	.	.	17.7986
Column Total	Mean	71.2531	60.2734	42.5094	64.4048	55.1470	55.3220
	Count	6	4	13	6	19	48
	Sum	427.52	241.09	552.62	386.43	1047.79	2655.46
	Std Dev	19.9930	19.2246	18.2385	8.0976	19.7153	19.9328

(£s 75.75) is 2.6 times as high as the extremely low expenditure in the Central Region of £s 29.37. Interestingly, the Boarding Schools' expenditure per pupil on Workers' Wages in all the respective regions is identical and equal to the national average. Whether this unique situation is a result of abiding by the rules and norms, or a mere coincidence, later discussions on costs indicators may reveal.

Intra-regional variations in unit costs on this component are considerable; more pronounced in the Central Region. Although the Northern and the Eastern Regions spend 1.6 times as much in the Day Schools the Central Region's sub-unit costs in this Type is almost twice that in Day and Boarding Schools.

Most regions have the highest cost on this component in Day Schools. Hence it should be recorded that Boarding Schools and the Day and Boarding Types are less expensive er pupil for workers' wages than Day Schools, contrary to expectations.

However, the Northern and the Eastern Regions have the highest unit costs in Day Schools, whereas the Central Region has the lowest costs in Day Schools and Day and Boarding School Types. Further examination can explain these wide variations.

7.3.5.4. Analysis of Unit Expenditure on Workers' Wages by Region and Kind of School:

As Table 7.24 illustrates, the mean cost per pupil on Workers' wages for Boys' Schools is higher than that for Girls. Nevertheless, both mean expenditures cluster around the national average.

Disparities in unit costs on this component within Girls' and Boys' Schools are marked; more so in the former kind. The Northern Region's Girls' Schools per pupil expenditure on Workers' Wages, £s 65.00, is more than twice that in the Central Region. On the other hand, Boys' Schools' highest sub-unit in the Eastern and the Northern Regions are 1.5 times that in the Central Region. It is

TABLE: 7.24

Unit Expenditure (£s) on Workers Wages by Region and Kind of School

Kind of School	REGION Mean / Count / Sum / Std Dev 1 Northern Region	2 Eastern Region	3 Central Region	4 Kordufan Region	5 Khartoum	Row Total
1 Girls	65.0042 2 130.01 19.1096	45.1643 2 90.33 1.1641	30.5395 5 152.70 10.1877	60.1463 2 120.29 7.0007	56.4350 9 507.91 17.8920	50.0621 20 1001.24 18.2969
2 Boys	74.3775 4 297.51 22.4817	75.3826 2 150.77 13.9375	49.9905 8 399.92 18.5642	66.5341 4 266.14 8.6494	53.9879 10 539.88 22.1288	59.0791 28 1654.22 20.5161
Column Total	71.2531 6 427.52 19.9930	60.2734 4 241.09 19.2246	42.5094 13 552.62 18.2385	64.4048 6 386.43 8.0976	55.1470 19 1047.79 19.7153	55.3220 48 2655.46 19.9328

important to note that Girls' Schools in all regions have the lower costs on this component, only Khartoum has almost identical expenditure in both kinds of schools.

The Eastern Region has the highest expenditure on this sub-unit in Boys' Schools, but the Northern Region can afford that in both kinds of schools, whereas the Central Region has the lowest component in both.

Summing up the analysis of unit costs on Workers' Wages, it is evident that variations by size, location, type and kind are considerable. Disparities on this component are more marked in the Small and Medium Schools Sizes, within the Rural area, in Day Schools and the Day and Boarding Types, and in Girls' Schools.

Discrepancy within regions is minimal in Khartoum, limited in Northern and Kordufan Regions, but relatively large in the Central and Eastern Regions. Generally, the Northern Region has the highest per pupil expenditure on this component, whereas the Central Region has the lowest below average costs; a matter which deserves further investigation.

However, the discussion in the next chapter of costs indicators that may influence, or even determine the unit costs on Workers' Wages (namely the average worker's wage, and the number of pupils per worker) may explain the wider variations observed above.

7.3.6.1. Analysis of Unit Expenditure on Non-Salary Expenses and Sources of Finance by Region and Size of School:

Table 7.25 shows that the national average per pupil costs on non-salary items is £s 160.19; 26% of the total unit expenditure. Although the largest share (72.9%) is financed by the regional governments the self-help contribution from parents and locally mobilised resources amounts to one quarter of the total (24.9%) while foreign aid and donations have a minor role, at an average 2.2%. However, these averages conceal wide variations among and within regions. The Large Schools' mean costs per pupil on this component is below that for the Small and Medium Sizes,

Table: 7.25

Unit Expenditure on Non-Salary Costs and Sources of Finance by Region and Size of School.

Size of Schl	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Up to 400 Pupls	UEN-S	198.53	132.92	175.91	150.96	145.70	162.55
		(78.6)	(.)	(38.5)	(.)	(18.0)	(38.4)
	Govt.	147.98	130.08	112.30	106.19	95.90	112.38
		(22.8)	(.)	(11.9)	(.)	(0.8)	(20.8)
	Self-H	43.61	2.84	63.60	44.77	49.80	49.10
		(46.0)	(.)	(40.9)	(.)	(18.2)	(31.0)
	F.	6.94	-	-	-	-	1.07
	Aid	(9.8)	-	-	-	-	(3.9)
401 to 800 Pupls	UEN-S	215.50	387.24	163.82	136.48	153.58	175.93
		(66.9)	(.)	(25.1)	(17.7)	(32.4)	(66.6)
	Govt.	181.57	132.33	115.35	104.88	96.42	119.74
		(35.9)	(.)	(12.1)	(10.0)	(2.6)	(33.3)
	Self-H	33.93	6.60	48.47	31.61	57.16	42.39
		(31.0)	(.)	(17.0)	(10.7)	(30.1)	(24.6)
	F.	-	248.31	-	-	-	13.80
	Aid	-	(.)	-	-	-	(58.5)
Over 800 Pupls	UEN-S	178.37	169.78	157.65	150.11	123.40	141.72
		(.)	(54.5)	(11.2)	(.)	(9.1)	(26.3)
	Govt.	168.27	127.08	108.33	127.56	93.59	107.39
		(.)	(1.6)	(1.6)	(.)	(9.0)	(21.3)
	Self-H	10.10	3.62	49.32	22.55	29.81	29.74
		(.)	(0.8)	(12.6)	(.)	(7.5)	(16.3)
	F.	-	39.08	-	-	-	4.60
	Aid	-	(55.3)	-	-	-	(19.0)
Col Total	UEN-S	203.65	214.93	165.64	141.17	137.21	160.19
		(57.0)	(120.4)	(25.9)	(15.5)	(23.1)	(49.3)
	Govt.	168.16	129.14	112.25	108.88	94.94	113.37
		(29.9)	(2.7)	(9.7)	(12.0)	(6.3)	(26.4)
	Self-H	33.18	4.17	53.39	32.29	42.27	39.72
		(30.9)	(1.7)	(24.6)	(10.9)	(21.3)	(24.9)
	F.	2.32	81.62	-	-	-	7.09
	Aid	(5.7)	(117.1)	-	-	-	(37.3)

* Standard Deviation in Parenthesis.

which may indicate a decreasing cost progression. Chapter eleven on economies of size may verify this issue. The mean costs by school size reveals that, on the whole, more public funds are spent on non-salary items in the Large Schools - with the wider catchment area - whereas self-help contributed more to Small Schools - within the community, as expected, but foreign assistance is highest in Medium Schools.

The regional mean costs on this component in the Eastern Region, £s 214.93, is 1.6 times as high as that in Khartoum, £s 137.21. Interestingly, the high expenditure in the Eastern Region is affected not only by an additional £s 81.6 per pupil from foreign assistance (not available for Khartoum) but also by £s 34.00 more per pupil from public sources.

Discrepancies in per pupil expenditure on non-salary among regions are considerable in all school sizes; even greater in Medium Schools. In the Small and Large Sizes, the Northern Region Schools highest sub-units costs (£s 198.53, and £s 178.37) is 1.5 times the lowest costs in the Eastern Region (£s 132.92) and Khartoum (£s 123.40), respectively. It is important to note that the Northern Region's high spending on this component in Small Schools is accounted for by the large support from self-help (fifteen times that in the Eastern Region), but in the Large Schools it can be explained by more public funds (1.8 times that available for the Capital). On the other hand, the Eastern Region's extremely high per unit costs in the Medium Size, £s 387.24, is almost three times as high as Kordufan's Schools, £s 136.48. This is attributable for the huge flow of foreign aid per pupil for this component in this region. Foreign assistance is known to be concentrated in the Eastern Region only, but it seems to favour particularly this school; the support from foreign donations alone is almost twice the total per pupil expenditure on non-salary in Kordufan. This may be because of a higher percentage of students with refugee status.

Disparities in per pupil costs on non-salary items within each region are marked; even widely in the Eastern Region. Although, Khartoum's and the Northern Region's expenditure on Medium Schools are around 1.3 times that in Large Schools, the Eastern Region's sub-unit in this size of schools amounts to almost three times as high as in the Small Size. All those are accounted for by the wide variations in unit costs on non-salary from the various sources in different sizes of school within each region.

Note the extremely high per pupil expenditure on this component in the Eastern and the Northern Medium Schools and, in contrast, the extremely low costs in Khartoum's Large Schools, Eastern Region's Small Schools and Kordufan's Medium Schools. However, the Northern Region is well endowed from both public and private sources. But, had it not been for foreign assistance in the Eastern Region and self-help in the Central Region, Kordufan, and Khartoum, unit costs on non-salaries, in these regions, would be less than 70% (at best) of its present level, which is not even satisfactory.

7.3.6.2. Analysis of Unit Expenditure on Non-Salary Expenses and Sources of Finance by Region and Location of School:

As Table 7.26 reveals, the mean per unit expenditure on non salary items in the Semi-urban (£s 169.93) and Urban Centres (£s 161.69) are higher than that for the Rural areas (£s 145.57); an expected phenomenon. A similar pattern is followed by the official allocation of resources. Surprisingly, the higher expenditure in the former locations is due to a higher government expenditure per pupil, whereas self-help favours the Semi-urban locality and foreign donations are distributed in the Urban centres only.

Discrepancies in per pupil costs on this component are larger in the Urban Sector, but rather limited in the Rural areas. Eastern Region's Urban Schools' per unit costs on this sub-unit (£s 214.93) is 1.6 times that in Khartoum

Table: 7.26

Unit Expenditure on Non-Salary Costs and Sources of Finance by Region and Location of School.

Loc. of Schl	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Urban	UEN-S	203.65 (57.0)	214.93 (120.4)	167.45 (24.5)	139.38 (16.6)	136.73 (24.6)	161.69 (53.5)
	Govt.	168.16 (29.9)	129.14 (2.7)	111.66 (11.4)	105.14 (8.7)	94.70 (6.9)	114.35 (28.7)
	Self-H	33.18 (30.9)	4.17 (1.7)	55.80 (25.2)	34.24 (11.0)	42.03 (22.6)	38.61 (25.6)
	F. Aid	2.32 (5.7)	81.62 (117.1)	- -	- -	- -	8.73 (41.4)
Semi Urban	UEN-S			169.93 (36.4)			169.93 (36.4)
	Govt.			116.24 (8.1)			116.24 (8.1)
	Self-H			53.70 (29.4)			53.70 (29.4)
	F. Aid			- -			- -
Rural	UEN-S			151.94 (26.5)	150.11 (.)	139.81 (15.3)	145.57 (16.5)
	Govt.			108.64 (2.4)	127.56 (.)	96.26 (0.9)	105.60 (12.4)
	Self-H			43.30 (28.9)	22.55 (.)	43.54 (15.7)	39.97 (18.4)
	F. Aid			- -	- -	- -	- -
Col Total	UEN-S	203.65 (57.0)	214.93 (120.4)	165.64 (25.9)	141.17 (15.5)	137.21 (23.1)	160.19 (49.3)
	Govt.	168.16 (29.9)	129.14 (2.7)	112.25 (9.7)	108.88 (12.0)	94.94 (6.3)	113.37 (26.4)
	Self-H	33.18 (30.9)	4.17 (1.7)	53.39 (24.6)	32.29 (10.9)	42.27 (21.3)	39.72 (24.9)
	F. Aid	2.32 (5.7)	81.62 (117.1)	- -	- -	- -	7.09 (37.3)

* Standard Deviation in Parenthesis.

(£s 136.73). This wide variation is mainly due to the higher concentration of foreign assistance in this location in the Eastern Region.

However, within individual regions disparities are minimal in Khartoum and Kordufan, but limited in the Central Region. It is noticeable that government and self-help expenditure on this component in Urban and Rural locations is almost identical in Khartoum and the Central Region, but in Kordufan the official sources favour the Rural Schools while self-help spends more in the Urban Sector.

7.3.6.2. Analysis of Unit Expenditure on Non-Salary Expenses and Sources of Finance by Region and Type of School:

Table 7.26 shows that the Boarding School Type has the highest mean expenditure on non-salary expenses per pupil whereas both those of Day Schools and Day and Boarding School Types are more or less around the national average. However, although Day and boarding Schools have the highest government support, the Boarding Type has the highest self-help expenditure per pupil; almost twice that in the former type.

In each type there are wide variations in per unit costs on this component among regions. The Northern Region's Day and Boarding Schools per unit costs (£s 201.10 and £s 215.42) are 1.3 times and 1.8 times as high as the corresponding types of school in Kordufan (£s 150.11 and £s 122.44), respectively. Khartoum's Boarding School Type and the Northern Region's Day and Boarding Schools' costs per pupil on non-salaries (£s 201.10 and £s 215.42) are 1.3 times and 1.8 times as high as the corresponding types of schools in Kordufan (£s 150.11 and £s 122.44 respectively). This is accounted for, in the Northern Region, by the highest per pupil costs on this component from public resources, whereas Khartoum has the highest contribution ever from self-help. On the other hand, the extremely high per pupil expenditure on this component in the Eastern Region Day Schools (£s 387.24), is almost three times the lowest expenditure in Khartoum, (£s 132.35). As observed

Table: 7.27

Unit Expenditure on Non-Salary Costs and Sources of Finance by Region and Type of School.

Type of Schl	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Day Schl	UEN-S	191.89	387.24	171.72	143.61	132.35	155.41
		(56.8)	(.)	(29.0)	(15.8)	(17.2)	(53.3)
	Govt.	152.16	132.33	110.88	105.67	94.54	105.93
		(17.7)	(.)	(9.5)	(9.9)	(6.5)	(19.6)
	Self-H	35.10	6.60	60.85	37.94	37.81	41.02
		(35.7)	(.)	(30.3)	(8.3)	(16.11)	(22.6)
	F.	4.63	248.31	-	-	-	8.46
	Aid	(8.0)	(.)	-	-	-	(44.6)
Bordg Schl	UEN-S			170.66	150.11	201.10	173.96
				(.)	(.)	(.)	(25.7)
	Govt.			106.93	127.56	100.68	111.72
				(.)	(.)	(.)	(14.1)
	Self-H			63.73	22.55	100.41	62.23
				(.)	(.)	(.)	(39.0)
	F.			-	-	-	-
	Aid			-	-	-	-
Day & Bordg Schl	UEN-S	215.42	157.49	158.72	122.44	156.02	167.82
		(66.9)	(44.0)	(25.7)	(.)	(.)	(44.7)
	Govt.	184.15	128.08	114.51	103.01	96.14	130.2
		(33.9)	(2.1)	(11.0)	(.)	(.)	(34.0)
	Self-H	31.26	3.36	44.21	19.44	59.88	32.03
		(33.3)	(0.7)	(18.5)	(.)	(.)	(25.1)
	F.	-	26.06	-	-	-	5.58
	Aid	-	(45.1)	-	-	-	(20.9)
Col Total	UEN-S	203.65	214.93	165.64	141.17	137.21	160.19
		(57.0)	(120.4)	(25.9)	(15.5)	(23.1)	(49.3)
	Govt.	168.16	129.14	112.25	108.88	94.94	113.37
		(29.9)	(2.7)	(9.7)	(12.0)	(6.3)	(26.4)
	Self-H	33.18	4.17	53.39	32.29	42.27	39.72
		(30.9)	(1.7)	(24.6)	(10.9)	(21.3)	(24.9)
	F.	2.32	81.62	-	-	-	7.09
	Aid	(5.7)	(117.1)	-	-	-	(37.3)

* Standard Deviation in Parenthesis.

above the high concentration of foreign donations per pupil in this school can explain the extreme disparity.

On the other hand, variations in per pupil expenditure on non-salary items are limited within all regions, but differ markedly in Khartoum and even more so in the Eastern Region. Interestingly, the Day School in the Eastern Region with the highest expenditure on this component (£s 387.24) is 2.5 times that in the Day and Boarding Type, whereas Khartoum's Boarding School sub-unit is 1.5 times as high as that in the Day Schools.

7.3.6.4 Analysis of Unit Expenditure on Non-Salary Expenses and Sources of Finance by Region and Kind of School:

Table 7.28 displays higher mean per unit costs on non-salary items in Boys' Schools, whereas the means of both kinds of schools are around the national average. Although, both kinds of schools get equal proportions per pupil from official sources nevertheless Boys' Schools receive all the support from foreign assistance and slightly higher contributions from self-help. These similar means conceal wide variations within each kind of school.

In Girls' Schools the Northern Region's extremely high costs on this component (£s 235.65) are almost twice the lowest costs in Kordufan (£s 121.39). Basically, this great disparity is due mainly to the unequal allocation of public funds between regions; the Northern Region can secure twice what is allocated for Kordufan. On the other hand, the Eastern Region's Boys, Schools with the highest sub-unit (£s 297.78) is more than twice the lowest level of expenditure in Khartoum (£s 139.18). The Eastern Region Boys' Schools have the highest per pupil costs from foreign assistance; 80% of the total per unit costs on non-salary expenses and the second highest support from official sources.

It is interesting to note, that only the Northern Region has a higher per pupil costs on non-salary items in Girls' Schools, which is accountable for the higher government expenditure and self-help on this kind of school.

Table: 7.28

Unit Expenditure on Non-Salary Costs and Sources of Finance by Region and Kind of School.

Kind of Schl	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Girls Schl	UEN-S	235.65	132.08	162.76	121.39	135.02	150.36
		(80.7)	(1.2)	(26.2)	(1.5)	(17.1)	(40.6)
	Govt.	191.78	129.13	115.54	98.44	95.84	113.95
		(44.2)	(1.4)	(11.9)	(6.5)	(0.8)	(31.3)
	Self-H	43.86	2.95	47.23	22.96	39.19	36.42
		(36.5)	(0.2)	(18.2)	(5.0)	(17.2)	(21.0)
	F. Aid	-	-	-	-	-	-
		-	-	-	-	-	-
Boys Schl	UEN-S	187.66	297.78	167.44	151.05	139.18	167.20
		(47.1)	(126.5)	(27.3)	(3.1)	(28.2)	(54.3)
	Govt.	156.34	129.15	110.20	114.10	94.14	112.97
		(16.6)	(4.5)	(8.2)	(10.8)	(8.8)	(22.8)
	Self-H	27.84	5.39	57.24	36.96	45.04	42.08
		(32.2)	(1.7)	(28.3)	(10.2)	(25.1)	(27.4)
	F.	3.47	163.24	-	-	-	12.16
	Aid	(7.0)	(120.3)	-	-	-	(48.6)
Col Total	UEN-S	203.65	214.93	165.64	141.17	137.21	160.19
		(57.0)	(120.4)	(25.9)	(15.5)	(23.1)	(49.3)
	Govt.	168.16	129.14	112.25	108.88	94.94	113.37
		(29.9)	(2.7)	(9.7)	(12.0)	(6.3)	(26.4)
	Self-H	33.18	4.17	53.39	32.29	42.27	39.72
		(30.9)	(1.7)	(24.6)	(10.9)	(21.3)	(24.9)
	F.	2.32	81.62	-	-	-	7.09
	Aid	(5.7)	(117.1)	-	-	-	(37.3)

* Standard Deviation in Parenthesis.

However, disparities in unit costs on non-salary among Girls' and Boys' Schools within the regions are minimal in Central Region and Khartoum, limited in Kordufan, but marked in the Northern Region and even more so in the Eastern Region. Although the Northern Region per pupil expenditure on this component is 1.3 times higher in Girls Schools the Eastern Region Boys Schools is more than 2.3 times as high. However, foreign assistance is concentrated in the Eastern Region's Boys' Schools only. It is interesting to note that, apart from the high expenditure per pupil on non-salary in the Northern Region Girls' Schools, it is generally the Boys' Schools that have the highest expenditure on this component as effected by a higher government, self-help, and foreign assistance contribution where relevant.

In summing up the examination of non-salary expenses per pupil it seems that the national contribution of this component to the total unit expenditure (26.1%) is reasonable. However, although the detailed pie chart of its constituents reveals a high proportion allotted to text- and exercise-books, the share of instructional materials, stationery, library books, raw materials and chemicals, all essential to classroom learning, are minimal. Nevertheless, the detailed analysis of non-salary costs per pupil reveals the striking variations among and within regions in the same size location, type ,and kind of school. Surprisingly, most of these marked disparities on the unit costs are attributable to the inequitable allocation of government funds, and to a lesser degree, from self-help contribution, and in only one case, the Eastern Region, it can be explained by an extremely high level of foreign assistance.

The Northern and the Eastern Regions have the highest unit expenditure on this component due to the highest contribution of public funds in the case of the former region and foreign assistance in the latter, whereas Khartoum's, Kordufan's and the Eastern Region's Small and Girls' Schools' lowest (below average) costs are mainly because of lower government spending in the former two

regions and little foreign assistance in the latter size and kind of schools.

Conclusion:

To sum up this discussion on the global unit expenditures and their components, it is evident that the total unit costs is relatively lower than the respective costs in other countries in the African region. The mean per pupil costs indicates a decreasing trend as the size of school gets larger. Interestingly, this signal of economies of size may be effected through the non-teacher components such as the unit costs on administration salaries and workers' wage and non-salary expenses; in contrast to Salih (1986) where this trend, in this level of education, was achieved through teacher and non-teacher unit costs. In contrast to the total unit costs, the unit costs on teachers' salaries (the major contributor) does not show a logical progression with increasing size of school, indicating that savings due to size effect might have been reinvested in improving the quality of resources. Despite the uniform salary scale and the national norms and regulations followed in all regions, unit expenditure and its components display marked disparities within the same size of school in the same location, type and kind. Variations between and within regions are, in many cases, striking, especially in all non-teacher costs. The high unit costs in the Northern Region and the lowest expenditure in the Central Region are explained by the trend of expenditure on the various components. The outstandingly high unit cost in the Eastern Region is boosted by the extremely high support of foreign assistance. Consequently, disparities are marked in the Medium Size because of this high costs. Discrepancies are large, also, in Rural area, in Day School Type and in Boys Schools. The highest unit expenditures are in Urban and Day Schools because of the highest unit costs on teachers' salaries but the mean costs by gender of school is almost identical. The extent of variations within regions varies considerably from one

setting to another; by size in Khartoum, by size and type in the Eastern Region, by location in Central Region. It is important to note that marked disparities on the unit costs are attributable to the inequitable allocation of government funds, rather than self-help contribution or foreign assistance; except in the unique case of the Eastern Region.

CHAPTER EIGHT

EDUCATIONAL COST INDICATORS

8.1.Introduction:

The previous chapter outlined the detailed analysis of the global unit expenditure of academic secondary schools and its six main components. At this stage it is necessary to identify those factors which may be held accountable for the variations observed in the various components and so determine the unit expenditure. However, such determinants of unit costs are many; they may differ in different countries, at different stages of development, even in different locations within the same country and for each education level and type.

Studies on costs of education reveal the critical importance of these determinants and their indicators as they "... provide an anatomical examination of the resources used in education ... (hence useful) ... for understanding the behavioural characteristics of educational costs (Tsang, 1988). This evidence is not only true as a theoretical research finding but from the perspective of policy makers as well. "... indicators are useful for a number of diagnostic purposes: they indicate the state of affairs in education, uncover areas of abnormalities, and provide the basis for gauging progress in educational interventions" (Johnstone, 1981; Oates, 1986).

In the case of secondary school costs, the subject of this study, the following determinants and indicators may be directly accountable for the variations in the units costs components observed in the previous chapter, 1) Number of pupils per class, 2) Number of pupils per teacher, 3) Distribution of the teaching force by sex, qualification, training, years of experience and areas of specialization, 4) Shortage of teachers and how it has been accounted for, 5) Number of teachers per class, 6) Average number of periods per teacher, or average teacher load, 7) Number of

administrative and non-teaching staff and workers per school, 8) Salary scale of teachers, administrators, clerical and non-teaching staff, and that of workers, 9) Average curriculum load, 10) Amount of non-educational or social and welfare expenditure and 11) Number of periods per class.

Such identification is essential, as Tibi (1986) emphasized, to explain the variations in unit expenditures among educational institutions classified in various ways, and reveal possible economies of scale; two of the areas which this study aims to explore in depth.

The examination of the above indicators is important to assess to what extent they may influence, separately or as groups, the different cost components in the various contexts. This thesis concentrates on the analysis and discussion of the determinants and indicators of only two cost components; one because of its paramount importance and the other because of its peculiarity. The first is **unit costs on teachers' salaries** and the other is **unit costs on workers wages.**

As noticed in the previous chapter, per pupil expenditure on teachers' salaries represents the major component of unit costs, and by far the largest single influence on its level. As a critical sub-unit, which is difficult to curb in its rising trend, it deserves further, in-depth examination which may throw light upon its determinants and their indicators. Variations in per pupil costs on teachers' salaries may be, basically, attributed to two contributory factors. These two determinants are the **average teacher salary** and the **pupil-teacher ratio.** Differences noted in both these determinants may reflect variations in other indicators. For instance, the variations in the average number of pupils per teacher may reflect disparities in (1) **class size**, (2) **average teacher load**, and (3) **average curriculum load.**

Each of these determinants and indicators is analysed in the above sequence, similarly to unit costs on teachers'

salaries, by region and size, and location, and type, and kind of schools.

8.2. Average Teacher Salary:

The first determinant of unit costs on teachers' salaries, the average teaching staff salary, by definition, is a function of the total salary bill and the total number of teachers. "Variations in teachers' salaries may be due to an increase (or decrease) in the quantity and/or quality of teachers, a higher (or lower) valuation of teachers, and a general price level increase in all goods and services" (Cumming, 1971). Yet, it can, also, be attributed "to the salary scale adopted and the average seniority (or average echelon) of the teachers which may be influenced by the geographic area in which the school is located" (Tibi, 1986).

In the Sudan a single unified salary scale is adopted. It underwent a series of adaptations and changes during the last two decades; the last was in 1986. The idea was to establish a new equitable and reasonable system of remuneration for all employees in the Public Service. The 1986 salary scale is represented by 18 grades, and each embraces between six and ten sub-grades (Appendix 4). Transition from one grade to the next higher is governed by the Civil Service rules. A set number of posts at a higher scale are available on a competitive basis each year to all teachers on a lower scale of the same educational level. This new scale of remuneration established a number of allowances based on the nature of duties (or job) performed. For instance, teachers in schools are eligible for a 'teaching allowance' while those in administrative posts and inspection have a 'responsibility allowance'. All teachers qualify for an annual allowance moving within the grade, from one sub-grade to the next higher, almost automatically. According to this effect, variations "in the average salary of teachers are sometimes attributed, at least partly to an 'increment creep' which is usually taken to imply a fairly steady annual rise due to the fact that teachers climb the scale" (Tibi, 1986). However, in the Sudan, as "... in many

developing countries where teachers' salaries increase with length of service this should be treated as an endogenous variable ... in any cost model for planning educational expansion" (Coombs and Hallak, 1972).

On the whole, "... teachers' earnings are significantly lower than those of civil servants with similar qualifications; a discrepancy most marked in the case of those with a degree" (Leite et. al, 1970). A new graduate teacher entering the profession enjoys the same salary as that in other public departments, but the belated annual allowance and slow promotion renders his salary uncompetitive a few years later, thus indicating that the returns to education and experience are higher for other occupations than for the teaching profession. However, "... the general issue of compensation differences between members of different professions has received extensive attention in the labor economics literature, usually in the context of an analysis of segmentation or discrimination, but little of it has focused on teachers' salaries" (Komenan and Grootaert, 1988).

Other factors may affect, more or less, the average teacher's pay. A rapid expansion of the teaching force (which results in a higher proportion of young teachers) consequently lowers the average salary, whereas promotion of large numbers (which raises the seniority level of teachers) automatically increases the average salary per teacher.

Because of the crucial importance of the 'quality' of the teaching force as a determinant of teachers' salaries (and, hence, the per pupil costs) the next chapter is devoted to the thorough analysis of this topic. The second determinant, a higher or lower valuation of teachers can be noted in the differences observed in the different regions, locations, types and kinds of schools. The general price level, though an important future determinant of the level of teachers' salaries, may not have specific influence in the short-run. "... Teachers have administered salaries and as such ... may not move in the same direction as goods in

general or even wages in general" (Vaizey and Chesswas, 1967).

However, the average secondary school teacher's salary in the Sudan (around US $1200 per annum) is definitely not comparable to that in developed countries, or oil-rich fellow Arab countries, and not even to some other countries in the Eastern Africa Region. Discussing teachers' salaries does not pose the question whether they are overpaid as, for instance, is the case in Brazil (Psacharopoulos, 1987) or the Ivory Coast (Komenan and Grootaert, 1988), rather the concern is that teachers are underpaid. Thus, to restrict their pay at this level, as in other countries, cannot be one of the policy options available to achieve some savings in unit costs. Reduction in pay is already shared by all government employees as salaries in real terms fell drastically in the last decade. The following Table (8.1) demonstrates the fall in 1986 salaries (in real terms) as a

Table 8.1

Decline of Public Salaries in Real Terms

Salary Scale Grades	1970	1978	1983	1986
4	100	46%	18%	13%
9	100	39%	16%	24%
14	100	42%	60%	16%

Source : Compiled by Kaballo, S.A., 1986 (in Arabic).

percentage of the 1970 level. It is important to note that Grade 14 is the starting salary for primary and intermediate school teachers. Grade 9 is for graduates of higher institutes and universities (who form the majority of the secondary schools teachers) whereas Grade 4 is the beginning of the senior staff level, mostly senior educational administrators, or directors and deputy directors of small secondary schools and larger ones, respectively. This Table reveals that civil servants', including teachers', basic

salaries in real terms, in 1986, were reduced to only 13-16% of their value in 1970. In spite of a package of improvement to increase the salaries in real terms (adding new allowances) phased over 1985 to 1986, "... real gross salary levels fell by 60-70% between July 1978 and the final increases of the package in July 1986" (ILO/JASPA Report, 1986). A review of Eastern Africa Countries reveals that Sudan is one of the countries with the lowest teachers' salaries in the region. "Some countries seem to be paying teachers very low salaries which may result in low morale and recruitment problems ... Sudan ... should determine whether low salaries have caused morale problems" (Wolff, 1985). However, most graduates are attracted to a teaching job for its nature and the security, but lower salaries "... might affect not only future supply of new teachers but also the morale and work atmosphere of existing teachers which in turn could affect teaching quality" (Komenan and Grootaert, 1988).

At this stage the average teacher's salary is discussed through the explanatory variables by which the Unit Expenditure on Teachers' Salaries was analysed in an attempt to marry the differences in the former with those observed in the latter in each situation.

8.2.1. Analysis of Average Teacher's Salary by Region and School Size:

Table 8.2 indicates that the national average teachers' salary is £s 7,188.55. Inter-size analysis shows no logical progression, the lowest average salary is in the Medium Schools and the highest in the Large Size; as expected, the latter has the most senior, qualified teachers. The discussion on teacher characteristics may give a clearer picture.

The regional mean average salary is highest in the Northern Region (£s 7,786.95), almost 1.2 times the lowest in the Eastern Region (£s 6,478.64). These averages conceal wide variations between regions.

TABLE: 8.2

Average Teacher Salary (£s) by Region and Size of School

School Size	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 up to 400		7759.6071	6269.3333	7446.8024	7099.0000	6858.2784	7151.2422
		2	1	4	1	5	13
		15519.21	6269.33	29787.21	7099.00	34291.39	92966.15
		114.3998	.	1249.5787	.	932.9998	934.4630
2 401 to 800 pupils		7733.8868	6106.1538	7347.4495	6701.1091	6489.4294	6960.9247
		3	1	5	4	5	18
		23201.66	6106.15	36737.25	26804.44	32447.15	125296.65
		375.7452	.	799.4997	416.2882	498.4787	727.7923
3 over 800 pupils		8000.8000	6769.5388	7670.5070	6719.6327	7538.4261	7458.0808
		1	2	4	1	9	17
		8000.80	13539.08	30682.03	6719.63	67845.84	126787.37
		.	80.3197	835.3373	.	547.7897	638.7015
Column Total		7786.9458	6478.6412	7477.4220	6770.5115	7083.3881	7188.5452
		6	4	13	6	19	48
		46721.67	25914.56	97206.49	40623.07	134584.37	345050.17
		265.0021	345.5675	893.1147	360.4574	773.0643	774.5418

Interestingly, the Northern Region has the highest teacher salary in all school sizes; at least 1.2 times over the lowest salaries in the Eastern Region. However, it is evident that the Northern and the Central Regions have the highest (well above the average teachers' salaries), whereas the Eastern Region, Kordufan, and Khartoum (except for the Large Size), have the lowest (below average) salaries.

In individual regions, the disparities in average teachers' salary are minimal, except in Khartoum where Large Schools have higher salaries, 1.2 times that in Medium size. Generally, Medium Schools have the lowest average salary in all regions, whereas Large Schools have the highest, except in Kordufan.

It is important to note that the highest unit costs on teachers salaries in the Eastern Region, Kordufan and Khartoum correspond to the lowest, below average salary. On the other hand, the lowest and next lowest unit expenditure on teachers pay are congruent to the highest and next highest average salary. Only the lowest average salary in Medium Schools may have influenced the respective lowest unit costs on teachers salaries. Khartoum's highest and the Central Region's lowest unit costs on teachers pay are not explained by the respective level of average teacher salary.

8.2.2: Analysis of Teachers' Average Salary by Region and Location of School:

Table 8.3 shows that the Urban Sector has the highest mean average teacher salary, £s 7,349.13, followed by the Semi-urban, £s 7017.63, while the lowest average salary is in the Rural Area, £s 6230.21; contrary to expectations as Rural schools include the national reputable schools. However, only the highest average salary in the Urban location may be attributable to the corresponding highest per unit expenditure on teachers' salaries (Table 7.6). The next chapter, on teachers' qualifications, may explain whether this is caused by a quality element. Table (8.3) shows considerable variations, in average teacher salary, within the Urban Sector but rather limited in the Rural

TABLE: 8.3

Average Teacher Salary (£s) by Region and Location of School

Location	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban		7786.9458	6478.6412	7999.0859	6780.6873	7255.2293	7349.1290
		6	4	8	5	16	39
		46721.67	25914.56	63992.69	33903.44	116083.67	286616.03
		265.0021	345.5675	587.0098	402.0389	688.1970	728.9063
2 Semi-urban				7017.6295			7017.6295
				3			3
				21052.89			21052.89
				321.6239			321.6239
3 Rural				6080.4547	6719.6327	6166.9016	6230.2078
				2	1	3	6
				12160.91	6719.63	18500.70	37381.25
				488.4380	.	574.7913	489.0304
Column Total		7786.9458	6478.6412	7477.4220	6770.5115	7083.3881	7188.5452
		6	4	13	6	19	48
		46721.67	25914.56	97206.49	40623.07	134584.37	345050.17
		265.0021	345.5675	893.1147	360.4574	773.0643	774.5418

Areas. Urban Schools, in the Central Region, have the highest average teacher's salary (£s 7999.09), more than 1.2 times the lowest in the Eastern Region (£s 6,478.64). Both these extreme salaries may not be accountable for the respective unit costs on teachers' salaries (Table 7.6). Such a discrepancy may be attributed to other indicators of teachers' pay. Within the Rural areas Kordufan Schools have the highest average salary, £s 6,719.63, whereas the Central Region's have the lowest £s 6080.46; both well below the average salary. Such lower level of salaries in this location may reflect a quality deficiency; the next chapter can give a better indication. However, it is only the lowest average salary in the Rural area that can explain the lowest per unit costs on teachers' salaries, Table 7.6.

Interestingly, all regions have the higher average teacher's salary in the Urban location (Table 8.3); with considerable variations. In Khartoum the average teacher's salary in Urban Schools is 1.2 times that in other areas, whereas in the Central Region it is as much as 1.3 times as high. Whether or not this reflects a discrepancy in the quality of teachers between the Urban and Rural Locations is yet to be discussed. It is important to note that both levels of salaries in the Urban and Rural locations can account for the higher and lower per unit costs on teachers' salaries respectively (Table 7.6).

8.2.3 Analysis of Average Teacher Salary by Region and Type of Schools:

As Table 8.4 demonstrates, Day Schools have the highest mean average teacher salary (£s 7,328.05), whereas the Boarding Type has the lowest (£s 6,455.18). However, only the Day Schools' highest mean teacher salary can explain the highest per unit costs on teachers' salaries in this type of school.

Table 8.4 displays wide variations in average teacher salary in the Day Schools, and the Day and Boarding Types but rather limited within the Boarding Schools. The Central Region Day Schools have the highest average teacher pay,

TABLE: 8.4

Average Teacher Salary (£s) by Region and Type of School

Type	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School		7850.5849	6106.1538	8051.3881	6856.2933	7163.4242	7328.0523
		3	1	6	4	17	31
		23551.75	6106.15	48308.33	27425.17	121778.21	227169.62
		177.1286	.	403.0769	421.1950	776.8443	771.6978
2 Boarding School				6425.8326	6719.6327	6220.0714	6455.1789
				1	1	1	3
				6425.83	6719.63	6220.07	19365.54
				.	.	.	251.0702
3 Day & Boarding		7723.3067	6602.8036	7078.7208	6478.2632	6586.0909	7036.7864
		3	3	6	1	1	14
		23169.92	19808.41	42472.32	6478.26	6586.09	98515.01
		363.3743	294.3254	971.9314	.	.	767.8727
Column Total		7786.9458	6478.6412	7477.4220	6770.5115	7083.3881	7188.5452
		6	4	13	6	19	48
		46721.67	25914.56	97206.49	40623.07	134584.37	345050.17
		265.0021	345.5675	893.1147	360.4574	773.0643	774.5418

£s 8,051.39, more than 1.3 times the lowest in the Eastern Region, £s 6,106.15. In Day and Boarding Type the Northern Region has the highest average teacher salary (£s 7,723.31), almost 1.2 times that in Kordufan Region, £s 6,478.26. However, neither of these regions' average salaries can account for the respective per unit costs on teachers' salaries, Table 7.7.

As Table 8.4 reveals, disparities in average teacher salary, within regions, are limited; but quite marked in Khartoum and the Central Region. In the Central Region and Khartoum, Day Schools average teacher pay is almost 1.3 times and 1.2 times as high as that in the Boarding Type, respectively. However, the consistent level of average salary in the other regions, in all types of schools, may reflect a similar level of teachers' characteristics in these types.

It is interesting to record that in all types of schools the extreme levels of average teacher pay are not accountable for the respective per pupil costs on teachers' salaries, Table 7.7. The analysis of other indicators, later in this chapter, may give an explanation. On the other hand, the range of variations in teachers' average salaries within these types may be explained by the detailed analysis on the indicators of teachers' quality given in the next chapter.

8.2.4 Analysis of Average Teacher's Salary by Region and Kind of Schools:

Table 8.5 reveals that Boys Schools have the higher mean average teacher's pay, (£s 7,262.00), while Girls' have the lower mean (£s 7,085.70). However, both these levels of average salaries do not account for the respective unit costs on teachers' salaries (Table 7.8).

In both kinds of schools there are considerable discrepancies in average teacher salary. The Northern Region has the highest average teacher salary in Girls' Schools (£s 7672.27) and Boys' Schools (£s 7844.28), which is 1.2 times the lowest in Kordufan (£s 6491.73) and the

TABLE: 8.5

Average Teacher Salary (£s) by Region and Kind of School

Kind of School	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Girls	1	7672.2703	6491.0388	7032.4332	6461.7316	7240.7944	7078.9698
		2	2	5	2	9	20
		15344.54	12982.08	35162.17	12923.46	65167.15	141579.40
		509.4991	313.5388	863.2395	23.3792	899.0416	801.6166
Boys	2	7844.2836	6466.2436	7755.5400	6924.9015	6941.7224	7266.8133
		4	2	8	4	10	28
		31377.13	12932.49	62044.32	27699.61	69417.22	203470.77
		131.7696	509.2438	843.6524	347.8821	655.5253	759.5113
Column Total		7786.9458	6478.6412	7477.4220	6770.5115	7083.3881	7188.5452
		6	4	13	6	19	48
		46721.67	25914.56	97206.49	40623.07	134584.37	345050.17
		265.0021	345.5675	893.1147	360.4574	773.0643	774.5418

Eastern Region (£s 6466.24) respectively. It is important to note that, average teacher pay in both, Girls and Boys Schools may not be responsible for the respective per pupil costs on teachers' pay, Table 7.8.

Analysis by region demonstrates that disparities in average pay are minimal, though the Northern, Central and Kordufan Regions favour Boys' Schools, whereas the Eastern Region and Khartoum prefer Girls'. However, except in the Northern Region, the higher average salary within each region corresponds to the higher per unit costs on teachers' salaries, Table 7.8. Yet, its independent trend in the other cases needs to be further investigated.

Summing up the analysis on the average teacher's salary, it is evident that, among regions, variations by size, location, type, and kind of school are considerable - though limited within them. However, discrepancies are large between regions in the Medium School Size, the Urban Sector, Day and Boarding Type, and Boys Schools. In individual regions disparities are marked in teachers' salary between Khartoum Large Schools and the Medium Size, but in the Central Region they are more marked between locations, types and kinds of school. Interestingly, the Northern and the Central Regions highest and next highest average salary correspond to the lowest and next lowest unit costs on teachers pay.

Whether the specific level of average salary can be accountable for the respective level of unit costs on teachers' salaries depends, also, on the other determinant and its indicators which may affect (directly or indirectly) that level of costs. The next analysis would be that of the other determinant of unit costs on teachers' salaries, namely the pupil:teacher ratio.

8.3. Pupil:Teacher Ratio:

As mentioned earlier, in this chapter, the unit expenditure on teachers' salaries is determined by two factors, the average teacher salary and the pupil:teacher ratio. However, as the pupil:teacher ratio may reflect the

quality of an educational level or system, the rate of utilization of its human resources, mainly teachers' resources, it is discussed in more depth, including its indicators. Pupil:teacher ratio, or the average number of pupils per teaching staff, depends directly on the number of enrolment and that of the teachers. It is often quoted as one of the most significant determinants of the differences noted in the per pupil costs on teachers' salaries. The importance of the pupil:teacher ratio is derived mainly from its frequent use as a device for projecting future teachers' requirement for education expansion, and as an indicator of educational quality and efficient use of resources.

Pupil:teacher ratio is used in several ways for projection purposes. The simplest and most crude, employed in developing countries where detailed accurate data is a constraint, depends on estimated or policy targets for this ratio. Hence pupil:teacher ratio is frequently used as an indicator of class size, particularly in primary education where the average number of weekly hours per pupil in contact with teachers generally corresponds quite closely to the teaching load of teachers.

However, at higher levels of education, for instance at the secondary level, "...modern educational systems allow much greater freedom to vary the size of the teaching group to meet the particular need of different pupils, curricular subjects, or teaching methods" (Unesco Office of Statistics, 1983). At this level, where knowledge and skills are specialized and teachers are limited mostly to one major subject, a more sophisticated method for calculating teachers' demand has to be used. This method must take into consideration the main factors that influence the pupil:teacher ratio, namely the average class size, average teacher load, average number of hours of instruction per class and, hence, the average number of teachers per class.

In countries which employ part-time teachers, pupil-teacher ratio may loose much of its significance when it ceases to be synonymous with class size. (Tibi, 1989) warned that "... it has therefore been proposed to calculate

pupil:teacher ratio in terms of full-time equivalents, which is not a very satisfactory solution, especially from the point of view of unit costs".

On the other hand, pupil:teacher ratio is well established as an index of the quality of education provided. However, researchers found quality of education difficult to define; it may be based on subjective criteria, such as parents' satisfaction or school reputation, or an objective one such as the rate of examination success or pupils' achievement. However, (Coombs and Hallak, 1972) observed that educational qualitative improvement may be critically dependent on a favourable pupil:teacher ratio. Lower pupil:teacher ratio is assumed to be congruent with smaller class size where pupils can get more individual attention, therefore their achievement is higher. This may be true of developed countries where a lower pupil:teacher ratio pinpoints better staffed schools and is an indicator of educational efficiency. On the other hand, in developing countries, a well staffed school, as indicated by a lower pupil:teacher ratio, is not synonymous with a more efficient school. A high percentage of teachers in these countries may not be basically qualified, or even trained, as is revealed in the next chapter on teachers' qualifications, training and seniority. Nevertheless, the relationship between the level of pupil:teacher ratio and the quality of education is not straight forward. The same ratio may correspond to different class sizes influenced by the combined effect of average teacher load and the number of hours of instruction pupils receive. Unesco Office of Statistics (1983) advocated that as long as both the class size and the number of hours of instruction received by the pupils remain unchanged, the pupil:teacher ratio will be lower the lighter the teacher's work load. The same theory applies if the average number of hours of instruction the pupils receive decreases, the ratio will decline, provided the average teaching load and class size remain the same. The analysis of these indicators later in this chapter may

show whether this argument applies to the data on Sudanese secondary schools.

A lower pupil:teacher ratio, in certain locations, may reflect only a smaller school population, as is the case in rural areas. A higher ratio, as Coombs and Hallak (1972) noted, "may signify the fact that urban schools usually have a greater involvement, so that the fixed numbers of specialist teachers needed are probably more intensively utilized - with corresponding economies of scale". However, unless the internal criteria of an educational system or level are taken into consideration, Cumming (1971) argued, "the pupil:teacher ratio is an educational statistic the interpretation of which is fraught with problems".

Pupil:teacher ratio is influenced by the number of available teachers; shortage of teachers may raise the ratio, though members of staff or part-time teachers account for the extra periods. In such a case a higher pupil:teacher ratio is misleading.

Despite the above arguments that imply that the pupil:teacher ratio is of limited importance for a number of reasons, it still remains an important indicator. As Cumming (1971) admitted "notwithstanding its limitations, the pupil:teacher ratio is the best and most readily calculable and interpretable index of resource use in schools". Moreover, it is a useful tool of educational costs analysis and projection of teachers' requirements for educational development plans.

The Sudan Educational Sector Review 1977, adopted as a strategy for action, called for a reduction in teacher:pupil ratio to achieve an appreciable reduction in teacher costs. A comprehensive study of the education system in 1976 revealed that the Sudan, similar to other developing countries with low enrolment ratios as well as low per capita income, would be able to expand education significantly only through raising the pupil:teacher ratios.

Table 8.6 below, shows the then prevailing ratios, and the recommended ones. Strangely, this long term strategy, which was planned to guide educational development decisions

Table 8.6

Pupil: Teacher Ratios Recommended, 1977.

Level	Teacher/Pupil Ratio (75/76)	Suggested Ratio
Primary	1 : 33.5	1.40
Junior Sec.	1 : 24.4	1.30
Acad. Sen. Sec.	1 : 19.5	1.25
Tech. Sen. Sec.	1 : 14.5	1.20
Primary Teach.Train	1 : 21.1	1.20

Source: Sudanese Education Sector Review: An Appraisal and Strategy for Action, Ministry of Education Sudan, 1977.

through the twenty-first century, recommended increasing the teacher:pupil ratio for primary education from an already high one, despite the crucial importance of teacher pupil contact at this level. But it suggested a small increase for the senior academic secondary and technical secondary education, as well as primary teachers' training colleges. While these recommendations are acceptable in technical education because of workshops and fieldwork, it would have been more cost-effective to raise the ratios in academic secondary and training colleges to a level comparable with other countries in the region and invest the saving to provide more instructional materials, which research indicates have positive impact on "... the value added to the child's academic skills".

Wolff's (1985) study of the costs of education in Eastern African countries showed that in the 1978-82 period, the Sudan pupil:teacher ratio was 34:1 in primary schools, 24:1 in intermediate (lower secondary), and 15:1 in (senior) upper secondary. This implies that, as far as the data available proves, little has been done to even implement the adopted policy recommendations of the 'Strategy for Action'. In fact, it is obvious that, while almost the same ratios are retained at the primary and intermediate levels, they are even reduced at the senior secondary level.
Nevertheless, Wolff (1985) noted that "In the typical

pattern of secondary teachers' utilisation, students attend classes for 40 periods per week, each of which is 40 minutes in length ... on average, teachers teach about 24 periods per week, or the equivalent of 16 hours, and the average student per class size is 35. The result of these practices is about 21:1 student teacher ratio" (Wolff, 1985).

The following analysis of the pupil:teacher ratio in the senior academic secondary schools would be by size, location, type and kind of school in an attempt to relate the level of the pupil:teacher ratio to the respective per unit costs on teachers' salaries.

8.3.1. Analysis of Pupil Teacher Ratio by Region and Size of School:

Table 8.7 illustrates that the national average pupil:teacher ratio is 23.1; higher than the available data suggested, and even less than the ratio recommended by the Education Sector Review more than a decade ago.

Inter-size analysis reveals that the lowest mean pupil:teacher ratio is found in Small Schools, whereas the highest is in the Large Size; an expected pattern. Empirical research found that teachers are under utilized in small institutions, but intensively used in the large ones.

Regional mean comparison indicates that the Central Region has the highest mean pupil:teacher ratio, 26.4, 1.4 times as high as the lowest in the Eastern Region, 19.

Among regions variations in pupil:teacher ratios are considerable within each school size. The Central Region's highest pupil:teacher ratio in Small (26.4), Medium (25.9), and in Large Schools (27.1), is 1.6 times that in Khartoum (17), 1.5 times that in the Eastern Region (17), and 1.4 times as high as Kordufan's (20), respectively. The higher pupil:teacher ratio in all these school sizes in this region can be accountable for the lowest unit expenditure on teachers' salaries, despite higher average teacher's salary.

Discrepancies in the pupil:teacher ratio within each region are limited, but larger in the Eastern Region and Khartoum. The Eastern Region Large Schools pupil:teacher

TABLE: 8.7

Pupil Teacher Ratio by Region and Size of School

School Size	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		24.1786	17.7222	26.3997	18.3333	17.0217	21.1631
up to 400		2	1	4	1	5	13
		48.36	17.72	105.60	18.33	85.11	275.12
		2.3739	.	3.0480	.	2.9771	5.0202
2		25.7294	17.0385	25.8615	20.1036	24.4342	23.6733
401 to 800 pupils		3	1	5	4	5	18
		77.19	17.04	129.31	80.41	122.17	426.12
		4.7536	.	2.8964	1.9847	7.9898	5.3161
3		24.4667	20.6712	27.0994	20.0000	23.6169	23.9270
over 800 pupils		1	2	4	1	9	17
		24.47	41.34	108.40	20.00	212.55	406.76
		.	2.4292	6.5833	.	3.8544	4.5607
Column Total		25.0020	19.0258	26.4080	19.7913	22.0964	23.0833
		6	4	13	6	19	48
		150.01	76.10	343.30	118.75	419.83	1108.00
		3.2881	2.3780	4.0296	1.6956	5.7084	5.0148

ratio is 1.2 times that in the Medium Size, whereas Khartoum Medium Schools is 1.4 times as high as that in Small Size.

On the whole, the Northern and Central Regions have the highest, above average pupil:teacher ratio, but the Eastern Region, Kordufan, and Khartoum Small Schools have the lowest below average ratios.

8.3.2. Analysis of Pupil Teacher Ratio by Region and Location of Schools:

As Table 8.8 reveals, the Semi-urban location has the highest mean pupil:teacher ratio. As expected this high ratio accounts for the low unit costs on teachers' salaries (Table 7.6) in this location, in spite of the next highest average teacher salary, (Table 8.3). Strangely enough, pupil:teacher ratio in the Rural and Urban Sectors are identical. These identical lower ratios account for two different levels of unit costs on teachers' salaries (Table 7.6); higher in the Urban Sector because of the highest teacher's salary in this location, Table 8.3.

Table 8.8 shows that disparities in pupil:teacher ratio are marked in the Urban and Rural locations; more so in the latter. In the Urban Sector, the Northern Region has the highest pupil:teacher ratio (25), followed by the Central Region which is 1.3 times that in the Eastern Region (19). However, the extremely high pupil ratio in the Central Region Rural Schools (30.1) is 1.6 times as high as that in Khartoum (19). These higher ratios can explain the lower per unit costs on teachers' salaries in these regions (Table 7.6), as was evident in the previous chapter.

On the other hand, disparities in the pupil:teacher ratio are limited in Kordufan, but considerable in Khartoum and the Central Region. Khartoum's highest ratio in the Urban Sector is about 1.2 times that in the Rural areas. Interestingly, Khartoum has identical unit costs on teachers' salaries in both locations because of the higher salary in Urban Schools, Table 8.3. In contrast, the Central Region Rural Schools highest pupil:teacher ratio is more than 1.2 times the lowest in the Urban areas. This can

TABLE: 8.8

Pupil Teacher Ratio by Region and Location of School

Location	Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban		25.0020	19.0258	24.4442	19.7495	22.6860	22.6511
		6	4	8	5	16	39
		150.01	76.10	195.55	98.75	362.98	883.39
		3.2881	2.3780	3.2046	1.8923	5.7515	4.6084
2 Semi-urban				29.1819			29.1819
				3			3
				87.55			87.55
				1.1934			1.1934
3 Rural				30.1020	20.0000	18.9522	22.8434
				2	1	3	6
				60.20	20.00	56.86	137.06
				6.2362	.	5.2499	7.1119
Column Total		25.0020	19.0258	26.4080	19.7913	22.0964	23.0833
		6	4	13	6	19	48
		150.01	76.10	343.30	118.75	419.83	1108.00
		3.2881	2.3780	4.0296	1.6956	5.7084	5.0148

explain the level of unit costs on teachers' salaries in each location. However, it may hint at crowded classes in the Rural areas to economise in costs, unless other indicators reveal better utilisation of teachers' resources.

As an indicator of teachers' resource distribution, this ratio indicates that Khartoum Schools in the Rural areas are more than one and a half times better staffed than those of the Central Region. On the other hand, the lower pupil:teacher ratios in Khartoum, Kordufan and the Eastern Regions may explain the higher unit costs on teachers' salaries in these regions, as shown in Table 7.6. Analysis of further indicators may give a clearer picture.

8.3.3. Analysis of Pupil Teacher Ratio by Region and Type of School:

Inter-type analysis, Table 8.9, shows that the highest mean pupil:teacher ratio is in the Day and Boarding Type and the lowest is in the Day Schools. Yet, all types mean ratios are almost identical and are grouped around the national average. However, the lower ratio in Day Schools and the higher average teacher salary (Table 8.4) can be attributable for the highest unit costs on teachers' pay in this type of school (Table 7.7).

In Day Schools and Boarding Type, the Central Region has the highest pupil:teacher ratio, 25.6 and 34.5 respectively. The former is 1.5 times the lowest in the Eastern Region which indicates that the Eastern Region is one and a half times better staffed than the Central Region. The latter is twice the lowest in Khartoum, thus showing how well-staffed are Khartoum Schools of this type. However, these ratios are indicative of the respective unit costs on teacher salaries. The Central Region highest pupil:teacher ratio accounts for the lowest unit costs on teachers' salaries (Table 7.7), in spite of the highest average teacher salary (Table 8.4). Similarly, the Eastern Region's lowest pupils ratio can be attributed to the highest unit expenditure on teachers' pay (Table 7.7), though it has the lowest teacher salary (Table 8.4).

TABLE: 8.9

Pupil Teacher Ratio by Region and Type of School

Type	REGION Mean / Count / Sum / Std Dev Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School	22.8668 3 68.60 2.8249	17.0385 1 17.04 .	25.6321 6 153.79 4.2428	19.5751 4 78.30 2.1382	22.2455 17 378.17 5.8613	22.4485 31 695.90 5.1436
2 Boarding School			34.5116 1 34.51 .	20.0000 1 20.00 .	16.7500 1 16.75 .	23.7539 3 71.26 9.4571
3 Day & Boarding	27.1372 3 81.41 2.3178	19.6882 3 59.06 2.4185	25.8333 6 155.00 2.5916	20.4474 1 20.45 .	24.9091 1 24.91 .	24.3452 14 340.83 3.6508
Column Total	25.0020 6 150.01 3.2881	19.0258 4 76.10 2.3780	26.4080 13 343.30 4.0296	19.7913 6 118.75 1.6956	22.0964 19 419.83 5.7084	23.0833 48 1108.00 5.0148

The Central Region extremely high ratio, 34.5 and Khartoum extremely low ratio of 16.8, in Boarding Type, is reflected in the level of unit costs on teachers' salaries. Khartoum has the highest per unit costs on this component (Table 7.7), despite having the lowest average teacher salary (Table 8.4), whereas the Central Region has the lowest unit expenditure on this sub-unit, in spite of its next highest average teacher salary (Table 8.4). The pattern of pupil:teacher ratio in this Boarding type is not systematic; with the highest ratio within the Central Region, twice the lowest in Khartoum. This implies that it is not a policy decision for this type of schools, hence further examination is needed.

In the Day and Boarding Schools Type, it is the Northern Region which has the highest pupil:teacher ratio (27.1), 1.4 times the lowest in the Eastern Region (19.7). Only the Eastern Region's lowest pupil:teacher ratio can explain the highest per pupil cost on teachers' salaries (Table 7.7). For the Northern Region other indicators may have contributed to this level of costs.

In individual regions, disparities in the pupil:teacher ratio are limited; marked in the Central Region and Khartoum. The Central Region's extremely high ratio in the Boarding Type is 1.4 times as high as that in Day and, Day and Boarding Schools. This can explain the lowest cost per unit on teachers' salaries in this region in this type of schools. Contrary to this, is Khartoum lowest pupil:teacher ratio, 16.8, in the Boarding Type. The highest ratio in the Day and Boarding School, (24.9) is 1.5 times this extremely low ratio in Boarding Schools, reflected in the highest per unit expenditure on teachers' salaries in this type of school. It is evident that this school is the most favourably staffed school in all types of schools, both in Khartoum and all other regions.

8.3.4. Analysis of Pupil:Teacher Ratio by Region and Kind of School:

Table 8.10 illustrates that Girls' Schools have a more favourable mean pupil:teacher ratio (21.3) than Boys' Schools (24.3). This explains the higher mean per pupil costs on teachers' salaries in Girls Schools, although these schools have the lower mean average salary per teacher (Table 8.5). The range of variations in both kinds of schools are the same. Girls and Boys Schools in the Central Region have the highest pupil:teacher ratios (25 and 27.3) which are 1.4 times those in the Eastern Region (18.3 and 19.6) respectively. However, as expected, the Central Region has the lowest unit expenditure on teachers' pay in both kinds of schools, Table 7.8, but the Eastern Region has the second highest unit costs on teachers. Other indicators may be responsible for that.

Girls' Schools have the more favourable pupil:teacher ratio in all regions; Kordufan has identical ratios Khartoum has the higher in Boys Schools. This can justify the higher per unit costs on teachers' salaries (Table 7.8) in all the regions concerned, except the Central Region. Despite its lower pupil:teacher ratio in Girls Schools, this Region has a lower unit expenditure on teachers' salaries. On the whole, variation in this ratio is minimal within regions, except in Khartoum; Boys Schools are almost 1.3 times as high. The most favourable ratio is in the Eastern Region Girls Schools, while the highest is in the Central's Boys Schools. Further analysis of other indicators may highlight this situation.

In summing up, it is evident that the national average pupil:teacher ratio is low - lower than the set norm - though it increased from the level noted in 1982, above. It is important to note that the Large Schools, the Urban Centres, Day Schools Type and Girls Schools have the most favourable pupil:teacher ratios. The range of variations in the pupil ratio among and within regions by size, location, type and kind of schools are considerable. Disparities are more marked in Small Schools, the Rural areas and the

TABLE: 8.10

Pupil Teacher Ratio by Region and Kind of School

	REGION					
Mean / Count / Sum / Std Dev / Kind of School	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Girls	24.4341	18.3379	24.9732	20.2570	18.7669	20.9913
	2	2	5	2	9	20
	48.87	36.68	124.87	40.51	168.90	419.83
	5.9268	.8706	1.9507	.2692	4.2622	4.3479
2 Boys	25.2860	19.7137	27.3047	19.5584	25.0930	24.5776
	4	2	8	4	10	28
	101.14	39.43	218.44	78.23	250.93	688.17
	2.4471	3.7833	4.8241	2.1333	5.2878	4.9916
Column Total	25.0020	19.0258	26.4080	19.7913	22.0964	23.0833
	6	4	13	6	19	48
	150.01	76.10	343.30	118.75	419.83	1108.00
	3.2881	2.3780	4.0296	1.6956	5.7084	5.0148

Boarding Schools type. In individual regions discrepancies by size and kind are greatest in Khartoum, but by location and type are particularly large within the Central Region and Khartoum. On the whole, it is the pupil:teacher ratio, more than the average salary, that directly explains the variations on teachers' salaries unit costs. Otherwise, it may be the effect of other indicators that influences the results.

At this stage it is important to identify the factors that may have contributed to the variations in the average pupil:teacher ratio in the different contexts, as observed above. Such identification is necessary to analyse these parameters of the pupil:teacher ratio and indicators of teachers' resource utilisation, to delineate the factors that may be attributable to this level of costs and whether they contribute directly or indirectly to the quality of education and the level of educational expenditure. However, a close analysis of educational input indicators can be justified on the grounds of more informed perspective for schools costs. Only an examination of how educational resources, mainly teachers, are utilised "... will assess the extent of under-utilisation of educational inputs or imbalance in the mix of educational inputs" (Tsang, 1988). Yet, whether a lower pupil:teacher ratio indicates a better quality of education, or otherwise, is only revealed if it corresponds to better resource utilization, as the analysis of its indicators may disclose. It is important to show whether the variations observed in the pupil ratio correspond to large disparities in teaching conditions between regions, or even within the same region as reflected by the average number of pupils per class, average teacher load, and average curriculum load.

As Tibi (1989) observed, the under-utilisation of teachers may have a high economic and/or pedagogical costs. However, whether or not the teachers' utilisation complies with the above standard in the 'typical' secondary school or otherwise, can only be revealed by the examination of the parameters below. "It is important to bear in mind that the

pupil teacher ratio is not precise, inasmuch as it is merely the result of variations in several parameters which are different in nature" (Tibi, 1986). These include class size, average teacher load, and the average curriculum load. Alternative hypotheses about the evolution of these indicators furnish the solid ground for the projection of the pupil:teacher ratio upon which the required number of teachers, for educational planning and expansion, can be estimated.

These indicators are analysed in the above sequence by the same explanatory variables by which the pupil:teacher ratio has been discussed to isolate those parameters which contribute to the difference observed in this ratio within the context of the academic secondary schools.

8.4. Class Size:

The first indicator to be assessed is the class size, or the number of pupils per class. Class size, or the average number of pupils per class, reflects the average size of the audience with whom the teacher has to make contact, whether she or he is a full-time or part-time teacher. Class density varies according to one or more of three main factors. Firstly, the expansion or contraction in school population. Although the latter phenomenon is assumed to be a problem of the developed world where birth rates declined and caused a decline in rolls, it has been a problem in the Northern Region in Sudan for a long time because of a high rate of migration of young people, mostly men; sometimes whole villages or districts. Secondly, the geographic distribution of the enrolment between the different locations (urban, rural, nomadic, etc.). Recent displacement of people in Western Sudan because of drought and desertification affected the distribution of school population in the various sectors. Thirdly, "the decision to accommodate enrolment, integrate pupils in already existing classes, build new classes in existing schools, or build new schools" (Tibi, 1985). In reality, it is more

likely that new pupils are accommodated in all three alternative solutions, depending on the number of pupils.

Class size is always closely connected to the pupil:teacher ratio; being a useful indicator of the quality of the education provided. The effect of class size on pupils' achievement and school output and hence quality of education has been the subject of serious debates and discussions both in developing and developed countries.

"Arguments in support of large classes included not only the economical use of buildings and the reduction in the number of teachers required but also the socialising and democratising opportunities provided by larger groups and the encouragement which they can give to independent study" (Flemming, 1958). "... the hourly productivity of a teacher, calculated on the basis of the quantity of knowledge dispersed, increases constantly with the size of a form as this quantity is in direct proportion to that size" (Hallak, 1967). However, beyond a certain class size, classroom management and organisation become difficult and teacher efficiency falls. In large classes, teacher:pupil relationships are different: "... teachers may become more authoritarian and dogmatic and the pupils more formal with more apathy and less cohesion" (Tibi, 1989).

On the other hand, promoters of small class size - traditionally educators and parents - believe that it is synonymous not only with higher achievement and lower attrition rates, but better behaviour on the part of the pupils, and improved morale among teachers. Here, "... teachers may apply a greater variety of instructional approaches and teaching activities ... the students may benefit from a more individualised education, participate in more creative activities and more diversified processes ... there are fewer problems relating to discipline and to the organisation of work in the classroom" (Tibi, 1989).

A large amount of research work was conducted to examine this relationship between class size and pupil achievement using a variety of tests. The results varied considerably according to the research set-up and variables

used. Some revealed that pupils achieve better in small classes, while others showed improved performance in large ones, and a third group proved that class size has no significance. Of the last group is Schiefelbein (1981) who concluded from his research in this field in Latin American countries that "class size does not affect achievement". However, the effect of the number of pupils per instructional groups on the 'quality of education', as extensive research indicates, is not yet clear cut, though there are thresholds. As Haddad (1975) admitted, the research evidence in this area is far from being conclusive Wolff (1985) studies in Eastern Africa seems to corroborate the finding of "no clear-cut pattern in the relationship between class size and internal efficiency". A study of a group of Eastern Africa countries (all with low pupil teacher ratios) revealed a wide variation in pupils' achievement. Furthermore, a considerable amount of research work attempted to assess the educational environment and the learning process in different class sizes. These studies confirmed that "teachers can no longer take into account individual differences once class size exceeds 35 to 40 pupils" (Tibi, 1989). It is interesting to weigh the benefits derived from smaller classes against the additional costs incurred. The evidence suggests that "payoffs associated with two costly policies - lengthening teacher training and reducing class size - are small" (Schiefelbein, 1981). Class size has a considerable effect on costs because of the additional expenditure on teachers, classroom equipment, materials and administration. Hence, Psacharopoulos and Woodhall (1985) suggested that, "in the absence of evidence that the additional cost generates additional educational benefits, it may be more cost-effective to allow a modest increase in class size and invest the annual savings in more teaching materials or textbooks". Farrell and Schiefelbein's (1972) research studies found that, "in Chile, a 15% increase in the average class size would reduce the annual budget by 5%". There is, however, little scope for increasing the pupil:teacher ratio

in countries such as those of West Africa where, in 1978, the average class size was greater than 50 (Eicher, 1984). Similarly, "Ethiopia, (with a student:teacher ratio of 59.1) and Malawi (with a ratio of 65.1) may have student:teacher ratios which are too high to ensure that children learn adequately" (Wolff, 1985).

Small classes, as such, do not guarantee better teaching or more individualised programmes. It is evident that only, "... the level of teachers' training modify the effect of reducing class size; only good teachers will benefit from small classes" (Schiefelbein, 1981). After all, rather than the size of the class, it is how the teacher benefits his pupils by the opportunities which the class size offers for learning that matters in the end. Tibi (1989) singled out "the number of pupils per class as one of six dimensions of teachers' preparation"; perhaps it is more urgent to improve the efficiency of teachers in large classes by a more systematic utilisation of teaching materials, by an improvement in the interaction and motivation of pupils, etc. However, the scope for effective ways of teaching in large classes using modern teaching techniques and aids has not been exhausted.

In the case of developing countries, where using modern teaching techniques and aids is not always feasible, it seems more important to plead for 'small classes'. The plea for 'small classes' is not because of better teaching through more individualised programmes, but for the simple reason that 'large classes' in these countries are beyond the threshold; where "... the efficiency of teacher falls to a very low level" (Wolff, 1985).

However, in the Sudan, the regulations delineate the number in classrooms at 50 pupils for primary schools, 45 for intermediate, (junior secondary schools), 40 for academic higher secondary schools and 35 for vocational and technical higher secondary schools. The actual numbers are much higher than these in some schools. More recently, the 'Admission Committee for Secondary Schools' set the maximum class size for academic secondary schools at not more than

50 pupils. The former class size was recommended by the Sudanese Education Sector Review (1977), Table 8.6, after a thorough study of the internal criteria of the whole educational system, whereas the latter was dictated by the pressure to admit all successful pupils who passed the 'Intermediate School Certificate Examination'.

The following analysis of class size reveals the extent of disparities between the official class size, the national average class size from the sample data, and that found in the regions in the various sizes, locations, types, and kinds of schools. Meanwhile, class size as a large determinant of the pupil:teacher ratio, as well as an indicator of teaching resource utilisation, is examined in order to display later, with other relevant indicators, the extent of efficiency in their use in different contexts and its impact on unit costs on teachers' salaries.

8.4.1. Analysis of Class Size by Region and Size of Schools:

Table 8.11 displays that the national average class size in academic secondary schools is 56.3. It is 1.6 times as high as the 'typical class size', referred to above, and 12.6% above the maximum size adopted by the Admission Committee.

Inter-size mean analysis reveals that the largest mean class size is in Large Schools (58.8), whereas the smallest is in Small Size (54.6); an expected pattern. That may explain the highest unit expenditure on teachers' salaries in the Small Schools.

The regional mean comparison indicates that the Northern Region has the largest class size (60.1), 1.2 times the smallest in Kordufan (49.7). No wonder Kordufan has the highest mean unit expenditure on teachers' salaries of all regions. All these mean averages conceal wide variations.

Disparities in class size among regions within each school size are marked. The Northern Region has the largest classes in Small (60.2) and Medium Schools (61.8), each 1.3 times as high as that in Kordufan (47.1), and the Eastern Region (49.2), respectively. Nevertheless, only the Eastern

TABLE: 8.11

Class Size by Region and Size of School

School Size	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		60.1667	53.1667	50.1086	47.1429	57.6667	54.5701
up to 400		2	1	4	1	5	13
		120.33	53.17	200.43	47.14	288.33	709.41
		.2357	.	6.4405	.	8.8796	7.5676
2		61.7718	49.2222	53.0138	51.1417	57.8570	55.1921
401 to 800 pupils		3	1	5	4	5	18
		185.32	49.22	265.07	204.57	289.28	993.46
		6.0398	.	3.7633	2.8345	14.5988	8.7332
3		55.0500	54.0333	61.6652	46.6667	60.3850	58.8182
over 800 pupils		1	2	4	1	9	17
		55.05	108.07	246.66	46.67	543.46	999.91
		.	.4243	2.4673	.	6.1338	6.0291
Column Total		60.1165	52.6139	54.7819	49.7294	59.0044	56.3079
		6	4	13	6	19	48
		360.70	210.46	712.16	298.38	1121.08	2702.78
		4.6240	2.3107	6.4022	3.1033	9.1335	7.6272

Region lowest class sizes may explain the level of the respective unit costs on teachers' salaries, Table 7.5; the others are affected by the highest average teacher's salary, Table 8.2. The Central Region Large Schools has the largest class size (61.7), as expected, which is 1.3 times that in Kordufan, (46.7). Interestingly, both these class sizes account for the lowest and highest unit cost, on teachers' pay (Table 7.5) respectively.

In individual regions discrepancies in class size are limited, marked in the Central Region. In the Large Schools, the Central Region's largest classes (61.7), is 1.2 times as high as that in the Small Size (50.1). As expected, both class sizes may account for the extreme levels of unit expenditure on teachers' pay, Table 7.5. However, most regions' largest classes are in the Large School size. Surprisingly, only that in the Eastern Region is in line with the respective costs per pupil on teachers' salaries, due to the highest levels of average salaries.

8.4.2 Analysis of Class Size by Region and Location of Schools:

As Table 8.12 reveals, the Urban Sector has the largest class size (57.1), though almost identical to the national average but the Semi-Urban having the smallest size (51.3). Strangely enough, the largest class size of the Urban area reflects the lowest pupil:teacher ratio (Table 8.8) and the highest average salary (Table 8.3). Both the latter indicators account for the highest per unit expenditure on teachers' salaries (Table 7.6). This may indicate that the Urban Schools are well staffed with experienced and more qualified teachers who can effectively handle large classes. The smallest class size of the Semi-Urban area cannot account for the lowest unit costs on teachers' salaries (Table 7.6) explained by the next highest average salary (Table 8.3), and the highest pupil:teacher ratio (Table 8.8).

Within the Urban Sector, inter-regional analysis demonstrates that variations in class size are limited.

TABLE: 8.12

Class Size by Region and Location of School

Location	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban	Mean 60.1165 Count 6 Sum 360.70 Std Dev 4.6240	Mean 52.6139 Count 4 Sum 210.46 Std Dev 2.3107	Mean 54.7470 Count 8 Sum 437.98 Std Dev 6.9729	Mean 50.3419 Count 5 Sum 251.71 Std Dev 3.0371	Mean 60.4760 Count 16 Sum 967.62 Std Dev 9.0355	Mean 57.1399 Count 39 Sum 2228.46 Std Dev 7.8049
2 Semi-urban			Mean 51.3333 Count 3 Sum 154.00 Std Dev 3.1759			Mean 51.3333 Count 3 Sum 154.00 Std Dev 3.1759
3 Rural			Mean 60.0942 Count 2 Sum 120.19 Std Dev 6.2615	Mean 46.6667 Count 1 Sum 46.67 Std Dev .	Mean 51.1556 Count 3 Sum 153.47 Std Dev 5.3609	Mean 53.3870 Count 6 Sum 320.32 Std Dev 7.0251
Column Total	Mean 60.1165 Count 6 Sum 360.70 Std Dev 4.6240	Mean 52.6139 Count 4 Sum 210.46 Std Dev 2.3107	Mean 54.7819 Count 13 Sum 712.16 Std Dev 6.4022	Mean 49.7294 Count 6 Sum 298.38 Std Dev 3.1033	Mean 59.0044 Count 19 Sum 1121.08 Std Dev 9.1335	Mean 56.3079 Count 48 Sum 2702.78 Std Dev 7.6272

The class size varies from as high as 60.5 in Khartoum and 60.1 in the Northern Region to as low as 50.3 in Kordufan; 1.2 times as high. The Eastern and Central Regions have class sizes clustering around the national average.

However, it is only the next highest class size in the Northern Region in line with the highest pupil:teacher ratio (Table 8.8), that can be attributable to the lowest unit costs on teachers' salaries (Table 7.6), despite the next highest average salary (Table 8.3). Similarly, Kordufan's smallest class size and next lowest pupil:teacher ratio (Table 8.8) may explain the highest per pupil expenditure on teachers' salaries (Table 7.6), as expected; though it has the next lowest average salary (Table 8.3).

In the Rural area, the Central Region has the largest class size (60.1), almost 1.3 times the smallest classes in Kordufan (46.7) [data relates to one school]. Kordufan's smallest class size, coupled with the next lowest pupil:teacher ratio (Table 8.8) and the highest average salary (Table 8.3), may account for next highest unit costs on teachers' salaries (Table 7.6). Similarly, the Central Region's largest class size, highest pupil:teacher ratio (Table 8.8) and the lowest average teachers' salary (Table 8.3) are attributable to the lowest costs per unit on teachers' salaries, as normally observed.

Inter-locational analysis by region displays that while Khartoum and Kordufan Region have the larger class sizes in the Urban Sector and the smaller in the Rural area, as expected, the Central Region has the largest class size in the Rural and the smallest in the Semi-Urban area. But it is worth recording that although Khartoum's larger class size is coupled with the higher pupil:teacher ratio, Kordufan's larger class size coincides with the lower pupil:teacher ratio (Table 8.8), but both have the higher unit costs on teachers' salaries (Table 7.6). This may be explained by the higher average salaries in the Urban Sector (Table 8.3). However, the Central Region's largest class size, coupled with the highest pupil:teacher ratio (Table 8.8) and lowest average salary (Table 8.3), are attributable

for the lowest per pupil expenditure on teachers' salaries (Table 7.6), as expected.

8.4.3. Class Size Analysis by Region and Type of Schools:

Table 8.13 shows that class size is almost identical in all types of schools and all cluster around the national average. However, the different class sizes in all types of Schools are not in line with the other indicators that may be attributable to the respective level of unit costs on teachers' salaries (Table 7.7). Analysis of more indicators may shed more light about class size, pupil ratio and average salary relationship and the support for the respective level of unit expenditure on teachers' salaries.

Analysis by type of schools displays that variation, between regions, are widest in the Boarding type, considerable in the Day Schools, limited in the Day and Boarding Type. In the Boarding Type, the Central Region has the largest class size (64.5), 1.7 times the smallest in Khartoum (39.1). It is particularly interesting to record the systematic pattern of class size, pupil:teacher ratio and the corresponding unit expenditure on teachers' salaries in this type of school. The Central Region, with the largest class size and the highest pupil:teacher ratio (Table 8.11), has the lowest per pupil costs on teachers' salaries. Khartoum, with the smallest class size and lower pupil:teacher ratio (Table 8.11), has the highest costs per unit on teachers' salaries (Table 7.8). In both cases the average teacher's salary (Table 8.3) does not follow in the same direction.

In the Day Schools type, class size is largest in Khartoum (60.4), 1.2 times as high as the smallest in the Eastern Region (49.2) [data is for one school]. However, whereas the systematic pattern observed above applies to the Eastern Region, it does not comply with Khartoum's situation. The Eastern Region's smallest classes and lower pupil:teacher ratio (Table 8.9) can be attributable to the highest per unit expenditure on teachers' salaries (Table

TABLE: 8.13

Class Size by Region and Type of School

Type	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School		59.3162	49.2222	54.4845	49.9774	60.4235	57.4576
		3	1	6	4	17	31
		177.95	49.22	326.91	199.91	1027.20	1781.19
		1.4824	.	8.0424	3.3783	8.1117	7.9988
2 Boarding School				64.5217	46.6667	39.0833	50.0906
				1	1	1	3
				64.52	46.67	39.08	150.27
				.	.	.	13.0603
3 Day & Boarding		60.9167	53.7444	53.4560	51.8000	54.8000	55.0942
		3	3	6	1	1	14
		182.75	161.23	320.74	51.80	54.80	771.32
		7.0239	.5834	3.5359	.	.	4.7723
Column Total		60.1165	52.6139	54.7819	49.7294	59.0044	56.3079
		6	4	13	6	19	48
		360.70	210.46	712.16	298.38	1121.08	2702.78
		4.6240	2.3107	6.4022	3.1033	9.1335	7.6272

7.7), despite the lowest average salary (Table 8.4). Analysis of other indicators may give a better explanation.

In individual regions (Table 8.17), variations in class size is very limited between Day Schools and Day and Boarding Schools types, except for Khartoum where classes in Day Schools are larger than those in Day and Boarding's. The respective pupil:teacher ratios show little variation between these two types, though higher on the whole in the Day and Boarding type of schools; reflected in lower per unit costs on teachers' salaries, as expected. The disparities are greater between the Boarding Type and other Types in the Central Region and Khartoum; marked in the latter. The Central Region Boarding Schools class size is 1.2 times that in the Day and Boarding, whereas that in Khartoum Day Schools is as much as 1.5 times as high as that in the Boarding Type. Indicators on teachers' utilisation may give a clearer explanation. However, in all types of schools, the Northern and the Central Regions have the larger classes, while the Eastern and Kordufan Regions have, comparatively the smaller. Khartoum, with large classes in the Day, and Day and Boarding Schools, has the smallest class size of all in the Boarding Type.

8.4.4 Analysis of Class Size by Region and Kind of Schools:

Inter-kind mean analysis (Table 8.14) displays that average Girls Schools and Boys Schools class size are almost identical, around the national average. However, the observed difference in per pupil costs on teachers' salaries (Table 7.8), can be attributable to the variation in pupil:teacher ratios (Table 8.10) and average teacher salary (Table 8.5). Effects of other indicators can be assessed later. Disparities in class size are considerable in both Girls and Boys Schools. Within Girls Schools class size varies from 63.2 pupils in the Northern Region to 51 in the Kordufan Region; more than 1.2 times as high. Strangely enough, these extreme class sizes coincide with the highest and lowest average salary (Table 8.5) and the next highest and third lowest pupil:teacher ratios (Table 8.10), which

TABLE: 8.14

Class Size by Region and Kind of School

		REGION					
	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Kind of School	1	63.1577	53.7500	54.4261	50.9833	58.3991	56.6752
Girls		2	2	5	2	9	20
		126.32	107.50	272.13	101.97	525.59	1133.50
		7.8380	.8250	3.6298	1.1549	7.8265	6.5862
	2	58.5958	51.4778	55.0043	49.1024	59.5491	56.0455
Boys		4	2	8	4	10	28
		234.38	102.96	440.03	196.41	595.49	1569.27
		2.4308	3.1898	7.9114	3.7461	10.5686	8.4006
Column Total		60.1165	52.6139	54.7819	49.7294	59.0044	56.3079
		6	4	13	6	19	48
		360.70	210.46	712.16	298.38	1121.08	2702.78
		4.6240	2.3107	6.4022	3.1033	9.1335	7.6272

contribute to the middle and next lowest per unit expenditure on teachers' salaries (Table 7.9) respectively. Here, it is evident that other indicators influence the pattern of unit costs.

In Boys Schools, class size ranges from as high as 61.2 in Khartoum to as low as 49.1 in Kordufan; almost 1.3 times as high. However, Kordufan's smallest class size and lowest pupil:teacher ratio (Table 8.10) can account for the highest per pupil costs on teacher salaries (Table 7.8), as expected, in spite of the next lowest average salary (Table 8.5); in Khartoum other indicators may explain the next lowest unit costs on teachers' salaries (Table 7.8).

Within regions, class size is almost identical in the Eastern, the Central and Kordufan Regions, with limited variations in the Northern Regions and Khartoum. This shows that the corresponding unit costs on teachers' salaries can be attributed to the pupil:teacher ratios. Whether this is supported by other indicators, the following analysis may reveal.

Conversely, the situation in Khartoum Girls and Boys Schools is more systematic. The smaller classes in Girls Schools, the lower pupil:teacher ratio (Table 8.10) and higher unit expenditure on teachers' salaries (Table 7.8). Similarly, the lower per pupil costs on teachers' salaries on Boys Schools can be accounted for by the larger class size, the higher pupil:teacher ratio (Table 8.10) and the lower teacher salary (Table 8.5). However, the class size, on a level with the pupil:teacher ratio, can explain the unit costs on teachers' salaries in the Central and Kordufan Regions and Khartoum, whereas in the Northern and Eastern Regions other educational indicators, beside the pupil:teacher ratio, may be attributable to the respective levels of unit expenditure on teachers' salaries.

Summing up the discussion on class size, it is observed that the mean variations in this indicator by size, location, type and kind of schools is limited, though the inter-regional variations within each size, location, type and kind of school are considerably wide. It is evident

that average class size in the academic secondary schools is large; larger than the average in the Northern Region and Khartoum; below the average and cluster around it in the Central and Eastern Regions; but well below the average in Kordufan. Class size on a level with the pupil:teacher ratio can be accountable for unit expenditure on teachers' salaries in many cases. In others, where class size is not in line with the respective pupil ratio, other educational indicators may have contributed to the explanation of the respective per pupil costs on teachers' salaries.

However, class size as an indicator of teachers' resource use may imply over-utilisation in the sense of reduced number of teachers in the Northern Region and Khartoum, whereas the optimum or best utilisation is in the Kordufan Region, with average use in the other two regions. This can only be exemplified by the other indicators on average teacher load and average curriculum load. As an indicator of educational quality, the larger class sizes of the Northern Region and Khartoum pinpoint a 'lower efficiency of teachers', unless other parameters reveal more 'effective ways of teaching' or teachers' levels of qualification and training implies that they are 'benefiting their pupils with opportunities, whatever class size offers for learning'. Alternatively, the lower class size in Kordufan may hint at better use of teachers' time, while the average class size of the Central and Eastern can signal average use. However, analysis of the following additional indicators can highlight the real situation.

The next indicator, average teacher load, is an important parameter in assessing the level of teacher use of time and to what extent the required load is adhered to, in practice.

8.5 Average Teacher Load:

The average teacher load (or average workload per teacher) is the total number of periods (hours) actually worked by full-time teachers, divided by their number. As early as 1959, Flemming argued that teachers' load includes

all those activities that relate to the teacher's professional duties, responsibilities and interests. "Account is taken (not only) of the number of class periods of instruction per week (but) of such differences as the character of the subject to be taught ... the extent of duplication in the preparation of lessons for the different classes, the length of teaching periods, the time spent on extracurricular activities, the extent of overcrowding in classroom, the amount of secretarial work required, the adequacy of the teaching materials provided, and the total number of pupils with whom the teacher has to make contact" (Flemming, 1959).

At a later date a study revealed that 6.7% of the average secondary school teacher's day was occupied with administrative and clerical tasks (Hilsum and Strong, 1978).

However, in this study which is basically on unit costs, the emphasis will be only on the number of teaching hours per teacher, despite the critical importance of the other activities for teachers' productivity and hence for the educational process as a whole.

The average teacher's workload reflects the actual conditions under which teachers are being used and, consequently, any attempt to calculate the productivity per teacher has to take into account their hours of work. In certain countries, the number of hours (periods) a teacher is required to teach at any given grade level depends on the teachers' qualifications (Tibi, 1986). In the Sudan, however, the standard teacher load varies according to the salary scale, as agreed between the Ministry of Education and the Secondary Schools Teachers' Trade Union.

According to this agreement a new graduate teacher at Scale 9, his colleagues in Scale 8 (at least four years later), those in Scale 7 (another five years of seniority), and those in Scale 6 (over 10 years of experience) teach a time-table of eighteen periods per week. At Scale 5 the head of a school department usually has a time-table of only twelve periods per week - in addition to the administrative work involved in performing his duties. In schools where a

head of a department has not yet been promoted to Scale 5, he can claim a reduced time-table on the basis of the administrative responsibilities of the job. However this agreement contradicts the Sudan Sector Review's declaration that, "The teacher with a limited training cannot bear the responsibility of a maximum load, especially in small schools which suffer shortages of teachers". These contradictory principles support Wolff's (1985) statement that, "These ... countries (Sudan included) have very low student-teacher ratios; in conjunction with low salaries they have apparently decreased teachers' responsibilities".

In reality, this required workload is only partially respected, especially in areas with surplus teachers or shortages of teachers where they teach extra periods but are paid per period for it as the following analysis may reveal.

8.5.1. Analysis of Average Teacher's Load by Region and Size of School:

As Table 8.15 reveals, the national average teacher load is 14.4 periods; below the standard teacher load observed above in the 'typical secondary school,' 24 periods. It is difficult to assess this according to the norm in the Sudan as it varies with teachers' position on the salary scale. It may indicate, however, that secondary schools have a large majority of senior, experienced teachers with a lighter required load.

As expected, the larger the school the more intensive the utilization of teachers. Large Schools have the heaviest load, 15 periods, whereas the Small Type has 13 periods - the lightest load. This can explain the highest unit costs on teachers' salaries (Table 7.5) in the latter case and the next lowest in the former which may, also be attributable to the highest average teacher salary (Table 8.2) in the presence of almost identical pupil teacher ratios (Table 8.7). On the other hand, the inter-regional mean comparison shows that discrepancies in average teacher load are limited; the heaviest in Kordufan is 15.1 periods and the lightest in the Eastern Region is 14. The average

TABLE: 8.15

Average Teacher Load by Region and Size of School

School Size / Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1	13.3661	12.7654	14.4359	15.0494	11.3589	13.0065
up to 400	2	1	4	1	5	13
	26.73	12.77	57.74	15.05	56.79	169.08
	.7197	.	1.4261	.	1.1716	1.7876
2	14.4617	13.5470	14.7945	14.6032	15.4082	14.7977
401 to 800 pupils	3	1	5	4	5	18
	43.38	13.55	73.97	58.41	77.04	266.36
	.6209	.	.7532	.5513	1.3509	.9446
3	14.9531	14.8248	14.7391	17.1474	14.9725	15.0270
over 800 pupils	1	2	4	1	9	17
	14.95	29.65	58.96	17.15	134.75	255.46
	.	.7279	1.6000	.	.9329	1.1212
Column Total	14.1784	13.9905	14.6671	15.1016	14.1362	14.3938
	6	4	13	6	19	48
	85.07	55.96	190.67	90.61	268.59	690.90
	.8306	1.0984	1.1678	1.1039	2.0098	1.5187

load, here, could not directly account for either of the extreme unit costs on teachers' pay. However, all these averages disguise considerable variations among and within regions.

Differences in average teacher load are great in each school size; greater in the Small Size. Small Schools in all regions have extremely light loads, well below the average, except in Kordufan and the Central Region. The Central Region schools of this size have average loads, whereas the heaviest teacher load in Kordufan (15.1 periods), is 1.3 times the lightest of all schools in Khartoum (11.4). Khartoum's level of average load and the lowest pupil teacher ratio (Table 8.7) can explain the highest unit expenditure on teachers' salaries (Table 7.5) despite the next lowest per teacher salary (Table 8.2). Generally, the Medium Schools have an average load, but Khartoum has a slightly above average load, 15.4, and the Eastern Region has a load below the average, 13.6. It is noteworthy that both average loads in Khartoum and the Eastern Region are accountable for the lowest and the highest costs per pupil on teachers' salaries (Table 7.5) coupled with the third highest pupil ratio (Table 8.7) and the next lowest teacher salary (Table 8.2) in the former, and in the latter region by the lowest ratio despite the lowest average salary (Table 8.2). On the other hand, all the Large Size Schools have a heavier than average load; even heavier in Kordufan single school than all schools, 17.2, almost 1.2 times as high as the lightest in the Central Region, 14.7. Strangely enough, Kordufan and the Central Region's level of teacher load does not influence the unit expenditure on teachers, salaries - which are explained by the pupil teacher ratio (Table 8.7).

In individual regions disparities in average teacher load are limited in the Northern and the Central Regions, considerable in the Eastern Region and Kordufan, but marked in Khartoum. Although in the Eastern and Kordufan Regions the highest average load in Large Schools is almost 1.2 times as high as that in Small and Medium Sizes,

respectively, in Khartoum Medium Schools it is almost 1.4 times that in the Small Size. Interestingly, the heaviest load in all these regions can be accountable, with the highest pupil:teacher ratio (Table 8.7), for the lowest per pupil costs on teachers' salaries (Table 7.5).

8.5.2 Analysis of Average Teacher's Load by Region and Location of School:

As Table 8.16 shows, the highest average teacher load is in the Semi-Urban Centres (15.7) and the lowest load is in the Rural area (13.8); the Urban Sector has an average load. The Semi-Urban's lowest unit costs on teachers' salaries can be accounted for by the highest average teacher load and the highest pupil:teacher ratio (Table 8.8), despite the next highest average teacher salary (Table 8.3) and the smallest class size (Table 8.12,). However, this level of teacher load implies better utilisation of teachers' time or hiring of younger, less experienced teachers. Further analysis on teachers' qualifications may give a clearer perspective. On the other hand, the next highest unit costs on teachers' salaries in the Rural Sector may be attributable to the next lowest pupil:teacher ratio and the next largest class size in spite of the lowest teacher load and the lowest average teacher salary. Other factors may have interacted to bring this result. This situation implies that teachers are hired but are occupied by other, non-professional, load or are senior and more experienced; further analysis may highlight the situation. The Urban Sector's highest per unit costs on teachers' salaries can be accounted for by the lowest pupil:teacher ratio (Table 8.8) and the highest average teacher salary (Table 8.3), despite the largest class size (Table 8.12), and the next highest teacher load.

In the Urban Centres, (Table 8.16) reveals that there are very limited variations among regions in this indicator. The heaviest average load is in the Kordufan Region 14.7) and the lightest (14) is in the Eastern Region. It is important to note that both Kordufan and the Eastern Region

TABLE: 8.16

Average Teacher Load by Region and Location of School

Location	Mean / Count / Sum / Std Dev	REGION 1 Northern Region	2 Eastern Region	3 Central Region	4 Kordufan Region	5 Khartoum	Row Total
1 Urban	Mean	14.1784	13.9905	14.3390	14.6925	14.4774	14.3806
	Count	6	4	8	5	16	39
	Sum	85.07	55.96	114.71	73.46	231.64	560.84
	Std Dev	.8306	1.0984	1.1184	.5175	1.9064	1.3852
2 Semi-urban	Mean			15.6744			15.6744
	Count			3			3
	Sum			47.02			47.02
	Std Dev			.6676			.6676
3 Rural	Mean			14.4687	17.1474	12.3166	13.8391
	Count			2	1	3	6
	Sum			28.94	17.15	36.95	83.03
	Std Dev			1.6540	.	1.7879	2.3588
Column Total	Mean	14.1784	13.9905	14.6671	15.1016	14.1362	14.3938
	Count	6	4	13	6	19	48
	Sum	85.07	55.96	190.67	90.61	268.59	690.90
	Std Dev	.8306	1.0984	1.1678	1.1039	2.0098	1.5187

have identical unit expenditure on teachers' salaries, Table 7.6. However, both have identical pupil teacher ratios and similar teacher loads.

Within the Rural area, the heaviest teacher load is in Kordufan (17.2); 1.4 times as high as that in Khartoum (12.3). It is interesting to note that Kordufan, with the heaviest load and Khartoum with the lowest, have identical higher unit costs on teachers' salaries. In Kordufan, it may be attributable to the highest average teacher's salary, small class size and next lowest pupil:teacher ratio, in spite of the heaviest teacher load, but in Khartoum it is the lowest pupil ratio and next smallest class size, coupled with the lightest average load, that may explain this highest level of unit costs in spite of the next lowest average teacher salary.

Variation in average teacher load within the regions is considerable. The heaviest teacher load in Kordufan is in the Rural area and in Khartoum in the Urban location; each is almost 1.2 times as high. It is noticeable that in Kordufan and Khartoum, despite the high discrepancy in average teacher load, unit cost on teachers' salaries are almost identical in Urban and Rural areas.

In summary, it is obvious that there is a limited variation in average teacher load by location; all cluster around the national average. In the Urban Sector, variations in teacher load are very limited but considerable in the Rural areas. Within the regions there are remarkable discrepancy in Kordufan and Khartoum. It is noticeable that despite the difference of around 17% between Urban and Rural locations, average loads and unit costs on teachers' salaries within Kordufan and Khartoum are identical. This is due to the interaction of other indicators. The rate of teachers' utilisation is reflected by the level of the average load; apparently the smaller the load, the more senior and experienced the teachers, and vice versa. However, the true perspective can be revealed later by the discussion on teachers' quality.

8.5.3 Average Teacher Load Analysis by Region and Type of Schools:

(Table 8.17) reveals that the highest average teacher load is in the Boarding Schools type (16.7) and the lowest load (14.1) in the Day Schools; a difference of 18.6%. However, teacher load in Day Schools and Day and Boarding type is lower, almost identical to the average.

In Boarding Schools the next lowest unit costs on teachers' salaries (Table 7.7) can be explained by the highest teacher load and the next highest pupil:teacher ratio (Table 8.9), though the lowest average salary (Table 8.4) and the smallest class size (Table 8.13) may not contribute to that. On the other hand, the highest unit costs on teachers'pay in the Day Schools type is attributable to the lowest average teacher load, the lowest pupil:teacher ratio (Table 8.9) and the highest average teacher's salary (Table 8.4), despite the largest class size (Table 8.13). But the Day and Boarding Schools' lowest unit costs on teachers' salaries (Table 7.7) can be attributable to the highest pupil:teacher ratio (Table 8.9), next lowest average teacher load, next highest class size (Table 8.13), and lowest teachers' salary (Table 8.4). However, further analysis of other indicators can reveal the actual situation.

Inter-regional analysis (Table 8.17) demonstrates the limited variations, in teacher loads, within each type of school in all regions; almost identical and cluster around the respective type average. The average teacher load in the Day Schools and Day and Boarding Schools types, within each region, are almost identical, while the Boarding Schools type, where available, have the highest average load. In Kordufan and Khartoum the discrepancy between the highest and lowest teacher loads is 17.5% and 26.7% respectively.

Summing up, it is evident that the Boarding Schools type has the highest average teacher load, while the Day and Day and Boarding types have lower identical average loads. Variations in teacher loads within types of schools are

TABLE: 8.17

Average Teacher Load by Region and Type of School

Type	Mean / Count / Sum / Std Dev	REGION 1 Northern Region	2 Eastern Region	3 Central Region	4 Kordufan Region	5 Khartoum	Row Total
1 Day School		13.5353	13.5470	14.6271	14.5907	13.9644	14.1185
		3	1	6	4	17	31
		40.61	13.55	87.76	58.36	237.39	437.67
		.5873	.	1.4961	.5367	1.9552	1.6136
2 Boarding School				15.6382	17.1474	17.4365	16.7407
				1	1	1	3
				15.64	17.15	17.44	50.22
				.	.	.	.9656
3 Day & Boarding		14.8214	14.1383	14.5453	15.0994	13.7576	14.5006
		3	3	6	1	1	14
		44.46	42.42	87.27	15.10	13.76	203.01
		.3734	1.2956	.9091	.	.	.8500
Column Total		14.1784	13.9905	14.6671	15.1016	14.1362	14.3938
		6	4	13	6	19	48
		85.07	55.96	190.67	90.61	268.59	690.90
		.8306	1.0984	1.1678	1.1039	2.0098	1.5187

limited; the minimum in the Day Schools and the maximum in the Boarding Schools. Within regions the Day and Day and Boarding Schools types have almost identical average loads, whereas the Boarding type has the highest load. This may be one of the reasons why Boarding schools are believed to raise pupil achievement. Interestingly, it is the level of pupil:teacher ratio, rather than the average load, that mostly explains the unit costs on teachers' salaries. It is difficult to assess the rate of utilisation of teachers' time from their average load here, as the required loads differ according to their position in the salary scale. However, the smallest average loads in Day Schools in the Northern and Eastern Regions and Khartoum, as well as Khartoum Day and Boarding Schools implies senior, more experienced teachers, whereas the largest loads in the Boarding Schools type and Kordufan Day and Boarding Schools suggests younger, less qualified teachers.

8.5.4 Average Teacher Load Analysis by Region and Kind of Schools:

As Table 8.18 shows, the mean average teacher load for Girls and Boys Schools are almost identical and cling around the national average. The Girls' Schools' higher per pupil costs on teachers' salaries (Table 7.8) may be explained by the lower pupil:teacher ratio (Table 8.10), despite a lower average teacher's salary (Table 8.5); otherwise the average teacher load, and average class size (Table 8.14) are almost identical. The Boys' Schools lower per unit costs on teachers' salaries (Table 7.8) can be attributable to the higher pupil:teacher ratio (Table 8.10) in spite of the higher average teacher's salary (Table 8.5). However, the effect of other indicators may have influenced the result.

In Girls' Schools, Kordufan has the highest teacher load (15.1 periods) while the Eastern Region has the lowest load (13.5 periods). Kordufan's highest teacher load may be accountable for the next lowest unit cost on teachers' salaries (Table 7.9) together with the smallest class size (Table 8.14), a middle pupil:teacher ratio (Table 8.10), and

TABLE: 8.18

Average Teacher Load by Region and Kind of School

Kind of School	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Girls	14.4925	13.5378	14.3119	15.0793	13.0170	13.7466
	2	2	5	2	9	20
	28.98	27.08	71.56	30.16	117.15	274.93
	.8749	1.0922	.8532	.0284	1.9855	1.5819
2 Boys	14.0213	14.4433	14.8891	15.1128	15.1435	14.8561
	4	2	8	4	10	28
	56.09	28.89	119.11	60.45	151.43	415.97
	.8922	1.2675	1.3325	1.4249	1.4813	1.3122
Column Total	14.1784	13.9905	14.6671	15.1016	14.1362	14.3938
	6	4	13	6	19	48
	85.07	55.96	190.67	90.61	268.59	690.90
	.8306	1.0984	1.1678	1.1039	2.0098	1.5187

the lowest average teacher salary (Table 8.5). The highest teacher load, middle pupil ratio and smallest class can be an indication of better use of teachers' resource and quality of education. On the other hand, the Eastern Region next highest per unit costs on teachers' salaries (Table 7.8) can be the result of the interaction of a next smallest class size (Table 8.14) and the lowest pupil:teacher ratio (Table 8.10) with the next lowest average teachers' salary (Table 8.5) and lowest average teacher load. The lowest average load and lowest pupil:teacher ratio with the next smallest class size may imply under-utilisation of teachers' time, unless other indicators show the contrary. Within Boys Schools, the discrepancies in average load is minimum.

Within the regions, average teacher loads are almost identical in Boys and Girls Schools, but slightly lower in all Girls Schools in all regions, except in the Northern Region.

In summary, it is apparent that average teacher loads in Girls and Boys Schools are almost identical. Variation within Girls Schools in teacher load is larger than within Boys', even less within regions between Girls and Boys Schools. On the whole, average teacher load is very low in both kinds of schools; the range is between 13.5 and 15.1 periods. Unless the indicators of teachers' quality - discussed later - give an explanation, this signals overall under-utilisation of teachers' time.

In summing up this analysis on the average teacher load, it is evident that disparities are limited by type and kind of schools, but marked by size and location; heavier average loads are found in Large Schools and in the Urban Centres. The average teacher load is not accountable directly for the respective level of unit expenditure on teachers' salaries.

Assessment of the conditions of teachers' utilisation may be difficult at this stage because of the variation in the required load by the position on the salary scale and seniority. It may be possible, later, in the discussion of teachers' quality. Better still, for a general assessment

of the level of teacher resource utilisation, is the average number of teaching hours per class, or the average number of periods of instruction - known as the average curriculum load. The following analysis of the average curriculum load per class may reveal the extent of variations per class that teachers are required to bear and the range of options open to pupils in these classes in the different situations. It may also reflect how far the curriculum load can be accountable for the variations in the per pupil costs on teachers' salaries.

8.6 Average Curriculum Load:

The term 'curriculum' may embrace the multiplicity of activities that take place inside and outside the classroom, or, as far as school teachers are concerned, refer only to the subjects on the timetable. McCormick and James (1983) perceive the 'curriculum' as the list of activities that include the "intended curriculum as formally stated by the timetable", "the actual curriculum as experienced by pupils when involved in learning activities", "the hidden curriculum where pupils experience and learn through such activities as lining up to enter school, wearing school uniform (etc.)", and "the outcome of learning in terms of the understanding, attitude, etc. that pupils develop". However, for the purpose of this study, the word 'curriculum' is confined to activities as delineated by the timetable of the school. Basically, "there are two components of a school's curriculum: the pedagogical which relates to such matters as the sequencing of content, teaching styles, methods of evaluating pupil performance and so forth, and the structural that forms the framework within which pedagogical matters are set" (Harold, 1987). Usually, the pedagogical aspects of the curriculum are left to the classroom teacher. The professional teacher's role, here, cannot be overlooked. As he enjoys some degree of autonomy at this level, he may be an independent innovator, implement change initiated by others, or even resist any new idea, especially if he "... plans (her/his) courses on very

different grounds from those recommended by curriculum theorists" (Taylor, 1970). On the other hand, the structural issue is the responsibility of the school administrators, mainly 'the Director' and the 'Deputy Director'. Both of them, in consultation with other senior members of staff and heads of departments, may solve the problem of the balance between compulsory and optional subjects, which subjects can be offered and the necessary staff required to teach the groups required. Hence "the curriculum of a school is seen as the head (director) and his staff's philosophy of what education should be about" (Ransom, 1979).

The results of all the above compromises and 'balancing the inequalities' is the school timetable. The timetabling operation of a school reflects its internal organisation, though governed by public examination, as well as the constraints of administrative, industrial and financial requirements. However, "... it is the tangible expression of school policy, incorporating the particular educational philosophy of the head teacher or other authority, compromised by consideration of staff numbers as well as their qualifications and ability, pupil numbers and accommodation" (Cumming, 1971). In other words, "this document displays on the one hand the distribution of pupils' time among classes of different types and sizes and on the other hand the distribution of the time which the school's teachers spend in front of different groups of pupils" (Harold, 1987). However, this does not include the non-teaching time of teachers which includes time spent on preparation of lessons, marking essays or examinations, as well as administrative, supervision of extra-curriculum activities and pastoral responsibilities. Thus the analysis of timetables or schools' curriculum and their variations may reflect the mode of resource utilisation in the schools. Over- or under-utilisation of resources may co-exist between establishment and/or within the same establishment and has direct or indirect consequences for the level of educational expenditure and the quality of educational services (Tibi,

1987). Nevertheless, one of the major concerns of many educators today is to secure a broad, balanced core curriculum for pupils in secondary schools. Some believe that curriculum development and innovation through "... large-scale well-financed projects run on a national or an educational authority scale provide the only hope for a major breakthrough, an effective shaking up of what they see as teachers entrenched attitudes and conservatism" (Hoyle, 1972).

Recently a more positive attitude developed, recognising that worthwhile change has to begin at the grassroots, at the individual school level. "Traditionally all schools are involved in routine reviewing of the curriculum, but this may not involve either questioning basic assumptions or considering the whole curriculum of the school" (McCormick and James, 1983). However, "there is an enormous amount of evidence that teachers have a significant impact on efforts to change schools ..., whatever the formal policies or curicula of a school or classroom might be" (Hawley and Rosenholtz, 1984).

Average curriculum load, or the average number of teaching hours per class, is not always equal to the average number of periods per pupil. The discrepancy often occurs when the number of classes to be taught is increased (or decreased in case of shortage of teachers) in all or some subjects and so the official curriculum is not followed. Or, more frequently, "... when the number of classes to be divided into two or more groups, as for instance in practical subjects and the sciences, is increased or decreased because of shortage of staff" (Tibi, 1985).

However, in the academic secondary schools in the Sudan, as in many developing countries, average curriculum load was larger than the per pupil teaching load. Nowadays the number of hours of instruction actually taking place in school is not equivalent to the theoretical, average number of hours of instruction per class offered, as the following data indicates. Usually the latter varies according to the number of options available within the third grade level.

As Table 3.12 shows, the third grade in academic schools has only four compulsory subjects, but nine optional subjects (from which the pupil has to choose at least two, and at most five). Recently, due to shortage of teachers, even in the first and second grades, where there are no options, the official number of periods to be taught is reduced. However, in fields which suffer serious shortages of qualified teachers, as in mathematics, science and English language, expatriates are recruited. "In 1983/84 expatriates represented 17% of the teaching force in academic subjects and 11% in technical subjects" (Status Quo in Education, 1985). At the time of this study national teachers in academic schools worked extra or additional periods to cover the shortage of teachers in these compulsory examinable subjects. The number of teachers with the required expertise influences the range of options that the pupils can be offered. Shortage of teachers in other subjects which are parts of the weekly time table of the first two grades (Table 3.9 and 3.10) does not appear to attract equivalent importance. These include, for instance, French language, arts, physical education and civics. It may be mainly because French language is not a competitive subject in most faculties or colleges of higher education while arts is chosen by a very small percentage of pupils - those applying for Art College. This implies that the curriculum taught is tied to examinable subjects and higher education admission requirements, not the general rounded development of pupils' personality, which is supposed to be the aim of this level of education. It should be noted that although civics is part of the official timetable of first and second grades it is not taught in any of the sample schools, whereas home economics, which is not part of the current syllabus, is taught in Girls' Schools as individual school's endeavour. However, practical subjects in academic schools are almost non-existent and sciences are taught in most schools for the whole class as a group. Even in the third (final) grade where pupils are divided into two groups of classes - arts and sciences sections - the total number

of hours of instruction for each group of classes is the same. Hence, it is totally legitimate to assume here that average curriculum load is congruent to average per pupil load.

Average curriculum load here covers the share of teaching actually taking place in the school by the teachers within their service requirement, in addition to the additional, or extra, hours which are actually performed in school by regular full-time teachers (or part-timers paid for by a specified hourly wage).

Average curriculum load, or the average number of teaching hours per class, is the third variable, together with class size and average teacher load, that influences the pupil:teacher ratio. It also reflects the organisation of teaching in schools. An indicator of that is how far schools' curriculum loads adhere to the set curriculum or fall beyond that; the following analysis reveals the reality.

8.6.1 Average Curriculum Load Analysis by Region and Size of Schools:

Table 8.19 shows that the national mean average curriculum load is 38.1 periods per week per class. However, it is 12.8% less than the theoretical average number of hours of instruction offered per class in the academic secondary schools - 43 periods per week - and lower than the number taught in a 'typical secondary school' - 40 periods - referred to above.

As expected, the Large School Size has the highest curriculum load asserting the intuitive judgement that this size has more resources and more options, whereas the Small Size has a lower than average load indicating the limited choice in these schools.

However, the regional mean curriculum load is highest in the Northern Region (40.5) and Kordufan (40.1) but lowest in the Central Region (35.2).

Similar to other indicators, variation within the same school size may be striking; in the Small Size the range is

TABLE: 8.19

Average Curriculum Load by Region and School Size

School Size	REGION Mean / Count / Sum / Std Dev Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1	40.7963	38.2963	32.4312	41.5556	38.8296	37.3321
up to 400	2	1	4	1	5	13
	81.59	38.30	129.72	41.56	194.15	485.32
	7.2544	.	1.9502	.	4.8757	5.0759
2	39.8516	39.1358	36.1089	39.6765	37.5779	38.1017
401 to 800 pupils	3	1	5	4	5	18
	119.55	39.14	180.54	158.71	187.89	685.83
	3.7691	.	1.4024	1.3905	6.0198	3.6657
3	42.0667	38.9185	36.9070	40.0106	39.0080	38.7420
over 800 pupils	1	2	4	1	9	17
	42.07	77.84	147.63	40.01	351.07	658.61
	.	2.9751	3.1671	.	4.9920	4.0707
Column Total	40.5357	38.8173	35.2229	40.0454	38.5847	38.1201
	6	4	13	6	19	48
	243.21	155.27	457.90	240.27	733.11	1829.76
	4.1212	1.7554	2.8257	1.3135	4.9798	4.1703

from 41.5 in Kordufan followed by 40.8 in Northern Region to 32.4 in the Central Region whereas, in Large Schools it varies from 42.1 in Northern followed by Kordufan to only 36.9 in Central Region. Discrepancy in the Medium Size is Limited; from more than 39 periods in the Northern and Kordufan to 36.1 in Central.

Within regions, differences in curriculum load are rather limited. Interestingly, the highest curriculum load in the Northern Region is achieved via additional periods as the teacher load is on the lower side, but in Kordufan it is affected by better use of its teaching force. However, the lowest curriculum load in all school sizes in the Central Region, despite the employment of part-time teachers and an average teacher load, may imply misspecification of needs.

In summary, larger schools (Large and Medium Sizes) have better organisation of their teaching/learning process than smaller ones. As the highest curriculum load and the lowest are in the two regions with the highest number of additional periods, it may indicate wider options in the former and imply shortage of teachers with the relevant specialisation in the latter. Higher curriculum load contributes to higher unit costs on teachers salaries with the relevant indicators.

8.6.2 Average Curriculum Load Analysis by Region and Location of Schools:

(Table 8.20) reveals that the Urban area schools have the largest curriculum load - 38.8 periods per week, while the Rural areas have the lowest load - 35.2 periods. This may reflect more options in Urban Schools curriculum; an expected privilege in a developing country setting. However, the highest curriculum load of the Urban areas and the lowest of the Rural schools are coupled with the next lightest and lightest average teacher loads respectively, implying better organisation of the teaching process in Urban location schools, but under-utilisation of teachers or employment of senior more qualified staff in both areas. Further analysis may shed light on this phenomenon.

TABLE: 8.20

Average Curriculum Load by Region and Location of School

Location	Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban		40.5357	38.8173	35.3000	40.0523	39.4092	38.7613
		6	4	8	5	16	39
		243.21	155.27	282.40	200.26	630.55	1511.69
		4.1212	1.7554	3.5537	1.4684	4.7758	4.1774
2 Semi-urban				35.6543			35.6543
				3			3
				106.96			106.96
				.6173			.6173
3 Rural				34.2673	40.0106	34.1877	35.1847
				2	1	3	6
				68.53	40.01	102.56	211.11
				2.0541	.	4.2058	3.6756
Column Total		40.5357	38.8173	35.2229	40.0454	38.5847	38.1201
		6	4	13	6	19	48
		243.21	155.27	457.90	240.27	733.11	1829.76
		4.1212	1.7554	2.8257	1.3135	4.9798	4.1703

The highest curriculum load, in the Urban Centres, is 40.5 periods in the Northern Region, and the lowest 35.3 periods in the Central Region. This implies that the Northern Region has the best organisation of its teaching process in this location. It could afford that through using additional periods (Table 7.10) - the highest number among all regions; indicating a better identification of needs of the otherwise lower curriculum load. On the other hand, the Central Region, though equally employing additional periods - the next highest number (Table 7.10) - could not increase the curriculum load even to the national average level. This, coupled with the next highest teacher load (Table 8.22), implies a limited organisation of the teaching operation and either younger, unqualified staff, or better-utilised teachers. The next chapter on teachers' qualifications and seniority may give further explanation.

Table 8.20 illustrates that within the Rural location the discrepancy between the Kordufan Region [data here relates to one school] and Khartoum the average curriculum load is 17%. Kordufan schools, with the highest curriculum load and the largest teacher load, signpost better organisation of the teaching process and either enhanced use of teachers' time or simply recruitment of young, inexperienced staff. On the other hand, Khartoum schools, with the lowest curriculum load and lowest average teacher load, may indicate far fewer options, and teachers who are hired but are not fulfilling their duties or even senior teachers whose statutory requirement demands a smaller timetable. The next chapter, on teachers' qualifications and experience, may explain the situation.

In individual regions, Table 8.20 reveals that the Central Region and Kordufan have almost identical average curriculum loads in all the relevant locations, implying a persistent policy in organising their teaching operation. On the other hand, it is Khartoum which has the higher average curriculum load in the Urban areas. It is interesting to note that the Central Region resorts to additional periods to compensate for its fewer teachers, as

reflected by the higher pupil:teacher ratio (Table 8.8), which are averagely utilised, as indicated by the average teacher loads (Table 8.16) in all locations. This may question the quality of teaching in this region, taking into consideration the behaviour and level of motivation of part-time teachers.

In summary, it is noted that the range of inter-regional variations in curriculum loads are larger than that of inter-locational mean; the largest mean is even higher. The employment of part-time teachers, coupled with lowest or average teacher utilisation, may indicate under-utilisation or teachers with the irrelevant specialisation. Smaller curriculum loads may indicate shortage of teachers.

8.6.3 Curriculum Load Analysis by Region and Type of Schools:

Table 8.21 shows that there is a limited variation in curriculum load by type of schools between the highest in Boarding Schools and the lowest in Day and Boarding type. It is noted that the highest load in Boarding type is supported by the least-but-one figure of additional periods (Table 7.11), coupled with the highest average teacher load and the next highest pupil:teacher ratio - implying fewer, but better utilised, teachers. The lowest curriculum load is supported by the highest number of additional periods (Table 7.11), the least-but-one average teacher load and the highest pupil:teacher ratio. Here, the situation reflects fewer teachers and under-utilisation or shortages in specific subjects.

As (Table 8.21) indicates, in the Day Schools type the variation in curriculum load ranges from as high as 41.2 periods per week in the Northern Region, to 34.8 periods in the Central Region; a difference of 18.3%. Although both supplement with additional periods (Table 7.11), the highest number of these extra periods employed by the Northern Region indicates better identification of needs. The lowest average teacher load in the Northern Region and the next

TABLE: 8.21

Average Curriculum Load by Region and Type of School

Type	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School		41.1861 3 123.56 5.1739	39.1358 1 39.14 .	34.8030 6 208.82 3.9222	40.5025 4 162.01 1.2346	38.9505 17 662.16 4.8121	38.5703 31 1195.68 4.5787
2 Boarding School				35.7198 1 35.72 .	40.0106 1 40.01 .	40.6852 1 40.69 .	38.8052 3 116.42 2.6932
3 Day & Boarding School		39.8852 3 119.66 3.7977	38.7111 3 116.13 2.1342	35.5599 6 213.36 1.8390	38.2519 1 38.25 .	30.2667 1 30.27 .	36.9762 14 517.67 3.3737
Column Total		40.5357 6 243.21 4.1212	38.8173 4 155.27 1.7554	35.2229 13 457.90 2.8257	40.0454 6 240.27 1.3135	38.5847 19 733.11 4.9798	38.1201 48 1829.76 4.1703

highest pupil:teacher ratio may imply fewer, under-utilised or more experienced teachers.

In the Boarding Schools type, Khartoum and Kordufan Region have the highest and next highest curriculum loads, coupled with the highest and next highest average teacher loads (Table 8.17), and the lowest and next lowest pupil:teacher ratio. The situation reveals that more teachers are highly utilised, or inexperienced, performing their required jobs. Further analysis may clarify the situation.

In the Day and Boarding type disparity in curriculum load is marked - it ranges from 39.9 periods per week to 30.3; a difference of 31.8%. The Northern Region has the highest curriculum load in this type of school, supplemented with the highest number of additional periods, but with the next highest average teacher load and the highest pupil:teacher ratio (Table 8.9) reveals the employment of fewer teachers who are highly utilised.

Khartoum has the lowest load in this type of school. Under-utilisation of already hired teachers is revealed by the lowest teacher load and the third highest pupil:teacher ratio. The inaccurate identification of needs is reflected by the limited number used of additional periods (Table 7.11).

Table 8.21 shows that the Central Region has the lowest options among all regions in Day Schools and Boarding Schools type. In all types, the curriculum loads are below the national average, though coupled with the highest average teacher load (Table 8.17) in Day Schools type, implying better utilisation for its fewer teachers as revealed by the highest pupil:teacher ratio (Table 8.9). In the other two types it is coupled with the lowest and third lowest teacher load and highest and second highest pupil:teacher ratio, which indicates under-utilisation of fewer teachers and less precise identification of needs, as Table 7.11 on additional periods shows.

8.6.4 Average Curriculum Load Analysis by Region and Kind of Schools:

Table 8.22 displays that average curriculum load mean in Girls' Schools - 39.4 periods per week - slightly higher than that in Boys' Schools - 37.2 periods. This, coupled in Girls' Schools with a slightly lower teacher load (Table 8.18) and a lower pupil:teacher ratio (Table 8.10), implies that staff are employed but under-utilised. In Boys' Schools the higher average teacher load and the higher pupil:teacher ratio indicate better utilisation of fewer teachers. However, the lighter curriculum load, in this kind of schools reveals that needs were not precisely identified, as Table 7.12 on additional periods shows.

As Table 8.22 displays, Girls' Schools have more options than Boys' Schools; all schools of this kind are above the national average, except those in the Central Region, and some are almost equal to the official curriculum - as in the Northern Region and Khartoum. Khartoum Girls' Schools, with the next highest curriculum load, the next lowest average teacher load and the next lowest pupil:teacher ratio, may reflect that more experienced teachers are hired, or teachers are recruited but under-utilised, or not performing their teaching duties fully. The Northern Region Girls' Schools, with the highest curriculum load, the next highest average teacher load and the next highest pupil:teacher ratio, indicates fewer, better utilised teachers. The Central Region Girls' Schools, with the lowest curriculum load, 35.1 periods, but the highest pupil:teacher ratio and third highest average teacher load may pin-point fewer, under-utilised teachers.

Within Boys' Schools, the range of variation in the average curriculum load reaches as high as 40.5 periods per week to 35.3 periods. Kordufan Region, with the highest curriculum load coupled with the highest teacher load and the lowest pupil:teacher ratio, may indicate that experienced teachers are mostly hired and better utilised. While the lowest curriculum load in the Central Region's Boys' Schools, coupled with the next highest average teacher

TABLE: 8.22

Average Curriculum Load by Region and Kind of School

Kind of School	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Girls	1	42.0274	39.6593	35.0757	39.1630	41.1459	39.3696
		2	2	5	2	9	20
		84.05	79.32	175.38	78.33	370.31	787.39
		.0870	1.9275	1.4463	1.2885	5.4629	4.5158
Boys	2	39.7898	37.9753	35.3148	40.4866	36.2796	37.2276
		4	2	8	4	10	28
		159.16	75.95	282.52	161.95	362.80	1042.37
		5.1068	1.6412	3.5309	1.2423	3.2568	3.7338
Column Total		40.5357	38.8173	35.2229	40.0454	38.5847	38.1201
		6	4	13	6	19	48
		243.21	155.27	457.90	240.27	733.11	1829.76
		4.1212	1.7554	2.8257	1.3135	4.9798	4.1703

load and the highest pupil:teacher ratio, implies better utilisation of teachers but poor organisation of the teaching process - in spite of the use of additional periods (Table 8.12).

In Girls' Schools in the Northern and Eastern Regions and Khartoum, the curriculum load is higher and above the national average which implies better organisation of the teaching process in this kind of schools. However, it is slightly better organised in Boys' Schools in the Central and Kordufan Regions.

It is important to note the lowest average curriculum load of the Central Region in both kinds of schools in spite of using additional periods; this needs further investigation. However, Khartoum has the worst organisation of teaching in Boys Schools, after the Central Region. Coupled with the higher average teacher load and the higher pupil:teacher ratio, it indicates either fewer, better utilised teachers or fewer young, inexperienced staff.

Summing up this table, it is evident that the Girls' Schools have better organisation of teaching operation than Boys Schools, in spite of employing fewer additional periods in the relevant regions. However, in this kind of school more teachers are hired but under-utilised. The detailed analysis of teachers' qualifications and seniority may illuminate the real situation.

Concluding the analysis of the determinants of unit costs on teachers' salaries, many interesting findings may be cited. Average teacher salary is definitely related to other factors outside the school control and is determined by aspects other than the quantity or quality of work done; hence the new approach in the USA for a compensation structure based directly on what teachers know and can do, not indirectly on their education and experience. It should be noted that its low value in real terms has an adverse effect on the organisation and the teaching process in schools, reflected by the limited number of hours actually taught and the range of options available for final grade pupils coupled, oddly, with a light teacher average load -

which implies either under-utilisation of the available teachers, or that they are occupied by activities or jobs other than their professional duties. Taking all these into consideration, the adoption of paid additional or extra periods indicates a shortage of teachers with much needed expertise. It should be mentioned that, in spite of the lower costs of these paid periods, many types of schools in the various regions and locations cannot raise the average curriculum load to even the national average; let alone the official or the 'typical' in this level of education. However, if the extra periods are undertaken by the school staff, it may have an adverse effect as a result of overloading an already limited staff. On the other hand, if part-time teachers are entrusted to bear this responsibility, serious concern is raised about their commitment and attentiveness towards their students. The next chapter (on teachers' qualifications, training and years of experience) may shed more light on the position of teachers on the salary scale and hence on the level of average teacher salary and the average teacher load required.

The next indicators to be analysed are those of the unit costs on workers' wages. Although these are not educational indicators as such, they are parameters of educational costs. Unit costs on workers' wages represents a heavy burden on salaried items; absorbing a share almost equivalent to that of the school administration. As it claims such a high percentage of very limited resources, it is of paramount importance to study its determinants and investigate their indicators. Whether these are the average worker's wage, the number of pupils per worker, or other factors out of the school control, may be revealed below.

However, this may be an abnormal situation - unparalleled, as the literature review demonstrates. In developed countries, there is always a caretaker and a limited number of cleaners working on hourly payment, and in most developing countries the salaried item is dominated by teachers' costs. Empirical studies on education costs

demonstrated the usefulness of these cost indicators which help to reveal the characteristics of total and unit costs. "Thus there are strong arguments for regularly constructing and examining these indicators" (Tsang, 1988), and even identifying new ones. Briefly, the close analysis of each input, "can be justified on the grounds of more informed control over public expenditure" (Cumming, 1971); taking into consideration that one of the objectives of costs analysis is a reduction of per pupil costs without foregoing the quality of education provided.

8.7 Average Worker's Wage:

As mentioned earlier in this chapter, the 'Job Evaluation and Classification Project' resulted in a single, uniform salary scale for all the Central and Regional Governments' employees as from 1978. The unclassified staff, or 'blue-collar' manual workers' starting pay begins at the bottom of the salary scale, the 18th echelon. School-workers belong to this category of public employees and their starting minimum wage is the 18th grade, from which they are promoted up to the 10th scale. As members of the national 'Workers Union', school workers enjoy all the fringe benefits and allowances that their Union's bargaining power has gained through the years. The Workers Union has been represented in all pay review committees since independence in 1956. The ILO Report (1986) observed that "... in practice, the Trade Unions were able to influence the ultimate recommendation and decisions". Hence, the minimum wage increased from £s 13.90 in 1970 to £s 300.00 in 1985 owing to this pressure. Due to the high rate of inflation the pay of central and regional governments' employees has fallen dramatically in real terms over the past decade. In spite of a package of improvements in the salary scale and the newly introduced allowances, the gross salary level fell by 60-70% between 1978 and the final increases of the package in July 1986 (ILO Report, 1986).

Taking 1970 as the base year, Table 8.23 below demonstrates the rise in minimum wage through the years, the increase in the respective cost of living index, and the supposedly equivalent wage that ought to be offered to workers according to the respective index. This table reveals clearly how actual minimum wages in the public service have drastically declined over the years.

It is worthy of note that the continued pay revision efforts did not only fail to achieve the 'promised' rise in the standard of living but could not even maintain the status quo that prevailed almost two decades ago. However, these were the official cost of living indices (which are below the actual cost of living) in which the 'Black Market' played the major role. Other corrective measures were the set of allowances introduced and the annual increment - more often twice the basic wage. However, these allowances are

Table 8.23

Year	Min. Wage in £s (1)	Cost of Living Index	Supposed Wage in £s (2)	% of (1) over (2)
1970	13.90	10.0	13.90	100
1978	28.00	314.9	43.77	63.97
1983	42.50	1059.9	147.33	28.85
1985	60.00	2060.6	286.42	20.95
1986	60.00	2673.1	371.56	16.15
1988	60.00	4998.8	694.84	8.64

Source: Compiled from the Economic Survey 1988/89, Kaballo, 1986 and the Salary Scales Tables for these Periods.

housing, transport and a 'job nature' allowance. It is important to note that the £s 20 housing allowance for the workers' starting scale (18th) would not rent a single room in any of the big towns where the great majority of public workers live. The high cost of renting a house is one of the main reasons that attracts senior workers to Boarding, and Day and Boarding Schools, where a considerable number - if not all - workers are housed in exchange for their 'housing allowance' only.

Another measure which acted as a 'sweetener' to public employment among workers is the 'overtime work' wage. Increase in 'overtime' hours and payment, even without an emergency case, is common. The Public Service Act (1987) says that "... the employer, in pressing imminent emergency may ask the worker to do over-time work for a period not exceeding four hours and except in cases of imminent emergency the overtime work shall be by an agreement of the two parties". Such actions may be justified by the fact that, although the rise in the basic minimum wage was at the rate of 9.2%, the inflation rate, at 9.7%, was higher (Kaballo, 1986). Despite this, "employment in the public sector, even with the present reduced real pay levels is still much sought after by many people" (ILO Report, 1986). That may not seem so strange if one knows that almost all workers have other employment, either within the school, especially in the Boarding School Type, or outside the school.

Nevertheless, more relevant to the theme of this thesis is that the average wage from the public purse constitutes a heavy burden on an already very restricted budget. Thus the various factors that influence it in the different regions, locations, types and kind of schools have to be analysed carefully. Although the average wage may not be directly attributable to the variation in unit costs on workers' wages, yet the higher the average wage, the higher the per pupil costs, at the lowest for the similar size schools, other things being equal. The following discussion shows the variation in the average worker's wage, how they relate

to unit costs on worker's wage and whether there is a systematic policy regarding all salaried personnel, for instance, teachers' salaries.

8.7.1 Average Worker's Wage Analysis by Region and Size of Schools:

Table 8.24 reveals that the national average worker's wage is £s 2,094.24; almost one third of a teacher's average salary. The mean average worker's wage by size indicates that the Large Schools have the highest average wage, £s 2,261.17, as expected, but the Medium Size has the lowest, £s 1,987.74. This same pattern is observed in the average teacher's salary, Table 8.2, which may indicate a close relationship between teachers' salaries and workers' wages.

Inter-regional mean analysis shows that the highest average worker's wage is in Khartoum, £s 2,256.92, almost 1.2 times the lowest in Kordufan, £s 1,914.56; Khartoum workers are better paid than the teachers.

Regional variations in the average worker's wage are considerable in all schools sizes. In the Small and Medium Schools Khartoum highest average wage, £s 2,268.19, and the Eastern Region's, £s 2,221.20, are 1.3 times and 1.2 times as high as the respective wages in the Central Region. However, within Large Schools, disparity is even larger, Central Region highest wage, £s 2,464.26, is 1.4 times the lowest in Kordufan, £s 1,710.83.

Within individual regions discrepancies in average wage are limited; larger in Central Region and Khartoum.

8.7.2 Average Worker's Wage Analysis by Region and Location of Schools:

Table 8.25 displays that, strangely enough, the highest mean average worker's wage is in the Rural area (£s 134.05), followed by the Urban Sector; both above the national average wage. The lowest mean wage (below the national average) is in the Semi-Urban Sector (£s 1575); a difference of 35.5%. The highest per unit costs on workers' wage

TABLE: 8.24

Average Worker Wage (£s) by Region and Size of School

School Size / REGION	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 up to 400 pupils	2156.7950	1833.7500	1715.0357	1955.7692	2268.1860	2023.3986
	2	1	4	1	5	13
	4313.59	1833.75	6860.14	1955.77	11340.93	26304.18
	19.0141	.	244.0240	.	207.2043	303.7027
2 401 to 800 pupils	1869.0155	2221.2000	1859.7464	1955.8215	2165.8182	1987.7420
	3	1	5	4	5	18
	5607.05	2221.20	9298.73	7823.29	10829.09	35779.36
	269.3553	.	292.3977	24.1814	713.5949	410.6703
3 over 800 pupils	2003.5000	2078.5554	2464.2643	1710.8250	2301.2674	2261.1706
	1	2	4	1	9	17
	2003.50	4157.11	9857.06	1710.82	20711.41	38439.90
	.	66.7640	774.5823	.	304.3503	444.4697
Column Total	1987.3561	2053.0152	2001.2255	1914.9801	2256.9172	2094.2383
	6	4	13	6	19	48
	11924.14	8212.06	26015.93	11489.88	42881.43	100523.44
	221.4314	165.4543	548.1698	101.7540	408.8922	409.4064

TABLE: 8.25

Average Worker Wage (£s) by Region and Location of School

Location	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban		1987.3561 6 11924.14 221.4314	2053.0152 4 8212.06 165.4543	2189.6145 8 17516.92 588.1552	1955.8111 5 9779.06 20.9417	2222.6245 16 35561.99 366.9709	2128.0554 39 82994.16 371.1146
2 Semi-urban			1575.0000 3 4725.00 25.6320				1575.0000 3 4725.00 25.6320
3 Rural			1887.0081 2 3774.02 572.7680	1710.8250 1 1710.82 .	2439.8119 3 7319.44 659.6550	2134.0462 6 12804.28 596.6578	
Column Total		1987.3561 6 11924.14 221.4314	2053.0152 4 8212.06 165.4543	2001.2255 13 26015.93 548.1698	1914.9801 6 11489.88 101.7540	2256.9172 19 42881.43 408.8922	2094.2383 48 100523.44 409.4064

(Table 7.22) in the Urban Centres and the next highest in the Rural area may not be explained solely by the respective average worker wages; other indicators may have contributed to this. The lowest unit expenditure on workers' wages in the Semi-Urban area (Table 7.22) can be explained by the lowest average worker wage, which may be supported by other indicators, as further analysis may indicate.

In the Urban location, Khartoum and the Central Region (Table 8.25) have the highest average wage above the national average and locational mean, while Kordufan, Northern and Eastern Regions have the lower average wage; below both averages. However, Khartoum (the next lowest) and the Central Region's lowest per pupil costs on workers' wage (Table 7.22) cannot be attributed to the highest and next highest average wage. The interaction of other indicators - as will be revealed later - may be responsible for these levels of unit expenditure. Similarly, the highest unit costs on workers' wage in the Northern Region (Table 7.22) cannot be explained by the next lowest average wage. Analysis of other indicators on unit expenditure on workers' wages may cast light on the situation.

In the Rural area the discrepancy between Khartoum's highest average worker's wage (£s 2439.81) and Kordufan's lowest wage (£s 1710.83) is even greater: 42.6%. However, the highest average wage in Khartoum can be attributable to the highest per pupil costs in workers' wages (Table 7.22), though the lowest wage in Kordufan may not be responsible for the next highest pupil costs on workers' wage. Similarly, the lowest per unit costs on workers' wage (Table 7.22) in the Central Region cannot be attributable only to the next lowest average wage. Further indicators may give a clearer view.

Table 8.25 demonstrates that the Central and Kordufan Regions have their highest average worker's wage in the Urban Sector, whereas the lowest in the Central Region is in the Semi-Urban area and in Kordufan in the Rural location; a difference of 39% and 14.3% respectively. It is clearly evident that the highest unit costs on worker's wages in the

Central Region, Kordufan and Khartoum can be attributable to the highest average worker's wage in these Regions.

It is interesting to note that in the Central Region Urban Sector, the highest average teacher salary (Table 8.3) corresponds to the highest average wage; whereas in the Northern Region the next highest teacher salary correlates with the next lowest workers' wage. Similarly, Kordufan Rural area schools have the highest average teachers' salary, but the lowest average worker wage. Khartoum, however, is peculiar in having a middle (in-between) average salary in Urban and Rural areas, which corresponds to the highest average wage in both locations.

In summing up, it should be noted that the average worker's wage is almost one-third that of the average teacher's salary. Variation between the Rural and Urban Sectors is minimal, but extremely wide between Rural and Urban on the one side and Semi-Urban areas on the other. Within both the Urban and Rural Sectors, Khartoum has the highest average wage; whereas Kordufan has the lowest wage. Within the regions, the Central and Kordufan Regions have the highest average wage in the Urban Sector, whereas Khartoum favours workers in the Rural schools. Discrepancy within these regions is highest in the Central Region and lowest in Khartoum.

Average worker's wage is found to be more relevant in explaining within regions variations, than inter-regional. However, there appears to be a pattern in the policy of salaries and wages: in some regions it is systematic, in others contradictory.

8.7.3 Average Worker's Wage Analysis by Region and Type of Schools:

As Table 8.26 reveals, the mean average worker wage is highest in Day Schools (£s 2190.40), higher than the national average, and lowest in the Boarding Schools Type, far below the national average: a difference of 24.5%. The same pattern is followed by the average teacher's salary in these types. Whereas the Day Schools' highest average wage

TABLE: 8.26

Average Worker Wage (£s) by Region and Type of School

Type	Mean / Count / Sum / Std Dev	Region 1 Northern Region	Region 2 Eastern Region	Region 3 Central Region	Region 4 Kordufan Region	Region 5 Khartoum	Row Total
1 Day School		2163.9004	2221.2000	2157.1973	1958.4177	2259.5699	2190.4014
		3	1	6	4	17	31
		6491.70	2221.20	12943.18	7833.67	38412.69	67902.44
		18.2271	.	729.8900	23.2259	270.3237	371.5484
2 Boarding School				2292.0162	1710.8250	1275.4286	1759.4233
				1	1	1	3
				2292.02	1710.82	1275.43	5278.27
				.	.	.	510.0333
3 Day & Boarding School		1810.8118	1996.9536	1796.7886	1945.3846	3193.3108	1953.0517
		3	3	6	1	1	14
		5432.44	5990.86	10780.73	1945.38	3193.31	27342.72
		169.5399	149.0144	303.6102	.	.	421.0980
Column Total		1987.3561	2053.0152	2001.2255	1914.9801	2256.9172	2094.2383
		6	4	13	6	19	48
		11924.14	8212.06	26015.93	11489.88	42881.43	100523.44
		221.4314	165.4543	548.1698	101.7540	408.8922	409.4064

can be attributable to its highest per pupil costs on workers' wage (Table 7.23), the next highest unit costs in the Boarding Schools and lowest costs in Day and Boarding Type may not be explained by the lowest and next lowest worker's wages only. In Day Schools, the average worker's wage in all regions is higher than the national average, except in Kordufan. These average wages may not be accountable for the respective unit costs on worker's wages in all regions.

In the Boarding Schools Type, it is interesting to note the wide variation between the average worker's wage in the Central Region (£s 2292.02) and that in Khartoum (£s 1275.43), which amounts to 79.7%. However, the highest average wage in the Central Region may be attributable to the highest per pupil costs on workers' wage (Table 7.24), but the lowest wage in Khartoum cannot be responsible for the almost identical highest per unit costs (Table 7.24). Other indicators must have contributed to the result.

Day and Boarding Type of Schools has striking variation in average wage; Khartoum highest average wage (£s 3193.31), is 77.7% over the Central Region's lowest wage (£s 1796.70). These extreme values can explain the highest per unit expenditure on workers' wage and the lowest (Table 7.24) in the respective regions.

Within regions disparities in average wage is marked in the Central and Khartoum; the highest average wage in the former Boarding Schools is 27.6% higher whereas the latter Day and Boarding Schools' is two and half times as much.

It is interesting to note that the Central Region's lowest average salary (Table 8.4), in Boarding Schools, corresponds to the highest average worker wage and the Day Schools highest average salary (Table 8.4) has the next highest average wage. This indicates that, while teachers are favoured in the Day Schools, workers are preferred in the Boarding Schools Type. In Kordufan, the highest average teacher's salary (Table 8.4) corresponds to the highest average wage in Day Schools, and the lowest average salary (Table 8.4) in the Day and Boarding Schools Type to a

middle, in-between worker's wage (which may imply an almost systematic pattern of salaries and wages). In Khartoum, however, the highest teacher's salary in the Day Schools corresponds to the next highest average wage but the lowest in the Boarding Type corresponds to the lowest average wage. This may indicate favoured teachers in the former schools, but a uniform policy for personnel pay in the latter type.

It is worth noting that Khartoum has the lowest and highest average worker's wage of all regions and types of schools.

Summing up, it is noticeable that there is considerable variation by type and within types in the average worker's wage. Though limited within Day Schools, the discrepancy is remarkably large within the Boarding and Day and Boarding Schools Types. Average worker's wage may be accountable, with or without other indicators, for the level of unit costs on workers' wages in all types of schools in the Central Region and Kordufan, but only the Day Schools in the Eastern Region and the Day and Boarding Schools in Khartoum. There appears to be a systematic pattern of salaries and wages policy in some regions in some types of schools.

8.7.4 Average Worker's Wage Analysis by Region and Kind of Schools:

Table 8.27 shows that the mean average worker's wage in Boys' Schools is slightly higher than that in Girls'; only 3.9%. Though Girls' Schools average wage is below the national average, and the Boys' Schools is above it, both of them are almost identical and cluster around the average. It is noted here that the lower average worker's wage in Girls' Schools and the higher wage in Boys' Schools both explain the respective unit costs on worker's wages (Table 7.24).

In Girls' Schools the average wage varies from £s 2243.47 in Khartoum to £s 1807.51 in the Central Region; a discrepancy of 24.1%. This highest average wage in Khartoum cannot be attributable to the middle, in-between unit costs on workers' wage (Table 7.24). Similarly, the

TABLE: 8.27

Average Worker Wage (£s) by Region and Kind of School

	REGION					
Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Kind of School						
1 Girls	1931.3127	1979.7574	1807.5100	1949.9864	2244.5542	2048.0325
	2	2	5	2	9	20
	3862.63	3959.51	9037.55	3899.97	20200.99	40960.65
	349.0257	206.4856	282.0042	6.5079	166.3227	271.1134
2 Boys	2015.3778	2126.2731	2122.2978	1897.4769	2268.0440	2127.2424
	4	2	8	4	10	28
	8061.51	4252.55	16978.38	7589.91	22680.44	59562.79
	194.8656	134.2469	652.7831	126.5578	556.3324	487.1723
Column Total	1987.3561	2053.0152	2001.2255	1914.9801	2256.9172	2094.2383
	6	4	13	6	19	48
	11924.14	8212.06	26015.93	11489.88	42881.43	100523.44
	221.4314	165.4543	548.1698	101.7540	408.8922	409.4064

next lowest average wage cannot be responsible for the highest unit costs on workers' wage in the Northern Region. The Central Region's lowest per pupil costs on this sub-unit may be explained by the lowest average wage.

In Boys' Schools, Khartoum also has the highest average wage (£s 2269.02), whereas Kordufan has the lowest (£s 1897.48); a difference of 19.6%. Here, it is interesting that neither of these extreme values explain the respective unit costs on workers' wages. Similarly, the extreme unit costs on this sub-unit (Table 7.24) are not attributable to the respective average wages in the Northern and Central Regions. Analysis of the other indicators, number of pupils per worker and number of workers per class, may shed more light on this.

Within all regions (except Kordufan), Boys' Schools have the higher average wage. Apart from Khartoum, Kordufan and the Northern Region, where the discrepancy is less than 5%, the Eastern and Central Regions' variation amounts to 7.4% and 17.4% respectively. It is of interest that, while the Northern and Central Regions have the higher teacher salary and worker's wage in Boys' Schools, the Eastern Region equivalents have the lower average salary and the higher wage. Khartoum is similar to the latter, though Kordufan has the higher teacher salary and the lower average wage in Boys' Schools.

To sum up, it is noticeable that the average mean wage is slightly lower in Girls' Schools, though it conceals wider variations within these schools than in Boys' Schools. Discrepancy in average workers' wage is very limited within regions, except in the Central Region. It is important to note that the average wage does not seem accountable for the variations in per unit costs on workers' wage in most cases; other indicators may be responsible for that. However, some regions appear to have a systematic pattern of dealing with teachers' salaries and workers' wages.

8.8 The Average Number of Pupils Per Worker:

School workers are not hired according to the number of pupils per school but larger schools are entitled to a larger number of workers, as explained earlier. This indicator is important in determining the variation in per pupil costs on workers' wages. The higher the ratio of pupils per worker, the smaller the total wage bill and vice versa, so it is also an indicator of this category of personnel utilisation. As control of this kind of expenditure may not affect the quality of education, it is important to endeavour to curb it.

Variation in this ratio can be better explained by the socio-economic factors prevailing in specific circumstances, rather than those official norms and regulations governing recruitment of unclassified personnel in schools. In schools with a surplus of teachers, interestingly, a lower ratio of pupils per worker is often detected. This indicates that, comparatively, better equipped and established schools are preferred by all categories of personnel.

The following analysis displays the variations in the number of pupils per worker in the selected regions by size, location, type and kind of school.

8.8.1 Number of Pupils Per Worker Analysis by Region and Size of Schools:

Table 8.28 reveals that the national for this ratio, average number of pupils per worker, is 42.9. As expected in Sudan, larger schools (Medium and Large Sizes) have more service workers, above the average. Interestingly, it is the Medium School that has the largest ratio, 47.4, and coupled with the lowest average wage may explain the lowest unit costs on workers wages in this size (Table 7.21). In Small Schools, where resources are usually under utilized the lowest ratio of pupils per worker can explain the highest unit costs on workers wage whereas in Large Size, despite the highest wage, the next highest ratio may be

TABLE: 8.28

Number of Pupils per School Worker by Region and Size of School

School Size	REGION Mean Count Sum Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1		23.3167	39.8750	47.3242	25.3846	32.0000	35.4761
up to 400		2	1	4	1	5	13
		46.63	39.88	189.30	25.38	160.00	461.19
		1.1549	.	17.1966	.	9.0105	13.6994
2		32.5727	26.0588	63.5762	31.0490	57.5689	47.4277
401 to 800 pupils		3	1	5	4	5	18
		97.72	26.06	317.88	124.20	287.84	853.70
		4.7628	.	14.7723	2.9452	37.2103	24.8436
3		30.5833	39.4706	42.7006	30.6250	48.2227	43.8210
over 800 pupils		1	2	4	1	9	17
		30.58	78.94	170.80	30.63	434.00	744.96
		.	11.9792	7.5403	.	10.5643	10.5283
Column Total		29.1558	36.2188	52.1523	30.0343	46.4131	42.9134
		6	4	13	6	19	48
		174.93	144.88	677.98	180.21	881.85	2059.84
		5.5128	9.6823	15.9000	3.2283	21.6621	18.2290

accountable for the next lowest per pupil costs on workers wages. Regional mean analysis shows that the Central Region highest (52.2) and the Northern Region lowest (29.2) ratios can explain the lowest and highest unit costs on workers pay in the respective regions; in spite of a lowest wage in the latter.

Within each school size, variations in this ratio are striking. In the Small and Medium Sizes, the highest ratios in the Central Region (47.4 and 63.6 respectively) are twice and almost two and half times the lowest in the Northern and Eastern Regions. Even in the Large Size, where differences in resources use are usually limited, Khartoum highest ratio is 50% higher than that in the Northern Region.

Disparities in pupils worker ratios, in each region between the various sizes, are marked; while the difference is 40% in Northern, 50% in Eastern and Central, it is 80% in Khartoum.

It is important to note the large discrepancies in the distribution of this resource within the same size between regions and even in the same region. This indicates inequity of available resources and the absence of a standard criteria for their management. The analysis implies that the pupils worker ratio, rather than the average wage, seems attributable for the level of unit costs on workers wages in the different sizes of school and can explain inter-regional variations.

8.8.2 Number of Pupils Per Worker Analysis by Region and Location of Schools:

Table 8.29 reveals that the Semi-urban mean (64.7) pupil worker ratio is the highest; higher than the national average, 50.7%, and the almost identical Urban and Rural Sectors' locational mean ratios, 55.8% and 57.1% respectively. This highest ratio and the lowest average wage are accountable for the respective lowest unit costs on workers wages.

In the Urban Sector, the average number of pupils per worker varies, from as high as 48.3 in Khartoum to as low

TABLE: 8.29

Number of Pupils per School Worker by Region and Location of School

Location	Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban	Mean	29.1558	36.2188	47.1384	29.9161	48.2778	41.5114
	Count	6	4	8	5	16	39
	Sum	174.93	144.88	377.11	149.58	772.45	1618.94
	Std Dev	5.5128	9.6823	11.1015	3.5948	23.0330	17.7642
2 Semi-urban	Mean			64.6548			64.6548
	Count			3			3
	Sum			193.96			193.96
	Std Dev			23.8889			23.8889
3 Rural	Mean			53.4541	30.6250	36.4679	41.1562
	Count			2	1	3	6
	Sum			106.91	30.63	109.40	246.94
	Std Dev			18.8740	.	8.2546	13.9415
Column Total	Mean	29.1558	36.2188	52.1523	30.0343	46.4131	42.9134
	Count	6	4	13	6	19	48
	Sum	174.93	144.88	677.98	180.21	881.85	2059.84
	Std Dev	5.5128	9.6823	15.9000	3.2283	21.6621	18.2290

as 29.2 in the Northern Region; a difference of 65.6%. Khartoum and the Central Region have the larger, above-average pupils per worker ratio, whereas the Northern, Kordufan and Eastern Regions have a smaller, well-below average number. However, in Khartoum the highest pupils per worker ratio, despite the highest average wage (Table 8.25), can be accountable for the next highest unit expenditure on worker's wage (Table 7.22). The highest unit costs on this component in the Northern Region may be attributed to the extremely low number of pupils per worker - in spite of the next lowest average wage (Table 8.25). In the Rural location the discrepancy is even wider, with a ratio of 53.5 in the Central Region and 30.6 in Kordufan, the difference in the number of pupils per worker amounts to 74.5%. The lowest unit costs on workers wages in the Central Region (Table 7.22) may be explained by the highest ratio, despite the next lowest wage (Table 8.25). Kordufan, with the next highest per pupil costs on worker's wage (Table 7.22), may attribute this to the lowest pupils worker ratio, despite having the lowest average wage (Table 8.25).

Within regions analysis indicates that, whereas Kordufan has an almost identical pupils per worker ratios in Urban and Rural areas, Khartoum has the higher ratio in the Urban Sector; a difference of 32.4%. It is interesting to note that, in spite of the identical ratios in Kordufan, unit costs vary (apparently due to the variation in average wage (Table 8.25). Khartoum's high pupils per worker ratio and lower average wage (Table 8.25) correspond to the lower unit costs on workers wages (Table 7.22). Conversely, the Central Region has the smallest ratio of pupils per worker in the Urban Sector and the largest in the Semi-Urban; a difference of 37.2%. It is observed that in each location in the Central Region the average wage (Table 8.25) and the pupils per worker ratio together are accountable for the respective per unit costs on workers wages (Table 7.22).

In summary, it is evident that the Semi-Urban location has the highest ratio of pupils per worker, though exclusive to the Central Region. The almost identical Urban and Rural

locations means disguise the wide variations within these locations in the pupils worker ratio, which are even wider in the Rural areas. The average pupils worker ratio can explain most of the respective unit costs on workers wages in many cases.

8.8.3 Average Number of Pupils Per Worker Analysis by Region and Type of Schools:

Table 8.26 shows considerable variation by type of schools. The highest pupils worker ratio (above the national average) is in the Day and Boarding Type (48.3), and the smallest number in the Boarding Type (31); a difference of 55.7%. In the Day and Boarding Schools, the highest pupils worker ratio can be accountable to the lowest unit expenditure on workers wages, though it corresponds to the middle next lowest average wage. In the Day Schools Type, Khartoum's pupils worker ratio (48.1) is almost twice that of the Northern Region (24.8). It should be noted that while Khartoum and the Central Region have a higher pupil worker ratio (above and around the national average), the Northern, Eastern and Kordufan Regions have extremely small ratios. However, the lowest costs per pupil on this component, in the Central Region (Table 7.23), may be accounted for by the next highest pupils worker ratio and the next lowest average wage (Table 8.26).

In the Boarding Schools Type, the Central Region has the highest ratio (40.1), while Khartoum has the smallest (22.3); a difference of 79.6%. Strangely enough, this marked disparity in the pupils per worker ratio observed in the Central Region and Khartoum correspond to identical unit costs on workers' wages (Table 7.23). It can be accounted for by the highest average wage (Table 8.26) in the Central Region and the lowest wage in Khartoum that balanced the extreme values.

Within the Day and Boarding Schools Type, the Central Region, with 64.1 pupils worker ratio, is more than twice that in Kordufan (29.9). This highest ratio and the lowest average worker's wage (Table 8.26) can be attributable to

TABLE: 8.30

Number of Pupils per School Worker by Region and Type of School

Type	REGION Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Day School		24.7914	26.0588	42.1985	29.9240	48.0801	41.6349
		3	1	6	4	17	31
		74.37	26.06	253.19	119.70	817.36	1290.68
		2.6816	.	10.5284	4.1509	22.0811	18.9490
2 Boarding School				40.1081	30.6250	22.3333	31.0221
				1	1	1	3
				40.11	30.63	22.33	93.07
				.	.	.	8.8940
3 Day & Boarding School		33.5203	39.6054	64.1135	29.8846	42.1538	48.2926
		3	3	6	1	1	14
		100.56	118.82	384.68	29.88	42.15	676.10
		3.4121	8.4738	13.2781	.	.	17.1146
Column Total		29.1558	36.2188	52.1523	30.0343	46.4131	42.9134
		6	4	13	6	19	48
		174.93	144.88	677.98	180.21	881.85	2059.84
		5.5128	9.6823	15.9000	3.2283	21.6621	18.2290

the Central Region's lowest unit expenditure on workers' wages (Table 7.23). On the other hand, Kordufan's next highest per unit costs on this component (Table 7.23) may be accounted for by the lowest pupils worker ratio and the third lowest average wage (Table 8.26).

Intra-regional analysis demonstrates that the Northern, Eastern and Central Regions have the higher ratios in Day and Boarding Schools rather than Day Schools, whereas Khartoum, in contrast to the above, has that in the Day Schools. The discrepancy is largest, in this ratio, in the Northern Region (74%), followed by the Eastern Region (65.8%) and then Central Region (51.9%). It is of particular interest to observe that the higher the pupils worker ratio in all regions corresponds to the lower unit costs on workers wages.

To sum up, it is observed that there is a considerable variation between the three types of schools; the widest between the Day and Boarding Type and that of the Boarding Schools. Within each of these types the discrepancy is extremely large in the Day Schools, and Day and Boarding Schools, but to a lesser degree in the Boarding Schools Type.

In Khartoum, variations are extremely high between the Boarding Schools and other types; whereas it is high in the Northern, Eastern and Central Regions between the Day Schools and Day and Boarding Type. However, it is the average pupils per worker ratio, rather than the average worker's wage, that corresponds to the variations in per unit costs on workers' wages. It can be said that the pupils per worker ratio can explain the respective variations in per pupil costs, especially within regions.

8.8.4 Number of Pupils Per Worker Analysis by Region and Kind of Schools:

As Table 8.31 demonstrates, the average number of pupils per worker in Girls' Schools (46.3) is larger than that in Boys' Schools (40.5). It can be argued here that the higher pupils worker ratio in Girls' Schools and the

TABLE: 8.31

Number of Pupils per School Worker by Region and Kind of School

	REGION					
Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
Kind of School						
1 Girls	30.2275	43.9081	63.0733	32.6482	43.4127	45.9824
	2	2	5	2	9	20
	60.46	87.82	315.37	65.30	390.71	919.65
	3.5168	5.7036	16.0608	3.9083	14.5448	16.4876
2 Boys	28.6200	28.5294	45.3267	28.7273	49.1134	40.7213
	4	2	8	4	10	28
	114.48	57.06	362.61	114.91	491.13	1140.20
	6.7366	3.4939	12.1471	2.3335	27.0803	19.3698
Column Total	29.1558	36.2188	52.1523	30.0343	46.4131	42.9134
	6	4	13	6	19	48
	174.93	144.88	677.98	180.21	881.85	2059.84
	5.5128	9.6823	15.9000	3.2283	21.6621	18.2290

lower level of worker's wage are responsible for the lower unit costs on workers' wages in these schools. The opposite is also valid for Boys' Schools.

In Girls' Schools, the Central Region's largest ratio (63.1) is more than twice the lowest in the Northern Region (30.2). However, these extreme values may explain the respective lowest unit costs on workers' wages (Table 7.24) in the Central Region and the highest unit costs of the Northern Region, supported by the lowest workers' wages (Table 8.27) in the former region and despite the next lowest wage in the latter.

In Boys' Schools, the largest pupils worker ratio is in Khartoum (48.5) and the lowest in the Eastern Region (28.5); a difference of 70%. The Eastern Region's lowest ratio, however, can explain the highest per pupil costs on workers' wages (Table 7.24), despite the next highest workers' wage (Table 8.31). The highest ratio of pupils per worker, in Khartoum may not be accountable for the next lowest unit cost on this component had it not been for the highest worker's wage in this area.

Girls' Schools in all regions (except Khartoum) have the higher pupils per worker ratio. However, the discrepancy, in this ratio, between Girls' and Boys' Schools is exceedingly wide in some regions; rising to 39.2% in the Central Region and 53.9% in the Eastern Region.

In the Northern, Eastern and Central Regions the higher pupils per worker ratio, the lower the per unit costs on workers' wage, and vice versa. In contrast, Khartoum and Kordufan higher ratios corresponds to almost identical unit costs. However, it may be the effect of the lower average wage in the former regions, and the higher wage in the latter.

To summarise, it is evident that variation by kind of schools is limited, but wide within Boys' Schools and remarkably wide within Girls' Schools. Discrepancy within regions, between Girls' and Boys' Schools, although limited in the Northern Region and Khartoum, is larger in the Eastern, Central and Kordufan Regions.

To sum up the analysis on the pupil worker ratio, it is evident that there are wide variations between regions by location, type and kind of schools. Although discrepancy by kind of schools is relatively limited, it is larger by location, especially between the Semi-Urban area and Urban and Rural Sectors, and between the Day and Boarding Schools and Boarding Schools Types. Even within the regions, there is a large discrepancy in the number of pupils per worker in the various locations and between Girls' and Boys' Schools; even larger between the different types of schools. The average pupils worker ratio is found to be more relevant in explaining the variations in unit costs on workers' wage than the average worker's wage.

However, a correlation coefficient is calculated to summarise the type and strength of relationship between the total unit expenditure, the unit expenditure on teachers salaries, its determinants and indicators and the unit costs on workers wage and its determinants. Table 8.32 shows that the unit expenditure on teachers salaries has a strong, negative, highly significant relationship (at 0.001 level) with the pupil teacher ratio ($r = -0.89$), a fairly strong, negative, significant relationship (at 0.01 level) with the average teacher load ($r = -0.45$), a strong, positive, highly significant correlation (at 0.001 level) with the average curriculum load ($r = 0.65$) and, strangely enough, a fairly strong, negative, significant relationship (at 0.01 level) with the pupil worker ratio ($r = -0.37$).

On the other hand, the unit expenditure on workers wages has a strong negative, highly significant (0.001) relationship with the pupil worker ratio ($r = -0.85$). It is important to note that, contrary to average salary, average wage has a fairly strong, positive and significant (0.01) relationship with unit costs on workers pay ($r = 0.39$). Similarly, the unit expenditure on workers wages has a positive, strong, significant relationship (0.01) with the pupil teacher ratio ($r = -0.43$). The significant association between unit expenditure on teachers salaries and on workers wages on one hand and pupil worker and pupil

Table: 8.32

Correlation Coefficient

	TUE	UETS	UEWW	ATS	PTR	Cl.s	ATL	ACL	AWW
UETS	.7324**								
	SIG .000								
UEWW	.6649**	.4518*							
	SIG .000	SIG .001							
ATS	.2482	.2243	.1137						
	SIG .089	SIG .125	SIG .442						
PTR	-.6346**	-.8851**	-.4286*	.2058					
	SIG .000	SIG .000	SIG .002	SIG .160					
Cl.s	-.2097	-.1956	-.0004	.3666	.4032*				
	SIG .152	SIG .183	SIG .998	SIG .010	SIG .004				
ATL	-.4570*	-.4520*	-.3309	-.0957	.4349*	-.1080			
	SIG .001	SIG .001	SIG .022	SIG .517	SIG .002	SIG .465			
ACL	.5254**	.6461**	.3338	.1733	-.5687**	.0716	-.0743		
	SIG .000	SIG .000	SIG .020	SIG .239	SIG .000	SIG .628	SIG .616		
AWW	.1327	.2873	.3870*	.2321	-.1257	.4617**	-.2919	.0456	
	SIG .369	SIG .048	SIG .007	SIG .112	SIG .395	SIG .001	SIG .044	SIG .758	
PWR	-.6551**	-.3714*	-.8517**	.0071	.4196*	.1525	.1700	-.3695*	.0458
	SIG .000	SIG .009	SIG .000	SIG .962	SIG .003	SIG .301	SIG .248	SIG .010	SIG .757

* - SIGNIF.LE.01 ** - SIGNIF.LE.001 (2-TAILED, " . " PRINTED IF A COEFFICIENT CANNOT BE FOUND)

teacher ratios, respectively, on the other support the prior belief that well established schools with favourable pupil teacher ratios may, also, enjoy lower pupil worker ratios. However, similar to Hough's (1981) finding there is a fairly strong, positive and significant (0.01) correlation between unit expenditure on teachers salaries and that on workers wages (r = 0.45); "teachers salaries were often quite strongly correlated with other items of expenditure, and particularly with non-teacher salaries, on a per pupil basis".

As expected, the factors that influence the unit expenditures on teachers salaries and workers wages are strongly related to the global unit costs. Table 8.32 reveals the negative, strong, highly significant relationship (0.001) between the total unit expenditure and the pupil teacher ratio (r = -0.64) and the pupil worker ratio (r = -0.66) as well as the positive, strong equally significant association with the average curriculum load (r = 0.53) and the negative, fairly strong, significant relationship (0.01) with the average teacher load. These, clearly, indicate that variations in these variables, rather than the average salary, determine the level of total unit expenditure in the various contexts.

8.9 Conclusion:

In concluding the analysis on educational costs indicators, it is evident that the variations in the global unit expenditure and its components the unit costs on teachers salaries and unit costs on workers wages observed earlier, are closely related to the disparities in these sub-units determinants in the four settings; namely the size, location, type and kind of school. Interestingly, the average teacher salary does not explain the disparities in unit expenditure on teachers salaries, the major contributor to total unit costs; in many cases to the opposite - the highest average salary corresponds to the lowest costs. However, the pupil teacher ratio and its indicators: the average curriculum load, the average teacher load and class

size appeared to be attributable to the discrepancies in unit costs on teachers salaries in the majority of cases. This trend, revealed in the detailed analysis, is supported by the strong and highly significant relationship between these variables and the unit costs on teachers salaries and the total unit costs. Moreover, for the first time, the pupil worker ratio is discerned as a determinant of unit costs on workers wages and hence influence global unit costs.

The pupil teacher ratio, class size, average teacher load and average curriculum load as indicators of resource utilization and educational quality indicate wide range of variations between and even within the same region; that may imply the absence of a standard criteria followed in resource distribution and teaching/learning organisation.

CHAPTER NINE

TEACHERS' QUALIFICATIONS, TRAINING AND EXPERIENCE

9.1 Introduction:

In Islamic societies the education of both children and adults, was entrusted to religious men and women of high calibre long before secular education was introduced. 'Al Ulama' (literally translated as 'scientists') were not only knowledgeable in religious affairs but in all walks of life and, as such, influenced the characteristics of teachers thereafter. According to Beshir (1969) teachers of theology, the "Ulama" formed a distinct class from those who taught the "Koran" (feki), but both groups were accorded a high status in the community. He advocated that this was in accordance with the tradition of Islam that "learned men are the inheritors of the prophets" and "whoever teaches me a word I become his slave". Similarly, in many societies priests were traditionally the teachers of young children. Later the secularisation of education gave rise to a parallel system of general education but the inherited image and high status of the teaching profession is not basically shaken.

However, the role of teachers has long been recognised as central to the delivery as well as to the quality of education (Haddad, 1985). As early as 1966 the Special inter governmental Conference on the status of Teachers, sponsored by UNESCO, recognised "... the essential role of teachers in educational advancement and the importance of their contribution to the development of man and modern society (and was) ... concerned to ensure that teachers enjoy the status commensurate with this role". However, empirical large-scale studies in the U.S.A. such as the Coleman Report (Coleman et al., 1966) and the re analysis, later, of these data by Jencks et al. (1972) and other related research indicated a limited role of all the school inputs. Implicitly, the first Report denied the

contributing effects of the teacher variable on student achievement, although that was "... not assessed in the Coleman data, nor was there systematic observation of teachers" (Evertson, 1986). Jencks et al. (1972) was specific in concluding that "our research suggests, however, that the characteristics of a school's output depends largely on a single input, namely, the characteristics of the entering children. Everything else ... the school budget, its policies, the characteristics of teachers, is either secondary or completely irrelevant".

Similarly in the United Kingdom the school's effect was questioned, if not refuted. The Plowden Report (1967) asserted that "the influence of the home has always been known to be important, . . . it must, therefore, be expected that differences between parents will explain more of the variations in children than differences between schools". Rutter (1983) noted that all "... these conclusions were both widely quoted and interpreted as meaning that schooling had such minor marginal effects that the educational process was scarcely worth the relatively large resources poured into it". In the U.S.A. this line of thought was reflected in publications such as 'Do Teachers Make a Difference? and titles like 'How Effective is Schooling?'

More recently Orenstein (1984) noted that research studies by Ryans, Flanders, Good and Brophy have all concluded that teachers do make a difference. However, Tibi (1990) noticed that more recent research in developed countries had underlined the impact on achievement of factors linked to teachers (i.e. time for learning, determined by the length of the official school year and the proportion of time lost through teachers/students absenteeism and other factors - level of knowledge, pedagogical skills). Interestingly, Haddad (1985) found that "results of research in developing countries have been less ambiguous and more supportive of the positive effect of teacher training on teacher performance and student achievement". The large number of studies of teachers and teaching carried out in the late 1970s and 1980s confirmed

the impact of teachers on the students' experiences and on efforts to change schools. Hawley and Rosenholtz (1984) postulated teaching as "the core technology of formal education". They argued that "teachers allocate and manage students' time, set and communicate standards and expectations for student performance and, in a multitude of ways, enhance or impede what students learn". They added that there was an enormous amount of evidence that teachers had a significant impact on efforts to change schools and to modify curricula - intentionally or not. This and other large-scale studies of classroom teaching produced an accumulation of findings about the relationship between certain teaching practices and student learning. Hanushek (1989), in a more recent review of research on factors that influenced students' achievement, revealed that most studies, regardless of what other variables of school inputs were included, analyzed the effects of the main determinants of instructional expenses, mainly teachers' education and experience. He noted that direct analysis of differential effectiveness of individual teachers as reflected in differences in performance of their respective students, led to 'unequivocal findings'. "Teachers and schools differ dramatically in their effectiveness ... the formal statistical tests employed in these studies confirm that there are striking differences in average gain in student achievement across teachers" (Hanushek, 1989).

Attention now is turned from "Do Teachers make a Difference?" to "What Factors Help Teachers Make the Difference?". Evertson (1986) suggested that to examine the factors and conditions that influence the practice of teachers and increase the impact of teaching on students, one must look at the sources of learning available to teachers and at the conditions of schools as work places.

In spite of conflicting evidence on the contribution of teacher education, training and experience to school performance, there is enough empirical evidence to back prior beliefs and observed school policies that "more

education and more experience on the part of the teacher both cost more and are presumed to be beneficial" (Hanushek, 1986).

As referred to in Chapter Eight, teachers' salaries are related to and, in most cases, are directly based on, teachers' educational level and years of teaching experience. It may be appropriate to mention here that, in some cases, "teachers' salaries were pegged to the performance of their pupils set against a system of national standards in reading, writing and mental arithmetic" (Neave, 1985). This idea originated in Britain in 1861 "and its narrowness and sterility was vigorously condemned by teachers (as) payment by results led to teaching for results and for results only" (Gould, 1973). More recently it was adopted in the U.S.A., but it was found problematic and inequitable to hold the teachers responsible for student performance, which was proved by empirical research to be influenced by demographic factors beyond the school's control. Neave (1985) noted that "despite the initial appeal of its apparent procedural simplicity, though not its methodological assumptions, educational performance contracting has not been widely adopted". As it does not appear to have lived up to its early expectations (Levin 1974), the field of teachers' pay and compensation is mainly dominated by teachers' characteristics. The Joint ILO/Unesco Committee (1988) discussed the criteria used to determine teachers' salaries in member countries and reported that "... by far the most frequently mentioned criteria were the level of academic attainment, education or training (42 countries) and the length of service in the profession (25 countries)".

However, this chapter concentrates on the sources of learning opportunities available to teachers - constituting their basic qualifications, in-service training and the resultant, accumulated experience and the influences of these on teachers' salaries and, hence, unit expenditure. Each of these determinants of teachers' salaries is

discussed individually then related to the situation in the Sudan and the data from the sample schools in turn.

9.2. Teachers' Qualifications:

The importance of qualified teachers to the educational process and their influence on future generations cannot be overestimated, thus selection to the teaching profession includes not only formal qualification but takes into consideration personal merits and social adjustment. Evans (1959) noted that teaching is a complex process calling for many different abilities (personal qualities, professional qualities and social qualities) no one of which is, by itself, sufficient to ensure success. The Joint ILO/Unesco (1988) comprehensive guide lines for the selection of future teachers stated that "policy governing entry into preparation for teaching should rest on the need to provide society with an adequate supply of teachers who possess the necessary moral, intellectual and physical qualities and who have the required professional knowledge and skills".

The Sudan Education Sector Review (1977) firmly recommended that admittance to teacher-training institutes "must be subject to other considerations beside academic qualifications - namely character, general cultural standard, ability of expression, freedom from such disabilities as may hamper proper performance and a genuine desire to join the teaching profession". These personal and social skills are critical and relevant to the teacher's success in fulfilling his expected role. As Mood (1970) observed, teacher effectiveness is not only limited to student achievement but includes outcomes such as: student attitudes toward self, school and the subject area, creativity, disposition to use the subject area in the future and every student's personal development and growth in areas such as social sensitivity, self confidence, responsibility, social competence and carefully thought out personal goals.

Although there is a universal consensus on the critical importance of personal and social qualities and their

contribution to success in teaching, this chapter focuses primarily on the formal basic academic qualifications of secondary school teachers. This teacher characteristic directly influences education expenditure and school costs, which is the main theme of this thesis.

Evertson (1986) affirmed that the methods by which teachers learn to teach can have an important impact on teachers' potential effectiveness. This confirms the role of initial and pre-service education in shaping future teachers. Preparation of secondary school teachers takes place in different institutions in different countries, the most common in developed and developing are teachers' colleges and university-based establishments. Holmes (1973) observed that an American student must take a number of education courses to obtain a certificate to teach and the professional degrees which are approved for teaching certificate purposes include general education, specialized subject matter and professional courses. Traditionally, in Western Europe, a university education qualified students for a teaching profession in secondary schools; "... for many decades a University Degree was de facto and de jure a licence to teach" (I.B.E., 1983). The recruitment of such a high level of academic qualification assumes that the teacher has a complete mastery of his subject matter, which is essential to his ability to teach it. Gage (1974) noticed that the importance of the teachers' knowledge of the subject matter may vary considerably at different grade levels or in different subject matters and may depend heavily on the kinds of instructional methods used. "Investigations of teachers' knowledge of their own subject have revealed significant variance among physics teachers and among teachers of secondary school mathematics in their knowledge of the subject they were teaching ... some teachers displayed such ignorance as to throw doubt on their ability to produce understanding on the part of their pupils (Gage, 1974). Lack of pre-service training (or its inadequacy) is partially cited "for the prevalence of outdated teacher methodology employed in schools: rote

learning, emphasis on examinations and one-way exposition in which the teacher is at the transmitting end and the learner is at the receiving end" (NCERT, 1986). In the U.K., until 1973, many secondary school teachers lacked any pre-service professional training "... it was not a required aspect of teacher education" (Lomax, 1973). Nevertheless, "pre-service training is actually 'initial training' - a beginning of a lifelong experience rather than a full training for a lifelong practice " (Haddad, 1985). The Joint ILO/Unesco Committee reported that qualifications for secondary school teaching (or even the lower levels in some countries) may be obtained in one of two ways: a university degree followed by a one-year post-graduate professional training, or a three- or four-year course for a degree in education (e.g. B.Ed) in which academic subjects are taught and professional training given concurrently. In the U.K. three or four year degree courses in teachers' colleges of education are slowly being replaced by the one year Post-graduate Certificate in Education (P.G.C.E.). Hough (1991) noted that the PGCE teachers' numbers rose from 21% of all trainee teachers in 1972 to 52% in 1988. In many developing countries secondary school teacher preparation takes place in colleges of education or university-based institutions with wide variation in duration.

Recently the value of teacher preparation programmes and courses was questioned, but survived a close scrutiny. Evertson, Hawley and Zlotnik's (1985) review of thirteen studies on the subject revealed "that regularly certified teachers exceeded the performance of teachers with less formal training". Empirical studies in developing countries seem to stress the importance of teachers' preparation and certification to student achievement. The review of education production function surveys from developing countries (Schiefelbein and Simmons, 1978) found that educational certification was significantly related to pupil achievement in thirteen studies in Africa, Latin America and Asia. Avalos and Haddad's (1981) synthesis of 589 studies' results shows that higher qualifications had a positive

effect at the secondary level in Malaysia, India, the Philippines and several Latin American countries, especially for science subjects. Mackenzie (1983) drew attention to their critical significance, particularly in situations where students lack the resources to develop into independent learners; a situation which clearly can be identified with that prevailing in most developing countries. "In these countries there is hardly any institution other than the school that provides learning opportunities and instructional experiences (thus) effective learning depends heavily on classroom teacher-centred activities and on the teacher's leadership skills in managing the instructional tasks" (Haddad, 1985). Despite the great role teachers in developing countries are expected to play, they are constrained by the inadequacies of their basic qualifications and pre-service education and thus rendered ineffective.

Quantitative expansion since independence in Africa, Asia and Latin America increased demand for teachers, exceeding in most cases the output of teacher preparation institutions. Tarvin and Faraj's (1990) study of South and Southeast Asia reported that, even in the 1980s, a dominant complaint of national educational reports was the shortage of qualified teachers. They found that in periods of most rapid expansion of student population low standards of qualifications had been accepted when hiring teachers. The recruitment of underqualified teachers who received inadequate pre-service training programs with respect to either methodology or content was reported to affect the quality of teaching in these countries.

Historically, in Africa, expatriates and candidates with lower qualifications were hired to cater for teacher shortages. Nigerian secondary school teachers were expected to possess a degree but lower certificates, such as the Yaba diploma and equivalent qualifications, were accepted (Callaway and Musone, 1969). Similar situations prevailed in other African countries, for instance Uganda and Tanzania appointed non-graduates to teach in secondary schools

shortly after independence (Coombs and Hallak, 1972). The recent expansion of higher education in many developing countries improved the formal qualifications of secondary school teachers and, gradually, expatriates were replaced by qualified nationals. Empirical evidence, as cited above, shows the significant impact of schooling variables which are subject to policy control, such as teacher certification and years of education. Intuition and prior belief, supported by research findings, emphasized the importance of highly educated and professionally qualified teachers, especially in developing countries. However, Haddad (1985) declared that there is no indication that increasing the level of qualifications beyond a certain point produces better results. He particularly specified that there is "a bracket of" knowledge and skills that teachers must possess for teaching different subjects at different levels, below which they cannot teach effectively and above which additional preparation is not cost-effective. Psacharopoulos and Woodhall (1985), however, considering the unique situation in the Third World, observed that though evidence suggested that such thresholds existed for teacher qualifications, they were likely to vary among developing countries. A serious endeavour to improve the knowledge, skills and professional training of teachers would, depending on different countries' specific conditions, necessitate more expenditure and extended financing of teachers' preparation establishments. Further research should concentrate on the analysis of the costs and effectiveness of teacher preparation to assist teachers' colleges in producing the most effective teachers in the most efficient manner.

In the Sudan, teachers at this level are recruited from graduates of higher institutions. Among these only those with a 'B.Ed' degree have the necessary professional training to teach in secondary schools (National Report, 1988). The establishment of a centre to provide post-graduate training for teachers was recommended by the International Education Commission which was invited to

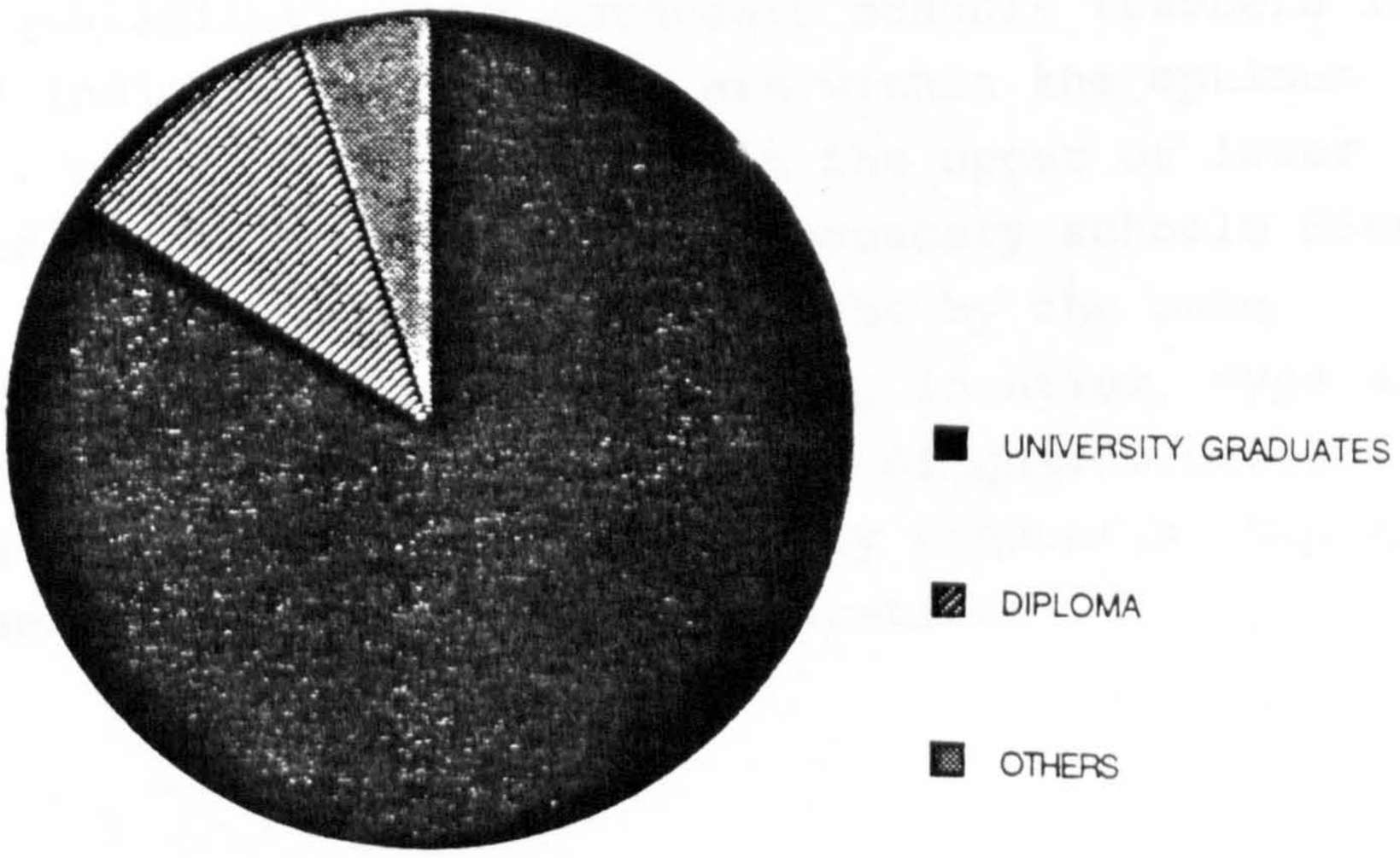
review the system of secondary education in 1955 (Sanyal and Yacoub, 1975). It was only in 1965 that the first qualified teachers graduated from the 'Higher Teachers' Training Institute of Education (HTTI). The minimum entry requirement for this sole institute which specialized in the professional training of teachers at this level, at that time, was successful completion of secondary education. All trainee teachers received a salary because they were automatically employed by the Ministry of Education on admission to the Institute. Initially HTTI conferred the 'Diploma' in education but after it became part of the University of Khartoum as "Faculty of Education" its graduates were awarded B.Ed degrees. Education Colleges (departments or faculties) specialize in professional training and teaching subject matters in 'Arts' and 'Sciences' as well as up-grading of the intermediate (lower-secondary) level teachers' academic knowledge. There is a high attrition rate among teachers with B.Ed degree qualifications; only a small percentage join the local teaching corps at this level and a high percentage of even these emigrate after a few years in the service. Nowadays the majority of secondary teachers are B.A. and B.Sc. holders, who are assumed to be competent in their subject matter but who have received no pre-service professional training. "Usually, teachers with B.A. or B.Sc degrees will be allowed later to study for the post graduate diploma in education" (National Report, 1988). However "later" has no time limit and may come too 'late' for the teacher to be able to adjust to new insight and skills which he should have acquired earlier in order to do a 'good' professional job. In the absence of adequately qualified teachers in the 1960s, quite a large number of lower calibre staff were hired during the period of rapid expansion. Most were 'diploma' holders, graduates of middle institutes, and less qualified (such as those who were dismissed at university 'intermediate level'). Unesco (1976) recommended that if such measures are inevitable in countries with a serious shortage of qualified teachers, "... they should not be

resorted to permanently, as this would undermine the efforts to promote a high standard of teaching and improve the status of teachers". These categories of teachers constitute now, a very small percentage of the teaching corps since more graduates have joined. Since the late 1970s new recruits for the teaching profession at the secondary level are required to have university or higher institutes qualifications.

Figure (9.1) shows the percentage distribution of the three classes of secondary schools teachers. The academically qualified are 'Graduates' from universities and colleges of education (holders of B.Ed., B.A. and B.Sc. degrees), 'Diploma Holders' (post secondary institutes level) and 'Other Qualifications'. This latter category includes three groups: a) trained primary school teachers, who joined the departments of home economics, physical education and art and craft in secondary schools when shortages of qualified teachers in these subjects were persistent; b) graduates of Religious Institutes at the

Figure 9.1

Distribution of Teachers by Type of Qualification



post-intermediate level who specialized in religious studies and Arabic language; 3) those who were dismissed from universities in their post-intermediate year and before graduating. As Figure 9.1 illustrates the percentage of University Graduates is 84.3. Despite this high ratio among teachers only one quarter of them had received professional pre-service training, as the sample data will reveal later. Diploma Holders and those with other qualifications constitute only a small proportion of the teaching corps (10.5% and 5.3% respectively).

This delineation by academic qualifications is crucial for placement of each category of teacher on the salary scale. As discussed earlier only graduates, according to the public service rules and regulations, are eligible for professional status, thus qualifying for the administrative-professional scale starting salary. Non-graduates, though on the same unified salary scale, are placed at a lower level and governed by the same rules and regulations. A higher percentage of these may adversely affect the level of teachers' salaries as the following discussion may disclose. It is important to relate teachers' basic qualifications, one of the determinants of the salary bill, to teachers' average salary and investigate the effect of this characteristic on unit cost on teachers' salaries and, hence, on the per pupil costs.

Analysis of the sample schools' data on the basic academic qualifications of secondary schools teachers in Sudan may indicate whether they are within the optimum 'bracket', mentioned earlier, or at the upper or lower 'threshold'. The analysis of the secondary schools data on teachers' basic qualifications would be by the same explanatory variables as before (size, location, type and kind of schools), for the three types of qualifications indicated in this sequence: University Graduates, Diploma Holders and those with Other Qualifications.

9.2.1 Analysis of Teachers' Basic Qualifications by Region and Size of School:

Table 9.1 displays that the national average of secondary school teachers with university degrees is 84.3%, whereas only 10.5% are diploma holders and 5.3% are under qualified. It may indicate that the vast majority of teachers at this level possess the necessary basic qualification. This can explain why upper-secondary school teachers' salaries are almost twice those in intermediate (lower secondary), and more than three times those in primary schools (Salih, 1986). The recognised variations in the percentages of these three classes of teachers can be accountable for the discrepancies in the average teacher's salary; among and within the regions, as each category is positioned differently in the salary scale according to the respective qualification. However the low ratios of under-qualified and unqualified indicate that these categories of teachers are gradually being replaced. It should be noted that the largest school size has the highest mean ratio of graduate teachers (86.8 percent), the lowest mean ratio of under-qualified (8.4%), and a lower mean percentage of unqualified staff (4.8%) which can explain the highest mean average teacher's salary in this size (Table 8.2). Interestingly, the regional mean ratios of each level of qualification are similar and cluster around the national averages. Nevertheless, the highest percentages of qualified staff in the Northern Region and the lower ratio of non-graduates may account for its highest average salary. In the Eastern Region, the opposite situation prevails.

The disparities in the percentage of university graduates among the regions in all school sizes are limited. They are all around the national average, except in the Central and Eastern Regions. In the Small and Medium School Sizes variations in this category of teachers are quite marked. Kordufan (94.4%) is 1.4 times that in the Central Region (70.1%), whereas in the latter size the Northern Region (89.4%) is 1.2 times as high as the Eastern Region (76.9%). The disparities among regions in the ratios of

Table: 9.1

Percentage of Teachers who are University Graduates, Diploma Holders, and with Other Qualifications by Region and Size of Schools.

Size of Schl	Level of Qualifs	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Up to 400 Pupils	Univ Graduates	83.5 (3.2)	77.8 (.)	70.1 (13.3)	94.4 (.)	83.4 (6.3)	79.7 (10.8)
	Diploma Holders	6.7 (0.6)	11.1 (.)	21.7 (7.3)	5.6 (.)	11.9 (6.7)	13.6 (8.1)
	Others	9.8 (3.7)	11.1 (.)	8.3 (7.5)	5.6 (.)	4.8 (4.8)	7.2 (5.3)
401 to 800 Pupils	Univ Graduates	89.4 (12.5)	76.9 (.)	85.7 (5.4)	83.6 (5.7)	85.1 (6.7)	85.2 (7.0)
	Diploma Holders	7.8 (7.7)	15.4 (.)	10.0 (3.5)	11.1 (3.9)	10.0 (5.3)	10.2 (4.7)
	Others	2.8 (4.8)	7.7 (.)	3.6 (2.4)	5.3 (2.1)	4.9 (3.0)	4.4 (2.9)
Over 800 Pupils	Univ Graduates	84.4 (.)	85.9 (3.6)	89.6 (7.7)	85.7 (.)	86.2 (3.5)	86.8 (4.6)
	Diploma Holders	11.1 (.)	8.8 (0.7)	8.4 (6.4)	4.1 (.)	8.5 (3.1)	8.4 (3.8)
	Others	4.4 (.)	5.3 (4.3)	2.0 (1.5)	10.2 (.)	5.3 (2.3)	4.8 (2.9)
Column Total	Univ Graduates	86.6 (8.6)	81.6 (5.3)	82.1 (11.9)	85.8 (6.2)	85.1 (5.1)	84.3 (7.9)
	Diploma Holders	8.0 (5.2)	11.0 (3.1)	13.1 (8.0)	9.0 (4.5)	9.8 (4.8)	10.5 (5.8)
	Others	5.4 (4.9)	7.4 (3.7)	4.5 (4.9)	6.2 (2.6)	5.1 (3.1)	5.3 (3.8)

* Standard Deviation in Parenthesis.

under- and unqualified teachers in all school sizes are striking. Central Region's percentage of under-qualified in the smallest size (21.7%) is almost four times that in Kordufan (5.6%), and Kordufan's ratio of unqualified staff in the largest size (10.2%) is five times that in the Central Region (2%). This reflects how each region tried to satisfy an increasing social demand for this level of education at a time of teacher shortages. However, in each school size, the highest percentage of qualified teachers does not reflect the highest average salary; discussions of other teacher characteristics may explain this.

Variation in the percentage of graduate teachers in individual regions is more restricted, except in the Central Region. In the largest school size, the Central Region's ratio of graduate teachers (89.6) is 1.3 times that in the smallest size (70.1). Disparities within all regions in the ratios of diploma holders and other qualifications are more marked, except in Khartoum, which may indicate an inefficient overall distribution of teaching staff. Most regions have the highest ratios of qualified staff in the largest schools, except Kordufan, which is in line with the level of average teachers' salary in this size (Table 8.2), as expected.

9.2.2 Analysis of Teachers' Basic Qualifications by Region and Location of Schools:

In the Urban Sector, as Table 9.2 shows, the locational mean ratio of each level of qualification is identical to the national average, whereas in the Semi-urban Centres the percentage of graduate staff is slightly below, and those of other categories are slightly above, the national average; contrary to the situation in the Rural areas. Surprisingly, the average teacher's salary in the Rural area (Table 8.3) is the lowest though the Urban Sector, with an average mean percentage of qualification, retains the highest average salary. Further discussion may cast light on this issue.

Inter-regional analysis demonstrates that, in the Urban Centres, variations between regions in all classes of

Table: 9.2

Percentage of Teachers who are University Graduates, Diploma Holders, and with Other Qualifications by Region and Location of Schools.

Loc. of Schl	Level of Qualifs.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Urban	Univ Graduates	86.6 (8.6)	81.6 (5.3)	82.1 (10.0)	85.8 (6.9)	84.5 (5.3)	84.2 (7.0)
	Diploma Holders	8.0 (5.2)	11.0 (3.1)	13.5 (7.8)	10.0 (4.2)	10.1 (5.1)	10.5 (5.5)
	Others	5.4 (4.9)	7.4 (3.7)	4.0 (2.5)	5.3 (1.9)	5.4 (3.1)	5.3 (3.2)
Semi Urban	Univ Graduates			78.3 (20.9)			78.3 (20.9)
	Diploma Holders			13.4 (12.0)			13.4 (12.0)
	Others			8.3 (9.2)			8.3 (9.2)
Rural	Univ Graduates			87.7 (4.3)	85.7 (.)	88.2 (1.7)	87.6 (2.4)
	Diploma Holders			11.2 (6.0)	4.1 (.)	8.5 (3.0)	8.7 (4.2)
	Others			1.2 (1.6)	10.2 (.)	3.3 (2.9)	3.7 (3.9)
Column Total	Univ Graduates	86.6 (8.6)	81.6 (5.3)	82.1 (11.9)	85.8 (6.2)	85.1 (5.1)	84.3 (7.9)
	Diploma Holders	8.0 (5.2)	11.0 (3.1)	13.1 (8.0)	9.0 (4.5)	9.8 (4.8)	10.5 (5.8)
	Others	5.4 (4.9)	7.4 (3.7)	4.5 (4.9)	6.2 (2.6)	5.1 (3.1)	5.3 (3.8)

* Standard Deviation in Parenthesis.

teachers are very limited, all holding around the national average. Although the Rural Areas have equal percentages of graduate teachers, there are marked disparities in the ratios of under- and un-qualified categories. Kordufan Region is almost a third of Central Region's in the former category, whereas the Central Region is nearly a ninth of Kordufan's in the latter.

Inter-location variation in percentage of graduate teachers is minimal, but the ratios of under- and unqualified teachers differ markedly. The Central Region's highest ratio of teachers with post-graduate qualifications in the Semi-urban (8.3%) is almost seven times that in the Rural areas. In Kordufan the ratio of under qualified teachers in the Urban Centre is more than two and a half times that in the Rural areas, but the Rural areas' ratio of unqualified staff is twice that in the Urban Centre.

The Rural areas have the highest percentage of qualified staff within the Central Region and Khartoum; an unusual phenomenon in developing countries. Chivore (1985) reported that only 13.6% of the teachers in Government Rural day secondary schools in Zimbabwe in 1984 were graduates.

Interestingly, it is the Urban Sector, with the lower percentage of graduate teachers in the Central and Eastern Regions and Khartoum, that has the higher average teacher's salary; contrary to the situation in the Rural areas of these regions. Other teachers' characteristics may be attributable to these discrepancies.

9.2.3 Analysis of Teachers' Basic Qualifications by Region and Type of Schools:

Table 9.3 illustrates that the mean ratios of each level of qualification in the three types of schools are identical and all cluster around the national average. It is important to note that the identical percentage of graduates in Day Schools and in Boarding Schools types identifies with the highest average salary (Table 8.4) in the former type but, in the latter, with the lowest pay. In

Table: 9.3

Percentage of Teachers who are University Graduates, Diploma Holders, and with Other Qualifications by Region and Type of Schools.

Type of Schl	Level of Qualifs	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Day Schl	Univ Graduates	88.1 (8.3)	76.9 (.)	77.3 (16.1)	84.2 (6.9)	85.7 (4.7)	83.8 (8.8)
	Diploma Holders	5.4 (2.4)	15.4 (.)	16.3 (10.6)	11.2 (3.8)	9.4 (4.6)	10.8 (6.5)
	Others	6.6 (6.3)	7.7 (.)	6.4 (6.5)	6.0 (1.2)	5.0 (3.2)	5.6 (4.0)
Brdg Schl	Univ Graduates			90.7 (.)	85.7 (.)	75.0 (.)	83.8 (8.0)
	Diploma Holders			7.0 (.)	4.1 (.)	17.9 (.)	9.6 (7.3)
	Others			2.3 (.)	10.2 (.)	7.1 (.)	6.6 (4.0)
Day and Brdg Schl	Univ Graduates	85.2 (10.5)	83.2 (5.3)	85.5 (4.9)	92.1 (.)	86.4 (.)	85.5 (5.9)
	Diploma Holders	10.6 (6.4)	9.6 (1.4)	10.9 (3.8)	5.3 (.)	9.1 (.)	10.0 (3.8)
	Others	4.3 (4.2)	7.3 (4.5)	3.0 (2.6)	2.6 (.)	4.6 (.)	4.3 (3.4)
Column Total	Univ Graduates	86.6 (8.6)	81.6 (5.3)	82.1 (11.9)	85.8 (6.2)	85.1 (5.1)	84.3 (7.9)
	Diploma Holders	8.0 (5.2)	11.0 (3.1)	13.1 (8.0)	9.0 (4.5)	9.8 (4.8)	10.5 (5.8)
	Others	5.4 (4.9)	7.4 (3.7)	4.5 (4.9)	6.2 (2.6)	5.1 (3.1)	5.3 (3.8)

* Standard Deviation In Parenthesis.

both cases later discussion of other teachers' characteristics may give a better explanation.

Note that discrepancy in the percentage of graduate teachers within each type of school is limited but extremely large in the ratios of under- and unqualified teachers. The percentage of under qualified staff in Day Schools in the Central Region is three times that in the Northern Region; in Boarding-schools Khartoum's ratio is more than four times that in Kordufan and, in Day and Boarding Schools, Central Region is twice that in Kordufan. On the other hand the level of unqualified staff in Kordufan's Boarding type is more than four times the Central Region's and in the Eastern Region's Day and Boarding Schools almost three times that in Kordufan.

Variations within each region in the percentage of graduate teachers are restricted, but extremely wide in the ratio of under qualified in all regions whereas, in the Central Region and Kordufan, the ratios of unqualified staff also differ markedly. In some regions the highest percentage of qualified teachers matches the highest average salaries, as in Northern and Eastern Regions, whereas, in Khartoum, only the lowest qualification is congruent with the lowest average salary. Surprisingly, in the Central and Kordufan Regions, the highest percentages of graduate teachers reflect only the lowest average salaries. Further analysis may clarify the situation.

9.2.4 Analysis of Teachers' Basic Qualifications by Region and Kind of School:

As Table 9.4 demonstrates, the mean percentages of graduate teachers, under- and unqualified staff in Girls' and Boys' Schools are similar to each other and almost identical to the national average. It is worth recording that these percentages are matched by different average mean salaries. Discussion of teachers' other characteristics may cast light on this issue.

Table: 9.4

Percentage of Teachers who are University Graduates, Diploma Holders, and with Other Qualifications by Region and Kind (gender) of Schools.

Kind of Schl	Level of Qualifs	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Girls Schl	Univ Graduates	86.2 (15.8)	83.1 (7.5)	84.6 (6.1)	86.1 (8.6)	84.0 (5.2)	84.5 (6.3)
	Diploma Holders	9.7 (9.9)	10.2 (1.3)	12.7 (4.4)	9.3 (5.7)	11.9 (5.0)	11.4 (4.8)
	Others	4.2 (5.9)	6.7 (6.2)	2.1 (1.9)	4.7 (2.9)	4.1 (2.6)	3.9 (3.1)
Boys Schl	Univ Graduates	86.9 (6.4)	80.1 (4.5)	80.6 (14.6)	85.6 (6.3)	86.1 (5.0)	84.1 (9.0)
	Diploma Holders	7.1 (3.0)	11.9 (5.0)	13.4 (9.9)	8.9 (4.8)	7.9 (3.8)	9.8 (6.4)
	Others	6.0 (5.2)	8.0 (0.5)	6.1 (5.6)	6.9 (2.5)	6.0 (3.3)	6.3 (4.0)
Column Total	Univ Graduates	86.6 (8.6)	81.6 (5.3)	82.1 (11.9)	85.8 (6.2)	85.1 (5.1)	84.3 (7.9)
	Diploma Holders	8.0 (5.2)	11.0 (3.1)	13.1 (8.0)	9.0 (4.5)	9.8 (4.8)	10.5 (5.8)
	Others	5.4 (4.9)	7.4 (3.7)	4.5 (4.9)	6.2 (2.6)	5.1 (3.1)	5.3 (3.8)

* Standard Deviation in Parenthesis.

It is evident that variations by kind of school in the percentage of the three levels of qualifications are minimal among and within the regions.

It is notable that the Northern Region has the highest percentage of graduates in both Girls' and Boys' Schools but the Eastern Region has the lowest in both kinds. That is matched by the relevant average salaries in both Regions, indicating that basic qualifications in these schools is the determinant of salary level. The percentage of graduate teachers is almost identical in both kinds of schools in the Northern Region, but higher in Girls' Schools in the Eastern, Central and Kordufan Regions whereas, for Boys' Schools it is higher in Khartoum. However, the level of average salary behaves differently (Table 8.5).

It is noticeable that Girls' Schools have more qualified teachers in three regions and an identical percentage to that in Boys' Schools in the fourth. However the higher level of salaries in Boys' Schools (Table 8.5) indicates that other teacher characteristics influence their levels, as further discussion may indicate.

Summing up the discussion on Teachers' basic academic qualifications it is important to note that the variation in university graduate percentages is very limited by mean type of schools and mean kind of schools and considerably by location of schools, especially within the Semi-urban Sector. Percentages of under qualified and unqualified staff are comparatively small but their level differs markedly among and within regions in all sizes, locations, types and kind of schools. It is noticeable that the levels of academic qualifications do not reflect the respective levels of average salary in the various regions in the different contexts. This indicates the interplay of the other teacher characteristics, as the following analysis may reveal, but it may instead be the influence of administrative measures that causes such discrepancies.

The following teacher attributes contribute to the improvement of teachers' professional competence and may enhance their teaching style and classroom behaviour. In

many countries on- and in-service training begin where initial training ends or complement the deficiencies of pre-service education and preparation and extend the continuing life-long training of teachers. The provision of such effective programme demands a substantial amount of resources and its implementation may also lead to a considerable increase in the education budget if the types of training offered raise the level of teachers' pay.

9.3 Teachers' In-Service Education and Training:

Recently the importance of in-service education and training has been well recognised as the legitimate means to secure a systematic improvement in the quality and content of education and the professional development of teachers' qualifications and skills. However, "... for many years it was widely accepted that the initial training given to teachers - whether by certificate or degree route - equipped them for a lifetime's career in the education service" (Morant, 1981).

Empirical research reveals the importance of the first year of teaching and the experiences encountered for the new teacher's future career. Taylor and Dale (1973) noticed that "the suddenness of the break from the work done in initial training and the feeling of a need to master the whole job at once, throw a considerable strain on the new teacher". This 'first' or 'probationary' year marks the starting point of in-service education and/or training for the new entrant to the teaching profession. In-service education and training is supposed to extend (in one form or another) for a span of at least twenty years, or the official time limit of optional retirement as is the case in the Sudan. Hollins (1973) noted that "Rapid changes in technology and social attitudes quickly made knowledge and skills obsolete, and suggested that continuous retraining would be more and more necessary. This notion widens the concept of in-service education and training to include all activities experienced by the teacher. More recently, however, it has been restricted to those linked with his/her

professional duties. Hence, Cane (1969) perceived in-service training as "all those courses and activities in which a serving teacher may participate for the purpose of extending his professional knowledge, interest or skill". Preparation for a degree, diploma or other qualification subsequent to initial training is included within this definition. The British Committee of inquiry into 'the present arrangements for the education, training and probation of teachers in England and Wales', later known as the 'James Committee', furnished a more comprehensive description of in-service education and training. It suggested that every teacher was entitled to regular in-service provision as "... the best education and training of teachers was that which is built upon and illuminated by growing maturity and experience ... a much expanded and properly co-ordinated programme ... is essential to the future strength and development of the teaching profession". Henderson's (1978) perception of teaching staff development was limited to the concept of 'training' only in preference to that of 'education'. He defined in-service training as 'structured activities designed exclusively or primarily to improve professional performance.' but Morant (1981) argued that 'in-service education' was a broader concept and "is bound up with the notion of bringing about teachers' professional, academic and personal development through the provision of a whole series of study experiences and activities of which training should be rated as but one aspect". He recognised that "a close connection exists between the two as is illustrated in official documents and other publications where increasingly the acronym 'INSET' (standing for 'in-service education and training') is used". However, as the acronym 'INSET' implies that the in-service programme includes 'education', the theoretical knowledge, and 'training', its application or practice, it may be safer to employ the phrase 'in-service education and training' as the comprehensive term and, as such, it is used in this chapter.

In-service education and training may take many different forms, subject to the very diverse knowledge, interests and career needs of the teachers. The time span may be just a few hours of consultation with other colleagues in the school. Berliner (1984) noticed that "the team organization, multi year grouping and advising program ... did help to maintain a sense of efficacy among the teachers at that school". Morant (1981) cited other types of in-service training taking place outside school-time. These include evening meetings and discussions, weekend conferences, short-term activities and others substantial in length and intellectual demands and structural courses leading to award-bearing qualifications such as post-graduate diploma or masters' degrees. The latter form of training is frequently achieved through study-leave, with or without full pay, or as a part-time endeavour.

However, in many countries the provision of in-service courses is directed "to compensate for any lack of pre-service training; to retrain teachers to move into shortage areas, to keep teachers constantly up to date in terms of knowledge and teaching skills, to make lifelong education possible and to enable a wider range of children with special needs to be given a sound education" (International Bureau of Education, 1983). A critical need for in-service education is among teachers who have been recruited with little or no pedagogical training at all. The Joint ILO/UNESCO Committee (1976) reported that in several countries between 30% and 50% of all secondary school teachers were of this category.

To justify the huge real and financial resources invested, in-service programmes have to be effective. Blackburn and Moisan (1987) suggested that teachers' in-service training can be effective if it was linked to a staff development policy which, preferably, applies to schools and has clearly defined objectives to allow for coherent, flexible and diverse provision.

More important to the developing countries' context is the design of a type of in-service training that promotes

innovation and facilitates change. More than one example can be cited in this field. Introduction of production work into the school curriculum has been an objective in the educational development plans of many developing countries for many years. It aims "... to develop the child's manual ability and taste for creative work and to prepare him to participate in the improvement of his personal resources and those of the community as explained by African teachers' educators" (Dakar, 1979). Unless teachers are retrained in this kind of change, the resistance that it will face and the number of problems which may arise will continue to jeopardize all efforts in this direction. Another example is the use of text books by teachers. Research studies in developing countries found that the availability of textbooks has the most consistent relationship of all school variables with student achievement. Schiefelbein et al. (1983) found that 49% of the teachers in the sample of Chilean schools had taken some course or been involved in some training activity related to the use of text books. They noticed that if teachers had not had training in how to use any particular didactic material they would be less likely to use it (or likely to use it less effectively) and concluded that investment in the widespread distribution of textbooks might best be accompanied by assurances that pre-service and in-service training would provide teachers with systematic instruction in textbook use. However, it was clear that "the effectiveness of textbooks depends upon the use made of them by the teachers" (Schiefelbein et al., 1983).

In developed countries the role of the teacher in curriculum development and the relationship between in-service training and curriculum analysis has recently been a matter of great concern. Hartley (1985) warned that "the content in INSET courses will be confined to matters of pedagogical competence, thereby avoiding any wider analysis of education ... this will reduce the professional teacher to a mere technician". On the other hand Torrance (1987) was critical about the in-service programme and its

inadequacy and limitations. He noted that "... the capacity of teachers to think broadly and reflectively about educational provision in the longer term may be under threat, and in-service provision is seen more and more in terms of equipping teachers with specific skills to teach in pre defined curricula areas, rather than as a way of encouraging teachers to analyse curricular problems and develop novel and responsive curriculum provision".

The need for in-service training for 'creativity and adaptability' is more urgent in less developed countries where teachers are thrown into isolated schools in rural areas, with no educational aid or equipment and very limited resources. "A better-trained teacher does not necessarily need more provision of resources for teaching and learning ... he might even need less" (IIEP, 1972).

A starting point for in-service education and training stems from teachers' professional needs. Morant (1981) emphasized four areas of related in-service provision that may cover most professional needs: induction needs (for new and unfamiliar duties); extension needs (for experienced aiming at a higher level of responsibility); refreshment needs (to reinvigorate a long-serving 'static' teacher) and conversion needs (for those due to change to a new job or retirement). Such broad and comprehensive, 'from the cradle to the grave' or, more relevant, 'from appointment to retirement' in-service education may be best served by the notion of 'teachers' centres'. Kenya's wide network of teacher advisory centres helps " ... many teachers to familiarize themselves with new educational developments, find self-help, to solve their day-to-day problems, develop their own instructional materials and enjoy a setting marked by professional co-operation" (Haddad, 1985). A more convenient and effective approach to in-service education is that based on and stemming from the school itself and its staff's individual needs. Traditionally almost all schools have been engaged in in-service training through guiding the probationer and advising the less experienced or the new-comer to the school. Practical experience reveals that, in

providing out of school training, institutions pay little attention, if any, to the individual teacher's needs or the schools where they serve. On the other hand, as Morant (1981) observed, schools rarely play a significant role in counselling or preparing teachers to gain the maximum benefit from their experience before they embark on study. Neither do they 'debrief' teachers, upon their return, after courses have been completed in order that the newly attained expertise may be brought to the attention and interest of other staff.

However, more recently, the concept of IT-INSET which focuses "... on what is happening in classrooms, what pupils are doing and what teachers are trying to do with them" is gaining more support in Leicestershire. Ashton et al. (1989) suggested that if "... this focus on what is happening in the classroom can be shared between the practising teachers as a form of in-service training, student teachers as part of their initial training and training institution tutors, an enormous potential is created for professional development".

The approaches of the school-based type are supported by research findings that it is the teachers' classroom behaviour that guides them to make a difference. Hanushek (1970) found that teaching experience and graduate education do not contribute to gains in student achievement scores. As there were characteristics that were purchased by the schools, he concluded that the "present set of living practices leads to inefficient allocation of resources".

Psacharopoulos and Woodhall (1985) observed that "the belief that investment in teacher training will improve the quality of schooling by increasing the level of pupil achievement led the World Bank to emphasise teacher training facilities in lending for education projects during the 1960s and early 1970s". Such a belief, however, was refuted by research findings in developed countries, such as Coleman et al. (1966) and Jencks et al. (1972) and others as referred to earlier. A review of research studies in developing countries revealed the importance of teachers'

training and qualification and concluded that "contrary to the arguments presented elsewhere, the evidence here suggests that trained teachers do make a difference". (Husen, Saha and Noonan, 1978). However, statistically significant relationships between teachers' characteristics and educational output have been demonstrated in several studies, for instance Katzman (1977) and Cohn and Millman (1975). Nevertheless, Heyneman, Farrell and Sepulveda-Stuardo (1981) reached the conclusion that availability of textbooks, rather than any other school inputs, including per pupil expenditure on teachers' salaries, was more closely correlated to student achievement. Even at the most pessimistic time there were researchers (Hanushek, 1970) who believed that if there was no significant relationship between a set of measured characteristics of teachers and output that did not mean that teachers did not matter (rather that) "... there still could be other characteristics, as yet unmeasured, that characterize the productive aspects of teachers". However, as Cohn and Riew (1972) asserted, "surely, conflicting evidence on the contribution of training and experience to productivity may be shown; yet there is sufficient empirical evidence to support the intuitive judgement that teaching experience and training are valuable teacher characteristics".

This notion is supported by research in the early 1970s which focussed on observed or perceived behaviours or activities of teachers within the classroom and their relationship to measures of student achievement. Although reviews of earlier studies in this field found few teaching practices that prevailed at all times in all settings, yet there were a number that had consistent effects on student learning (Rosenshine, 1971).

More recently, the biggest factor that consistently related to student achievement in developing (Lockheed, 1987) and developed (Evertson, 1986) countries was time spent on instruction and student learning. The Evertson (1986) review found that academic learning time (ALT) was a powerful correlate of student learning achievement and that

particular teaching practices and processes increased the time available for instruction and student engagement in academic work. Foyle (1986) quoted "classroom management and organization categories" as one teaching practice that was included in teaching effectiveness research and tended to be related consistently to student achievement. The establishment of order and its maintenance in the classroom environment varies between situations and individuals in different settings. Thus "time spent on maintaining order and disciplinary matters reduce student learning" (Lockheed, 1987) and was found to be negatively related to student achievement; even lowering the achievement level of the class. (Hanushek, 197).

Other researchers specified 'instructional strategies' and strategies that communicated high expectations for student performance as factors that help to increase 'time on task'. Research studies did not point to only one instructional method, however, but Murnane and Phillips (1981) cited teaching techniques known as 'direct instruction'. They noted that this teaching strategy was known to create a learning environment which maximized the amount of time that students spent actually working at learning tasks. Another form of direct instruction is interactive teaching. Here also "the time teachers spend interacting with students is positively related to student achievement" (Evertson, 1986). 'Teachers' expectations', the third factor that may enhance or increase academic time, had consistent significant correlation with student achievement in almost all earlier studies but "... educators and the public were concerned at the extent to which teachers' expectations of their students' ability to achieve influence the actual achievement of their students" (Rosenshine, 1971). Martinek et al. (1982) explained this phenomenon as the " 'Pygmalion Theory' ... where children perform in accordance with the expectation of their teacher". However, they warned that "an important implication of this theory (and rather a dangerous one) is

that these expectations can be inflexible and unrealistic, thus perpetuating failure in children".

All of these relate to the importance of teachers' characteristics and their implications. Although 'bought' qualities such as teacher education, pre-service' in- and on-service training and years of teaching experience gained a low percentage or insignificant sign in correlational and regression equations, yet more recent empirical findings proved that they can be good indicators of the kind of behaviour and practices desired. Egbert and Kluender (1984) revealed that the assumption that the content of teacher training programmes should include what was known about effective teaching practices was gaining acceptance from teachers' educators. In this respect, Evertson (1986) observed that grants were sought to fund the strengthening and collaborating of university - school relationships in the interest of bridging the gaps between coursework, field experience and the formal school setting. These emphasized the fact that research conducted in classroom settings has become an extremely valuable resource for the improvement of practice (Evertson, 1986). Consequently, it has important policy implications. "If inappropriate teaching stems from poor teachers' training and from insufficient teacher sensitivity it would appear that teachers would improve if they became more aware of their teaching behaviour and learned to monitor and change their interactions with students". (Martinek, et al, 1982).

However, "early research suggests that teaching practices also influence pupil performance in the Third World" (Fuller, 1985) but very few studies (and those mainly by foreign organisations or consultants) were conducted in this area. Nevertheless the results of such studies seldom found their way to teachers' colleges programmes to enhance day to day teachers' practices. Generally, developing countries are becoming more concerned about most cost-effective in-service training. Haddad (1985) cited three innovative and potentially efficient mechanisms. The first was 'distance training' which included a combination of

radio with correspondence and seminars for trainees as in Togo, or direct instruction for a limited period instead of the seminars with the other two components, as in Comoros. The second is the "ripple" or 'echo', system where a small core of personnel were first trained and they in turn trained a larger group and so on, as known in East and South Asia (for instance Thailand). The third form of training, introduced in Indonesia, was mobile delivery. Here a mobile team of tutors selected from teacher training colleges or centres for curriculum development would meet trainees in a central primary school for two to four days three times a year and prepare their lessons from instructional materials under the guidance of a local inspector.

These types of in-service provision may be better alternatives for "the traditional patterns of teacher training (which) are often conservative and expensive in relation to local needs and resources" (Psacharopoulos and Woodhall, 1985). Although, as discussed earlier, the importance of in-service training in developing countries was reinforced by research studies results, what is not known is the cost-effectiveness of alternative ways of in-service training relevant to each country's particular setting. Moreover, even if there is an established cost-effective technique of in-service provision, the question may be whether there is another school input which may 'effectively boost achievement' at a lower cost.

In the Sudan, the only professional and pedagogical training is provided through universities' departments of education which lasts for four years at the pre-service level. That is believed to be a life-time training for this category of teachers, though this is not openly admitted. The Scientific and Technical Potential Survey (1974) reported the "seven hundred and thirteen students have graduated from higher teacher training institutes during the period from 1964-65 to 1972-73". Based on these data Sanyal and Yacoub (1975) calculated that "there were 66 students per trained teacher in 1973 in higher-secondary schools". They projected school enrolment and the total teacher stock

in 1980 and concluded that "... if the number of students expected to enrol in the higher secondary school is correct then the usual development of teacher education, as indicated in the intake policy, will improve the teaching quality of the higher secondary schools to a reasonable extent (there will be) 40 students per trained teacher". In the academic year 1987/88 there were 200,036 students in the public secondary schools and 2,704 'trained' teachers which means that, seven years later, there were almost 74 pupils per trained teacher. (Educational Statistics 1987/88). However, 'trained teacher' here does not mean, necessarily, a graduate of a teacher training college as the researchers above indicated.

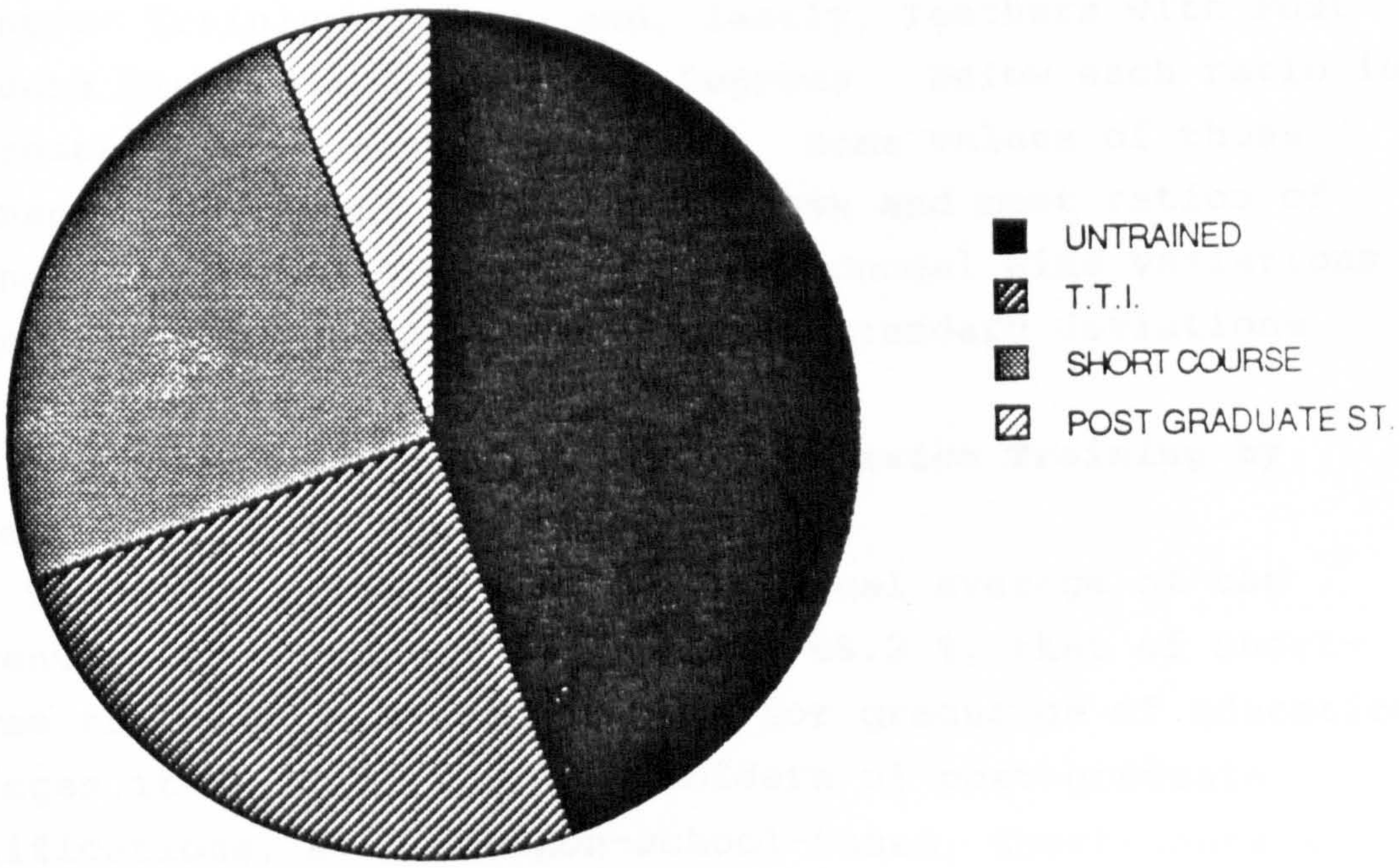
A large number of secondary teachers attended short courses of a duration of four to six weeks, mainly for 'textbook use'. The introduction of the new English Language syllabus in secondary schools necessitated, at the experimental and post-implementation levels, the provision of related in-service training on using the new books for the different grades. Previously, the reform of the mathematics curriculum at this level and the transfer to 'Modern Mathematics' gave mathematics teachers an opportunity of a four week training course on the new subject matter. However, "short summer courses are organized by the Ministry of Education to improve the quality of teaching and to keep teachers abreast of new educational developments". (National Report, 1986). Apart from these two objectives secondary school teachers can be granted a study leave locally or abroad (recently 'abroad' is limited to technical instructors or teachers) for a post-graduate diploma or master degree in education or one of the specialized subjects with full pay and studentship allowance. "Specialized and advanced professional training locally and abroad is also provided for teachers" (National Report, 1986). Although each teacher, after completing two years of probationary period, is eligible for these different types of in-service training, there is a wide discrepancy between the percentage of trained teachers in

each category among the regions in the various sizes, locations, types and kind of schools.

Apart from the post-graduate degrees (diploma and master), training in Sudanese secondary schools is not considered for promotion purposes or increase in pay but there is an allowance of £s 10.00 per month for those who acquire a post-graduate diploma - £s 15.00 for holders of a master degree. Unless other contributory factors influence the average teacher's salary training, as such, does not have a substantial effect because of the small percentage of those with post-graduate qualifications and the small benefit they gain. However, those who had pre-service professional training have the same starting salary as other university graduates. Figure 9.2 presents the percentage of untrained teachers, the ratios of those trained in the various programme as well as the ratio of those considered 'trained' because they had professional training in their initial, pre-service, education. As displayed, the highest percentage is that of 'untrained' teachers which amounts,

Figure 9.2

Distribution of Teachers by Type of Training



almost, to half the teaching force. This high percentage is attributable to many contributing factors but, as stated officially, "the high rate of migration of our qualified personnel, among whom is a considerable proportion of trained teachers at different levels, to the neighbouring Arab countries raised the proportion of untrained teachers, which affects, negatively, the internal efficiency of our educational system". (National Report, 1986).

The provision of in-service training programme available for secondary schools teachers, as demonstrated by Figure 9.2, are short courses, teachers' training institutes or colleges (TTI) and post-graduate diploma and/or masters degree. Those who attended short courses do not necessarily emerge professionally qualified. Nevertheless, the ratio of untrained teachers and those trained in 'sandwich' courses constitute the majority of the teaching corps at the senior secondary level. However, centralized norms and regulations govern the distribution of trained teachers among different sizes, types and kinds of schools in the various locations.

The analysis of the situation of teachers' training in academic secondary schools would be by the same explanatory variables as indicated above. As displayed in Tables 9.5 to 9.8, the levels of training would be in the following sequence: Untrained, Trained in Short courses, Graduates of Teachers' Training College and, lastly, Teachers with Post Graduate Diploma and/or Master Degrees. Below each ratio is its respective standard deviation. Some values of those trained in Teachers' Training Colleges and most ratios of Teachers with Post Graduate Degrees conceal wide variations as indicated by the large respective standard deviations.

9.3.1 Analysis of Teachers' In-Service Training by Region and Size of Schools:

Table 9.5 reveals that the national average of the percentage of untrained teachers is 45.2 %, that of short-course trainees is 24.7%, whereas for graduates of education colleges it is 25.1% and, for holders of post-graduate qualifications, 6%. The non-school-based, Short-courses

Table: 9.5

Percentage of Teachers who are Untrained, Trained in short Courses, in Teachers Training Institutes and Colleges, and Holders of Post-Graduate Diploma and / or Master Degree by Region and Size of Schools.

Size of School	Level of Trng	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Up to 400 Pupils	Un-Trained	40.6 (13.3)	66.7 (.)	38.7 (17.5)	55.6 (.)	53.3 (8.5)	48.1 (14.1)
	Short Courses	50.0 (0)	11.1 (.)	36.5 (20.4)	33.3 (.)	21.7 (11.5)	30.7 (17.0)
	T T I	9.4 (13.3)	16.7 (.)	20.6 (14.1)	11.1 (.)	24.1 (7.6)	19.2 (10.8)
	Post Grads	- -	5.6 (.)	4.2 (4.9)	-	1.7 (2.4)	2.4 (3.4)
401 to 800 Pupils	Un-Trained	58.9 (6.8)	46.2 (.)	56.1 (7.6)	54.9 (10.3)	32.0 (10.6)	49.1 (13.8)
	Short Courses	25.8 (2.9)	7.7 (.)	13.3 (9.9)	21.3 (4.2)	27.8 (8.3)	20.9 (9.4)
	T T I	13.0 (11.3)	42.3 (.)	25.1 (11.8)	18.7 (5.8)	39.3 (12.5)	26.5 (14.2)
	Post Grads	2.3 (2.1)	3.9 (.)	5.5 (9.0)	5.2 (1.9)	7.9 (11.7)	5.5 (7.5)
Over 800 Pupils	Un-Trained	44.4 (.)	46.4 (6.7)	50.9 (8.7)	32.7 (.)	32.0 (12.7)	38.9 (13.1)
	Short Courses	35.6 (.)	12.8 (1.6)	19.6 (14.6)	36.7 (.)	26.3 (6.7)	24.3 (10.2)
	T T I	17.8 (.)	34.3 (2.5)	22.2 (4.8)	18.4 (.)	31.4 (7.7)	28.0 (8.2)
	Post Grads	2.2 (.)	17.9 (4.6)	7.8 (2.2)	12.2 (.)	10.9 (5.0)	9.4 (4.6)
Column Total	Un-Trained	50.4 (11.9)	51.4 (10.9)	49.2 (13.1)	51.3 (12.1)	37.6 (14.3)	45.2 (14.1)
	Short Courses	35.5 (12.0)	11.1 (2.6)	22.4 (17.1)	25.9 (7.9)	25.5 (8.4)	24.70 (12.5)
	T T I	12.6 (9.8)	31.9 (10.9)	22.8 (10.3)	17.3 (5.5)	31.5 (10.3)	25.1 (11.8)
	Post Grads	1.5 (1.8)	6.3 (3.3)	5.8 (6.0)	5.5 (4.2)	7.7 (7.6)	6.02 (6.2)

* Standard Deviation in Parenthesis.

programmes do not generally include any professional training and their effects are limited for the majority that were recruited with no pre-service education. Hence, it would be safe to note that only the latter two categories of teachers are professionally trained; 31.1% of the teaching force.

The mean level of qualifications by school size shows (Table 9.5) that the largest school size has the lowest mean ratio of untrained teachers, the highest mean ratio of teachers' colleges graduates and the highest ratio of holders of post-graduate degrees. It implies that the largest schools are favoured both with more staff from the best types of in-service training and with the lowest ratio of untrained teachers.

Discrepancies within each school size, in the level of untrained, short-courses trainees, graduates of teacher colleges, and holders of post graduate degrees are striking. In the smaller school size, the percentage of untrained in Kordufan (66.7%) is 1.7 times that in the Central Region (38.7%). The ratio of teachers who attended short courses in the Northern Region (50%) is more than four times that in the Eastern Region (11.1%). Khartoum percentage of professionally trained teachers (24.1%) is more than two and a half times that in Northern Region (9.4%). Holders of post graduate qualifications in the Eastern Region (5.6%) are more than three times those in Khartoum (1.7%); whereas Northern and Kordufan Regions have no teachers who are qualified at this level in this size of schools. After all, it is expected that the small size schools have fewer qualified and well trained teachers. In the medium school size the ratio of untrained teachers in the Northern Region (58.9%) is almost twice that in Khartoum (32%). Short courses trainees in Khartoum (27.8%) are almost four times those in Eastern Region. The percentage of Education Colleges' graduates in Eastern Region (42.3%) is more than three times that in Northern Region (13%). There are three times more holders of post graduate degrees in Khartoum (7.9%) than in the Northern Region (2.3%).

The largest school size ratio of untrained staff in the Central Region (50.9%) is 1.6 times that in Khartoum (32%). The percentage of teachers trained in short-courses is highest in Kordufan (36.7%), almost three times that in the Eastern Region (12.8%). The Northern Region has the lowest level of professionally trained teachers and of holders of post-graduate degrees (17.8% and 2.2% respectively), whereas the Eastern Region has twice those holding the former qualifications and Kordufan more than five times those with the latter. However, the extent of variations in the ratio of untrained is similar in all school sizes, but in the various types of in-service training it is almost identical in the small and medium sizes, but it is comparatively less in the larger size.

Within each region disparities are marked in the level of untrained staff and the various types of in-service training. In all regions the highest ratio of untrained is around one and a half times the lowest. The disparity in Short-courses trainees' level in the Northern and Kordufan Regions in one size is almost twice the other but, in the Central Region it is more than 2.7 times. The highest percentage of teachers' colleges graduates in the Northern and Kordufan Regions and in Khartoum is around 1.5 times the lowest, but in the Eastern Region it is 2.5 times. However, the range of variations in the ratios of post-graduate degrees holders is two times in the Eastern and Central Regions and 2.4 times in Kordufan, and even six times in Khartoum.

Generally, within most regions, the small school size is identified with the highest ratio of untrained teachers and short-courses trainees but the largest size has the highest percentage of post-graduate degrees holders in all regions and in some that of professionally trained teachers.

9.3.2 Analysis of Teachers' In-Service Training by Region and Location of Schools:

Table 9.6 shows the variations in the percentage of untrained teachers and those trained in different programme

Table: 9.6

Percentage of Teachers who are Untrained, Trained in short Courses, in Teachers Training Institutes and Colleges, and Holders of Post-Graduate Diploma and / or Master Degree by Region and Location of Schools.

Loc. of School	Level of Trng	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Urban	Un-Trained	50.4 (11.9)	51.4 (10.9)	48.3 (13.5)	55.0 (8.9)	34.7 (13.1)	44.2 (14.4)
	Short Courses	35.5 (12.0)	11.1 (2.6)	21.6 (13.5)	23.7 (6.5)	27.1 (8.0)	25.2 (11.2)
	T T I	12.6 (9.8)	31.9 (10.9)	22.9 (8.0)	17.1 (6.1)	32.1 (10.4)	25.3 (11.8)
	Post Grads	1.5 (1.8)	6.3 (3.3)	7.5 (6.6)	4.1 (2.9)	8.9 (7.7)	6.6 (6.4)
Semi - Urban	Un-Trained			43.5 (14.2)			43.5 (14.2)
	Short Courses			31.8 (29.1)			31.8 (29.1)
	T T I			21.7 (20.2)			21.7 (20.2)
	Post Grads			3.0 (5.3)			3.0 (5.3)
Rural	Un-Trained			61.0 (0.8)	32.7 (.)	53.2 (11.3)	52.4 (12.6)
	Short Courses			11.2 (6.0)	36.7 (.)	16.8 (5.1)	18.2 (10.4)
	T T I			24.3 (1.8)	18.4 (.)	28.5 (11.1)	25.4 (8.1)
	Post Grads			3.5 (4.9)	12.2 (.)	1.5 (2.6)	4.0 (5.0)
Column Total	Un-Trained	50.4 (11.9)	51.4 (10.9)	49.2 (13.1)	51.3 (12.1)	37.6 (14.3)	45.2 (14.1)
	Short Courses	35.5 (12.0)	11.1 (2.6)	22.4 (17.1)	25.9 (7.9)	25.5 (8.4)	24.7 (12.5)
	T T I	12.6 (9.8)	31.9 (10.9)	22.8 (10.3)	17.3 (5.5)	31.5 (10.3)	25.1 (11.8)
	Post Grads	1.5 (1.8)	6.3 (3.3)	5.8 (6.0)	5.5 (4.2)	7.7 (7.6)	6.0 (6.2

* Standard Deviation in Parenthesis.

among and within the various regions and locations.

The locational mean ratios of untrained teachers and that of each type of training indicate very limited variation, all cluster around the national averages, although they conceal large disparities among regions in both Urban and Rural locations.

Interestingly, in the Urban Sector the variations are considerable in the ratios of untrained teachers and extremely wide in each type of training. The percentage of untrained teachers in Kordufan (55%) is 1.6 times that in Khartoum (34.7%) but the ratio of short-course trainees in the Northern Region (35.5%) is more than three times that in Eastern Region (11.1%). The percentages of Education Colleges' graduates (32.1%) and holders of post-graduate degrees (8.9%) in Khartoum are more than two and a half times, and almost six times respectively those in the Northern Region.

In the Rural areas, discrepancies are even larger among regions. The ratio of untrained in Central Region (61%) is almost twice that in Kordufan (32.7%). Kordufan percentage of short-course trainees (36.7%) is more than three times those in Central Region (11.2%) and its ratio of holders of post-graduate qualification (12.2%) is eight times that in Khartoum. But Khartoum's percentage of professionally trained teachers (28.5) is 1.6 times that in Kordufan.

In individual regions Khartoum has the lower ratio of untrained teachers, the higher percentages of short-courses trainees, graduates of teachers' colleges and holders of post-graduate qualifications in the Urban Sector, whereas Kordufan favours the Rural areas. On the other hand, the Central Region has the highest ratio of holders of post-graduate qualifications in the Urban Sector, the lowest ratio of untrained and the highest percentage of short-courses trainees in the Semi-Urban, while the Rural areas has the highest level of untrained and lowest ratio of trained in short-courses but the highest percentage of teachers' colleges graduates. Disparities are more marked in the ratio of untrained and the ratio of each level of

training among regions than within the regions, especially for post-graduate qualifications in both the Urban and Rural locations.

To sum up, it may be noted clearly that, except for Khartoum Urban Schools and Kordufan Rural School, all institutions in the different locations have between 43.5% and 55% of their teaching staff completely untrained. It is only Khartoum and the Eastern Region that can retain the highest ratio of professionally trained teachers, around 32%. The Northern Region, strangely enough, has the lowest ratio of this teachers' category, of only 12.6%. Again, Khartoum and Central Region have the highest ratios of post-graduate studies in the Urban Sector, whereas the Rural School in Kordufan has the highest percentage of this training in all locations, 12.2%.

9.3.3 Analysis of Teachers' In-Service Training by Region and Type of Schools:

As Table 9.7 demonstrates the mean ratio of both untrained teachers and of each level of training reveals marked disparities between the Boarding Schools, and Day and Boarding. The Boarding Type has the lowest mean ratio of untrained teachers (31%), the highest mean percentages are of short-courses trainees (27.7%), trained in colleges of education (33.7%) and holders of post-graduate degrees (15.9%). The large standard deviations indicate the wide variations these means conceal.

Inter-regional disparities are striking in the ratio of untrained and those of each level of training. In Day Schools the percentage of untrained teachers in Kordufan (58.9%) is 1.5 times that in Khartoum (38.6%). In Short-Course types of training and graduates of teachers' colleges, the highest discrepancies are between the Northern and Eastern Regions. The Northern Region has almost six times the ratio in the Eastern Region in the former type whereas the Eastern Region has more than three times the Northern in the latter type of training. In higher levels

Table: 9.7

Percentage of Teachers who are Untrained, Trained in short Courses, in Teachers Training Institutes and Colleges, and Holders of Post-Graduate Diploma and / or Master Degree by Region and Type of Schools.

Type of School	Level of Trng	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Day Schl	Un-Trained	45.1 (12.2)	46.2 (.)	39.4 (12.1)	58.9 (2.4)	38.6 (14.3)	42.2 (13.9)
	Short Courses	41.4 (14.8)	7.7 (.)	33.7 (18.3)	23.1 (7.3)	25.1 (8.0)	27.5 (12.5)
	T T I	12.6 (10.9)	42.3 (.)	20.5 (11.4)	14.9 (3.7)	29.8 (8.6)	24.8 (11.2)
	Post Grads	0.9 (1.6)	3.9 (.)	6.9 (3.8)	3.2 (2.2)	6.7 (6.0)	5.6 (5.1)
Boardg Schl	Un-Trained			60.5 (.)	32.7 (.)	17.9 (.)	37.0 (21.6)
	Short Courses			7.0 (.)	36.7 (.)	39.3 (.)	27.7 (18.0)
	T T I			25.6 (.)	18.4 (.)	57.1 (.)	33.7 (20.6)
	Post Grads			7.0 (.)	12.2 (.)	28.6 (.)	15.9 (11.3)
Day and Boardg Schl	Un-Trained	55.7 (11.1)	53.2 (12.6)	57.0 (7.1)	39.5 (.)	40.9 (.)	53.5 (9.9)
	Short Courses	29.6 (5.8)	12.2 (1.5)	13.6 (8.9)	26.3 (.)	18.1 (.)	18.0 (9.4)
	T T I	12.6 (11.0)	28.5 (10.4)	24.8 (10.6)	26.3 (.)	36.4 (.)	23.9 (11.2)
	Post Grads	2.1 (2.1)	7.1 (3.5)	4.6 (8.4)	7.9 (.)	4.6 (.)	4.8 (5.8)
Column Total	Un-Trained	50.4 (11.9)	51.4 (10.9)	49.2 (13.1)	51.3 (12.1)	37.6 (14.3)	45.2 (14.1)
	Short Courses	35.5 (12.0)	11.1 (2.6)	22.4 (17.1)	25.9 (7.9)	25.5 (8.4)	24.7 (12.5)
	T T I	12.6 (9.8)	31.9 (10.9)	22.8 (10.3)	17.3 (5.5)	31.5 (10.3)	25.1 (11.8)
	Post Grads	1.5 (1.8)	6.3 (3.3)	5.8 (6.0)	5.5 (4.2)	7.7 (7.6)	6.0 (6.2)

* Standard Deviation in Parenthesis.

of training, post-graduate studies, Khartoum is more than six times the Northern Region ratio, 6.7%.

In the Boarding type variations are even more striking. The percentage of untrained staff in the Central Region (60.5%) is three times that in Khartoum (17.9%) and twice that in Kordufan (32.7%). In Short-Courses provision, Khartoum and Kordufan have almost equal ratios, six times that in Central Region. However, Khartoum has the lion's share of trained teachers. Its highest ratio of graduates from teachers' colleges is three times that in Kordufan and twice that in Central Region, whereas its highest percentage of post-graduate degrees is over four times those in Central Region and more than twice that in Kordufan.

In the Day and Boarding type of schools, it is Khartoum and Kordufan Regions that have the lowest ratios of untrained staff whereas each of the other regions has over 50%. The percentage of Short-Courses trainees in the Northern and Kordufan Regions is more than twice the provision in Eastern and Central Regions and almost over 10% higher than that in Khartoum. On the other hand Khartoum has the highest ratio of professionally trained college graduates (36.4%), three times that in the Northern Region but, at the post-graduate level of training, the Eastern and Kordufan Regions have the highest percentages - over 7%.

Individual regions differ markedly in their training provision. While the Northern, Eastern and Central Regions have the lowest percentage of untrained in Day Schools, Kordufan and Khartoum favour the Boarding Schools. Untrained in Khartoum and Kordufan Day Schools are almost twice that in Boarding Schools. However, the Boarding Type has the best percentage of professionally trained in all regions and in Khartoum.

Summing up, it is evident that discrepancies in the percentage of untrained and trained in different provisions of in-service programme among and within regions are sometimes extremely large. In the same type of schools the ratio of trained staff at the different levels varies greatly. For instance, the Boarding Type represents the

national schools in the three regions; there is wide variation in the distribution of trained staff between them. Even within the same region the various types of schools differ greatly in their numbers of trained and untrained teachers.

9.3.4 Analysis of Teachers' In-Service Training by Region and Kind of Schools:

As Table 9.8 indicates, the mean percentage of untrained staff and that of each level of training in both kinds of schools is similar to the national average and clusters around it. Girls' Schools have the higher ratio of untrained (50.2%) and the lower ratio of trained in short courses (19.4%).

The disparity in the level of training within each kind of school, and between them, is considerable. In Girls' Schools the ratio of untrained in the Northern Region (60.5%) is 1.4 times that in Khartoum (42.4%). Although the Northern Region has the highest ratio of trained in short courses (26.8%), more that twice that in Eastern Region (11.4%), it has the lowest percentage of professionally trained (9.5%) and holders of post graduate degrees (3.4%) whereas Khartoum has more than three times (29.7%) the former ratio and Central Region has over twice (7.6%) the latter.

In Boys' Schools Kordufan's ratio of untrained teachers is more than one and a half times that of Khartoum. The Northern Region's percentage of trained in short courses is almost four times the Eastern Region's but, in this region the ratio of professionally trained (39.2%) is more than two and a half times that in the former while the ratio of post graduate degrees in Khartoum (8.7%) is more than fourteen times that in the Northern Region.

In individual regions, it is interesting to note that Girls' Schools have the higher ratio of untrained teachers and the lower percentage of trained in short courses and trained in teachers' colleges, except in Kordufan, but they have the higher ratio of post graduate degrees holders in

Table: 9.8

Percentage of Teachers who are Untrained, Trained in short Courses, in Teachers Training Institutes and Colleges, and Holders of Post-Graduate Diploma and / or Master Degree by Region and Kind (gender) of Schools.

Kind of School	Level of Trng	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Girls Schl	Un-Trained	60.4 (8.9)	58.9 (11.0)	57.0 (8.1)	49.7 (14.5)	42.4 (15.8)	50.2 (14.1)
	Short Courses	26.8 (3.4)	11.4 (0.4)	13.6 (9.2)	21.5 (6.8)	22.3 (8.3)	19.4 (8.7)
	T T I	9.5 (13.4)	24.6 (11.2)	21.8 (8.5)	23.2 (4.5)	29.7 (8.8)	24.5 (10.2)
	Post Grads	3.4 (1.0)	5.1 (0.6)	7.6 (8.6)	5.6 (3.2)	6.6 (6.0)	6.3 (5.7)
Boys Schl	Un-Trained	45.4 (10.6)	43.9 (3.2)	44.3 (13.7)	52.1 (13.1)	33.2 (12.0)	41.6 (13.2)
	Short Courses	39.9 (12.6)	10.8 (4.4)	27.8 (19.2)	28.1 (8.3)	28.4 (7.7)	28.6 (13.6)
	T T I	14.1 (9.5)	39.2 (4.4)	23.5 (11.8)	14.4 (3.0)	33.2 (11.7)	25.5 (13.0)
	Post Grads	0.6 (1.1)	7.5 (5.1)	4.7 (4.0)	5.4 (5.1)	8.7 (9.1)	5.8 (6.6)
Column Total	Un-Trained	50.4 (11.9)	51.4 (10.9)	49.2 (13.1)	51.3 (12.1)	37.6 (14.3)	45.2 (14.1)
	Short Courses	35.5 (12.0)	11.1 (2.6)	22.4 (17.1)	25.9 (7.9)	25.5 (8.4)	24.7 (12.5)
	T T I	12.6 (9.8)	31.9 (10.9)	22.8 (10.3)	17.3 (5.5)	31.5 (10.3)	25.1 (11.8)
	Post Grads	1.5 (1.8)	6.3 (3.3)	5.8 (6.0)	5.5 (4.2)	7.7 (7.6)	6.0 (6.2)

* Standard Deviation in Parenthesis.

Northern, Central and Kordufan Regions. Whether the higher rate of untrained staff in Girls' Schools is because the new recruits entering the profession are mainly females, or that Girls' Schools' are providing a better atmosphere as work places is not clear. Some regions favour the Girls' Schools with professionally trained staff as in Eastern, Central and Kordufan, others, as in the Northern Region and Khartoum, have more professionals in Boys' Schools.

In summary, it may be obvious that the highest level of untrained staff, 60.4%, is in Girls' Schools, whereas the lowest is in Boys' Schools - almost half of the above ratio, 33.2%. Not only that, but the highest percentage of trained in Short-Courses, the highest and next highest percentage of graduates of teachers' colleges and the highest ratio of staff holding post-graduate degrees are all in Boys' Schools.

9.4. Teachers' Years of Experience:

One of the main criteria of recruitment and selection to key posts and eligibility for promotion at all levels in the public sector is the number of years of experience in the respective profession. Conventional wisdom and intuitive judgement trust that the longer a person stays in a post the more experience he accumulates and the more competent he becomes; hence he can be entrusted with higher posts with more responsibilities in his own discipline. In common with almost all other civil servants 'years of experience' has been one of the main conditions of teachers' promotion to higher posts with more responsibility.

Years of teaching experience was included in almost all research studies as a desired teacher's characteristic. Cohn (1968), Reiw (1966) and Kiesling (1967) were a few of a large number of researchers who used teachers' experience as a proxy of teachers' quality and, hence, school quality. However, "casual observation suggested that the most selective (suburban) systems weight previous teaching experience heavily" (Hanushek, 1972) and so do many educational systems all over the world.

An earlier review by Rosenshine (1971) included nine studies in which teacher age, years of teaching experience and years of experience teaching a particular grade were related to student achievement measures. He found that various measures of teacher experience appeared to be consistently positive but non-significant predictors of school output. However, in those studies where aspects of 'teachers' behaviour' and 'measures of teachers' experience' were both included, he observed that 'the behavioral measures yielded higher correlations than the measures of teachers' experience. This may indicate that the teacher attribute 'years of teaching experience' served as a useful proxy of 'teacher style' and 'teacher classroom behaviour'.

However, prior belief asserts that "experience does alter perspective" (Education Digest, 1989). Experienced teachers developed their own style, emerging out of confidence in their 'learner-oriented' practices. Sepulveda-Stuardo and Farrell (1983) believed that 'as teachers acquire experience they become familiar with types of students; they master the content of their subject area and they therefore become more effective". In line with this notion, experienced teachers were found well aware of the recently established importance of text books and they used them, at least in certain subject areas. Katz (1972) suggested that as the beginning or less experienced teachers were more concerned about what they taught and as such being more content-oriented may find the use of text books quite helpful. Research studies found that the percentage of teachers who claimed to use text books "always" increased with an increase in years of experience.

Murnane and Phillips (1981) study tested the hypothesis that the 'relationship between teaching experience and effectiveness reflected the influences of three factors, namely: learning-by-doing, vintage effects and self-selection effects. The first factor implied that teachers become more effective as they gain experience in performing their job. The second reflected the difference in average abilities of new recruits to the profession over time but

the third pinpointed that the effectiveness of those who chose teaching as a career differed from those who could leave if a better opportunity appeared. Their findings were striking. The first aspect was supported by the significant positive relationship between teacher experience of 1-7 years and performance. The second factor was asserted by a positive relationship between teacher experience with more than fourteen years and effectiveness. The third was explained by the very high performance of teachers with more than 25 years of experience. They concluded that empirical results provided compelling evidence that the variable, years of teaching experience, was significantly related to teaching effectiveness in a non-linear manner in their four cross-sectional samples. Yet their final interpretation would give great comfort to those concerned about the efficient allocation of public resources in schools. "Experienced teachers and more able teachers are effective because they are most successful in the search for techniques appropriate for their students". (Murnane and Phillips, 1981).

The effectiveness of experienced teachers has lately been challenged, if not refuted. Career teachers "are weary from the excessive demands of the occupation, dulled from their routinized work with children and frustrated by the lack of opportunity for intellectual, purposeful exchange with adults". (Lanier and Little, 1986). However, low pay in industrialized countries (Hough 1991), as well as Third World countries (Wolff, 1985 and Eicher, 1984) compelled teachers to find other sources of income which reduced the time and energy that otherwise would have been spared for continuing education. Lanier and Little (1986) noted that "in the U.S.A 'over a third of all teachers report additional work for pay either within the school system (almost 25%) or outside the school system (over 11%) ... such work involves bus-driving, coaching, bartending, child-rearing or house cleaning". Regrettably, none of these jobs were related to their profession or might have contributed to their classroom practices.

In the absence of school-based on-service training, the learning by experience is simply learning alone, on the basis of trial and error. The fallacy of the importance of field experience for learning practical skills was questioned by research findings. "... Substantial amounts of field experience foster a 'group management' orientation, in contrast to an 'intellectual leader' orientation in teachers' thinking about their work" (Lortie, 1975). Although many believe that teachers learn best from experience, Lanier and Little (1986) review found "a growing body of research to show that the typical experience of teachers in school is noneducative at best and miseducative at worst". Lately the long held faith in the value of 'teaching experience' was basically shaken when it was not included as a requirement or condition for selection to the post of 'school principal' or director in New Jersey State; a job teachers look up to. As Guthrie (1988) observed, supporters of the new policy, contended that teaching experience was not an appropriate criterion as many of the principal's functions lay outside instruction. However the rationale for requiring such an attribute for this important post remains compelling. "Through such experience, administrators gain not only knowledge of their profession but also credibility with their colleagues - both crucial to their success" (Guthrie, 1988). However, recently heavy emphasis has been laid on an effective policy and programme of staff development to overcome the limitations of on-the-job experience but such provision was found to be isolated and did not follow a coherent policy which deemed them irrelevant to their clients' (the teachers) demands of work and interest. On the other hand, most staff development programmes were not integrated with school priorities for curriculum development and/or improvement of instruction and hence had little support in the 'workplace'. Moreover, teachers' professional development had to compete with a host of activities in and out of schools with varying importance. Cusick (1983) noticed that "scheduled in service offerings take second or third place behind

sponsored student activities and clubs, second jobs, or independently owned businesses, community or church activities and family obligations".

Nevertheless, Lanier and Little (1986) were hopeful that "if more teachers gave serious attention to the organization of district staff development programs, the programs would have greater chance for success". Hence, prolonged service in education would be a 'blessing' rather than a 'curse' to the professionals and the generations they serve. All these take one back to the paramount importance of teachers' motivation to secure a better quality of service. Research studies exposed the influence of 'low pay' and 'conditions of service' on the morale, motivation and social status of teachers. If these problems can be addressed seriously teachers will find the time to make in- and on-service programme a success and can co-operate to make the workplace conditions more conducive to professional development. These reveal the 'importance' of 'pay parameters' as proxies of school qualities and not misallocation of resources, although they were not found directly, or highly correlated with students' achievement gains. It may be concluded that for a booming Education 'industry' a market economy incentive is needed in the form of higher pay for teachers - at least comparable to that enjoyed by those with similar or the same qualifications in other professions - and better conditions of service. However, the traditional belief that the "... best reward to a teacher is to see that a child a teacher taught holds a responsible position in the country" (Heyneman, 1975) no longer contributes to a teacher's sense of efficacy, or socio-economic status especially in Third World countries. Schott (1986) review of related research studies revealed that factors within the experience of teaching identified as correlates of sense of efficacy included: salaries adversely affected by inflation; a decline in status of the teaching role and a corresponding lack of public recognition.

On the other hand, in relation to the cost-effectiveness of this teacher attribute, Haddad (1985)

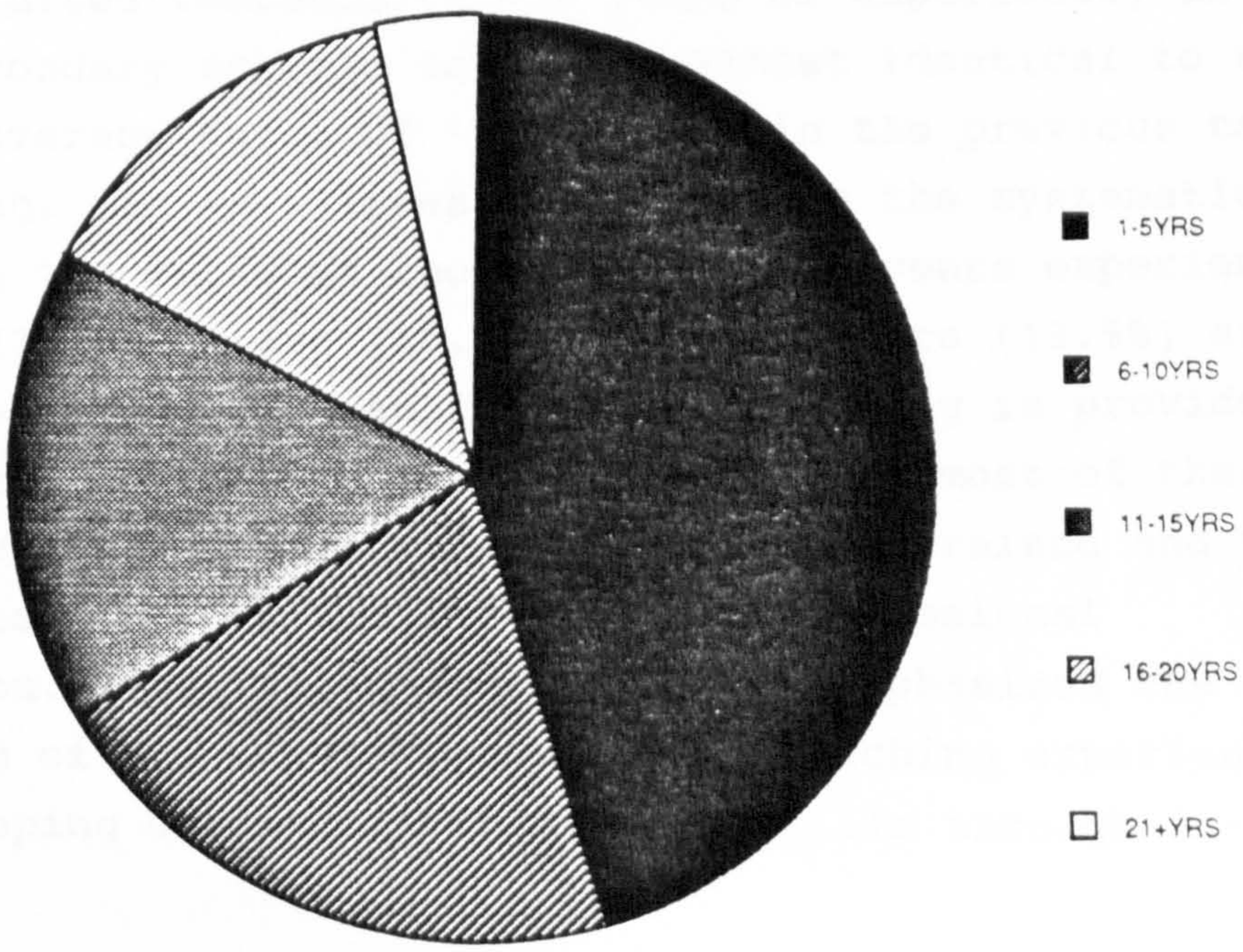
believed that there was an optimum time span for 'experience' to have an effect and implications for educational development. His review of research indicated that effective 'experience' hid between 10 and 20 years of service or 30 and 40 years of age; but the first five years of teaching experience were found to be critical for instructional skills that had implications for certain types of in-service training.

In the Sudan 'years of teaching experience' is of crucial importance for selection for in-service training, senior posts and secondment to Oil-rich Arab countries or regional and international organizations. Its importance stems from the fact that, generally, on- and in-service training for the large majority of teachers come later in the service; hence it is identified with better style and desired behaviour.

Figure 9.3 below displays the teaching force level of experience which reflects the age structure of those in higher secondary schools. Generally, only new graduates

Figure 9.3

Distribution of Teachers by Years of Experience



join the teaching profession as those who return back to teaching constitute a small insignificant number. As Figure 9.3 illustrates, the distribution of teachers ranges of years of experience starts from one to five years to over 21 years. It is important to note that the largest single category of teachers is those with one to five years of experience. This may imply that lately there is a large number of new graduates entering the teaching profession. On the other hand, the small ratio of teachers with over twenty-one years of service may indicate that the education system has a limited attraction to retain experienced teachers with over twenty-one years of service. Lately the Ministry of Education reported that the high rate of attrition in qualified experienced teachers to other Arab countries adversely affected the efficiency of the education system.

The following Tables 9.9 to 9.12 display the teachers' years of experience among and within regions in the various sizes, different locations, types and kinds of schools in this sequence: the first row is 1-5 years, followed by 6-10 years, 11-15 years, 16-20 years and over 21 years of service.

9.4.1 Analysis of Teachers' Years of Experience by Region and Size of Schools:

Table 9.9 shows that the national average ratio of newly recruited teachers (1 - 5 years of experience) is 45%, of the secondary schools teachers; almost identical to the national average ratio of 'untrained' in the previous tables on training. It is interesting to notice the systematic decline in the ratio of those with 6 - 10 years experience (20.8%), 11 - 15 years (16.7%), 16 - 20 years (13.5%) and over 21 years (3.6%). As in-service training is provided for teachers after some years of experience most of these teachers with 1 - 5 years of service are untrained and the majority have no pre-service, initial professional preparation. However, research studies emphasized the importance of the first five years of teaching experience for developing desired instructional skills through in-

Table: 9.9

Percentage of Teachers with 1-5 years of Experience, 6-10 years, 11-15 years, 16-20 years and those with over 21 years of Experience by Region and Size of Schools.

Size of School	Years of Exp.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Up to 400 Pupils	1-5	33.9 (12.6)	66.7 (.)	29.8 (22.9)	38.9 (.)	51.7 (13.1)	42.4 (18.8)
	6-10	27.2 (12.0)	22.2 (.)	26.7 (19.8)	38.9 (.)	22.7 (4.7)	25.8 (11.7)
	11-15	25.9 (16.4)	5.6 (.)	13.2 (9.6)	11.1 (.)	17.7 (6.5)	16.1 (9.5)
	16-20	3.1 (4.42)	5.6 (.)	13.2 (9.6)	5.6 (.)	6.9 (9.2)	8.0 (8.2)
	21 +	9.8 (3.8)	- -	17.2 (18.7)	5.6 (.)	- -	7.2 (12.2)
401 to 800 Pupils	1-5	41.4 (20.5)	50.0 (.)	48.1 (10.1)	54.1 (6.4)	57.5 (17.8)	51.0 (13.7)
	6-10	21.3 (5.5)	23.1 (.)	11.2 (6.1)	20.5 (5.2)	19.0 (6.0)	17.8 (6.7)
	11-15	21.7 (9.3)	19.2 (.)	20.0 (8.1)	13.6 (3.5)	8.1 (5.1)	15.5 (8.1)
	16-20	14.7 (14.1)	7.7 (.)	19.4 (13.7)	11.8 (2.0)	13.2 (10.7)	14.6 (10.3)
	21 +	0.9 (1.6)	- -	- -	- -	2.2 (2.1)	0.8 (1.5)
Over 800 Pupils	1-5	31.1 (.)	52.9 (4.1)	32.6 (7.7)1	49.0 (.)	41.6 (11.4)	40.6 (11.1)
	6-10	17.8 (.)	23.9 (2.4)	19.8 (6.9)	22.5 (.)	19.6 (3.7)	20.2 (4.3)
	11-15	24.4 (.)	9.3 (6.5)	20.0 (5.4)	14.3 (.)	19.7 (6.4)	18.5 (6.6)
	16-20	20.0 (.)	8.8 (0.6)	24.5 (10.8)	14.3 (.)	14.6 (5.3)	16.6 (7.9)
	21 +	6.7 (.)	5.1 (0.6)	3.1 (3.6)	- -	4.1 (2.8)	3.9 (2.9)
Column Total	1-5	37.2 (14.9)	55.6 (7.9)	37.7 (16.0)	50.7 (7.9)	48.4 (14.7)	45.0 (14.9)
	6-10	22.7 (7.4)	23.3 (1.6)	18.6 (12.9)	23.9 (8.4)	20.3 (4.6)	20.8 (8.3)
	11-15	23.6 (9.6)	10.8 (7.0)	17.9 (8.0)	13.3 (2.9)	16.1 (7.6)	16.7 (8.0)
	16-20	11.7 (11.5)	7.7 (1.6)	19.1 (11.7)	11.2 (3.3)	12.2 (8.2)	13.5 (9.4)
	21 +	4.8 (4.9)	2.6 (3.0)	6.2 (12.2)	0.9 (2.7)	2.5 (2.7)	3.6 (7.0)

* Standard Deviation in Parenthesis.

service training, as referred to above. It is interesting to notice the systematic decline in the ratio of teachers as the number of years of teaching experience increases. This may signal the inability of this level of education to retain its teachers as they become more trained and experienced.

As Table 9.9 reveals the variations in the mean ratios of each level of experience between the three school sizes can be striking. Although the disparities between the first three ranges of experience (1 - 5, 6 - 10 and 11 - 15 years) are quite restricted, all are similar and almost identical to the national average but the last two differ markedly. However, the largest school size has the lowest mean ratio of less-experienced teachers (1 - 5 years) and the higher or highest mean percentage of each of the other ranges of experience. No wonder this size has the highest average teachers' salary (Table 8.2).

The discrepancies in the regional mean ratios of each level experience are more marked the higher the range. Although, the Eastern Region mean ratio of less-experienced (1 - 5 years) is almost one and a half times that in the Northern Region, and Kordufan percentage of teachers in the next smallest level (6-10 years) is 1.3 times as high as that in the Central region, in all the other levels the highest ratios are more than twice the lowest*. However, the low mean level of less-experienced staff in the Northern Region and the higher or highest mean ratios of teachers in the other ranges of experience can explain the highest average teachers' salary, contrary to the situation in the Eastern Region, which accounts for the lowest average pay.

In each school size disparities in the proportion of teachers in each range of experience are marked but they are more marked in the small school size. The Eastern Region highest level of less-experienced teachers (66.7%) is 2.2 times as high as that in the Central Region (29.8%). In the next smallest and middle ranges Kordufan and Northern Region

* Some values are non significant.

ratios (38.9% and 25.9% respectively) are 1.8 and 4.6 times the corresponding levels in the Eastern Region. It is important to note that starting from the middle range (11 - 15 years) the ratio of staff can be as low as 3.1% and 5.6% in some regions, and in others there are no teachers with over 21 years of experience. However the Northern Region lower proportion of the less-experienced and higher ratios in each level of experience, contrary to that observed in the Eastern Region in this size, are attributable to the highest average teacher pay (Table 8.2).

In the Medium School Size, Khartoum highest ratio of less-experienced teachers (57.5 %) is 1.4 times that in the Northern Region (41.4 %) and the Eastern Region's ratio in the second level (23.1%) is more than twice that in the Central Region. The highest ratios of staff in the other ranges of experience are more than twice the lowest*. It is noteworthy to record that the Eastern, Central and Kordufan Regions have no teachers with over 21 years of experience whereas the Northern Region has less than 1% and even Khartoum has only 2.2% in this size. However, the Northern Region lowest level of less-experienced teachers and higher and highest ratios in the other experience levels can account for the highest average salary (Table 8.2)

As school size increases the discrepancies in the ratios of each level of experience become comparatively smaller. The percentage of teachers in the first and second ranges of experience in the Eastern Region (52.9% and 23.9%) are 1.7 times and 1.3 times as high as the respective ratios in the Northern Region. In the third and fourth ranges of experience, the Northern and Central Regions ratios (24.4 and 24.5%) are respectively 2.6 and 2.8 times those in Eastern Region. Moreover the Northern Region has the highest percentage in the fifth level of experienced staff (6.7%) more than twice that in the Central Region (3.1%)*. However, it is also the Northern Region lowest ratio of less experienced teachers, higher proportions in the last 3

* Some values are non significant.

levels of experience that are attributable to the highest average salary (Table 8.2). Surprisingly, the extremely large discrepancies within each school size challenge the supposedly centralized norms and regulations that govern the distribution of teachers with different levels of experience between schools.

Allocations of teachers within the same region is far from being equitable in almost all levels of experience and great differences are evident. In the smallest and next smallest ranges of experience the Central Region has the largest disparities. The former ratio in the Medium School Size is 1.6 times that in the Small Size, whereas the latter ratio in the Small Size is even 2.4 times as high as that in the Medium Size. The variations in ratio of teachers in each of the last three ranges of experience are striking, though most values are non-significant. Almost all regions have no teachers in the most experienced range in one school size, others, even in two. However, it seems that the Large School Size in all regions, except Kordufan, have the lowest ratio of less experienced teachers. In the other ranges of experience this size has the next highest, if not the highest ratio as the level of experience rises.

Interestingly, all regions, except Kordufan, have the highest average salary in the Large School Size. Hence, the ratio of newly-recruited or less-experienced teachers with lowest average pay seems to have a critical effect on the overall level of average teachers' salary.

To sum up, it is evident that in all regions, within each school size the highest ratio is that of newly recruited teachers, with 1 - 5 years of experience. Variations among and within regions by size are mostly striking, indicating the absence of a systematic criterion for distributing teachers according to levels of experience according to their size. It is interesting to note that the low level of less experienced teachers, in the Large School Size, as well as the higher ratios of more experienced teachers are accountable for the highest average teachers' pay in the relevant regions (Table 8.2), as expected.

In the next largest range (16 - 20 years) the Largest School Size (16.6 %) is more than twice that in the Smallest (8 %) whereas, in the highest range of experience (over 21 years), the former size is almost ten times that in the Medium school (0.8%). As Table 9.9 illustrates, the mean percentage of teachers' years of experience in the Largest size is lowest in the less-experienced range, 1-5 years (40.6%), below the national average, identical to the national average in the range, 6 - 10 years (20.2%), highest in the more experienced range of 11 - 15 and 16 - 20 years (18.5% and 16.6% respectively) and identical to the national average in the most experienced range of over 21 years (3.1%). It confirms prior beliefs that this Size of schools retains the best qualified and experienced teachers. These averages conceal wide variations among regions within each size of school.

In the smallest size the percentage of newly-recruited, less-experienced teachers in the Eastern Region (66.7) is more than twice that in Central Region (29.8). The ratio of those in the next smallest range of experience in Kordufan (38.9%) is almost 1.8 times that in Eastern Region (22.2%), but in those with 11 - 15 years experience in Northern Region (25.9%) it is almost five times that in the Eastern Region (5.6%). In the next largest and the largest ranges of experience Central Region (13.2% and 17.2%) is four times that in the Northern Region (3.1%) and three times that in Kordufan (5.6%) respectively. In Medium Size Khartoum's ratio of teachers in the smallest range of experience (57.5%) is only 1.4 times that in Northern Region (41.4%). In the next largest range, the Eastern Region's ratio (23.1%) is twice that in the Central Region (11.2%). In the middle range the Northern Region (21.7%) is over two and a half times that in Khartoum (8.1%). Central Region (19.4%), in the next largest range, is more than two and a half times that in Eastern Region (7.7%). In the Largest School Size the Eastern Region ratio of less experienced teachers (52.9%) is 1.7 times that in the Northern Region (31.1%). In the Middle range Northern Region (24.4%) is 2.6 times

that in Eastern Region (9.3%). In the next largest range of experience, Central Region (24.5%) is almost three times that in the Eastern Region (8.8%), but in the largest range the Northern Region is over twice that in the Central Region.

In each region the ratio of teachers in different ranges of experience in the various school sizes differs markedly. Although in the smallest range of experience variation within regions between the three sizes is considerable, it is extraordinary at the higher ranges. The highest ratio of teachers in each range of experience, in one school size is often more than twice that in the other. this is true of the Central Region's ratios in the next smallest range, of the Eastern Region in Khartoum ratios in the middle range of the Northern, Central and Kordufan Regions, and Khartoum in the next largest range and of all regions in the largest range. In the latter range of experience the ratio of teachers varies from 0 and less than 1 to five or even ten times as much. However, the largest school size in most regions is favoured with a smaller percentage of less experienced teachers and a higher ratios of teachers with the next largest and largest years of experience.

9.4.2 Analysis of Teachers' Years of Experience by Region and Location of Schools:

Inter-locational comparison, Table 9.10, reveals that in all locations the mean ratios of teachers, in the smallest (1-5 years), the next smallest (6-10 years) and the middle (11-15 years) ranges of experience are similar, below or around the national average. Nevertheless, they differ markedly in the mean ratios of staff in the next largest and largest ranges. In the former range the Urban Centre's ratio is 1.7 times that of the Semi-urban whereas, in the latter range, this location is more than three times as high as that in the Rural areas. However, although the first three identical mean ratios for all locations implied similar teachers' salaries, (Table 8.3), yet the Urban

Table: 9.10

Percentage of Teachers with 1-5 years of Experience, 6-10 years, 11-15 years, 16-20 years and those with over 21 years of Experience by Region and Location of Schools.

Loc. of School	Years of Exp.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Urban	1-5	37.2 (14.9)	55.6 (7.9)	33.4 (16.0)	51.0 (8.8)	46.3 (14.6)	43.8 (15.1)
	6-10	22.7 (7.4)	23.3 (1.6)	19.1 (6.3)	24.2 (9.4)	20.6 (4.9)	21.3 (6.1)
	11-15	23.6 (9.6)	10.8 (7.0)	18.4 (6.6)	13.1 (3.2)	16.3 (8.1)	16.9 (8.0)
	16-20	11.7 (11.5)	7.7 (1.6)	22.0 (11.9)	10.6 (3.3)	13.9 (7.6)	14.2 (9.3)
	21 +	4.8 (4.9)	2.6 (3.0)	7.0 (14.8)	1.1 (2.5)	2.7 (2.8)	3.7 (7.2)
Semi-Urban	1-5			43.5 (14.2)			43.5 (14.2)
	6-10			22.5 (27.8)			22.5 (27.8)
	11-15			17.2 (14.9)			17.2 (14.9)
	16-20			8.6 (7.5)			8.6 (7.5)
	21 +			6.1 (10.5)			6.1 (10.5)
Rural	1-5			45.9 (22.1)	49.0 (.)	59.8 (10.8)	53.4 (14.0)
	6-10			10.8 (4.4)	22.5 (.)	18.6 (2.2)	16.7 (5.4)
	11-15			17.0 (2.3)	14.3 (.)	15.3 (5.2)	15.7 (3.6)
	16-20			22.8 (10.5)	14.3 (.)	3.0 (5.3)	11.5 (11.4)
	21 +			3.5 (4.9)	- -	1.5 (2.6)	1.9 (3.1)
Col Total	1-5	37.2 (14.9)	55.6 (7.9)	37.7 (16.0)	50.7 (7.9)	48.4 (14.7)	45.0 (14.9)
	6-10	22.7 (7.4)	23.3 (1.6)	18.6 (12.9)	23.9 (8.4)	20.3 (4.6)	20.8 (8.3)
	11-15	23.6 (9.6)	10.8 (7.0)	17.9 (8.0)	13.3 (2.9)	16.1 (7.6)	16.7 (8.0)
	16-20	11.7 (11.5)	7.7 (1.6)	19.1 (11.7)	11.2 (3.3)	12.2 (8.2)	13.5 (9.4)
	21 +	4.8 (4.9)	2.6 (3.0)	6.2 (12.2)	0.9 (2.3)	2.5 (2.7)	3.6 (7.0)

* Standard Deviation in Parenthesis.

Sector highest average teachers' pay is accounted for by the higher mean percentages of senior teachers.

In the Urban Sector discrepancy between the regions is noticeable in all years of experience percentages. The highest ratio of less experienced teachers in the Eastern Region (55.6%) is 1.7 times that in the Central Region (33.4%). This may expose the difference in the quality of education where more than half the teaching force is less experienced and hence untrained. In the other ranges of experience the differences are comparatively small. However, it is important to note the huge influence of increased years of experience on teachers' pay levels. The Central Region highest percentages of those within the next largest and largest ranges in the Urban Centres might explain the highest average teacher salary (Table 8.3). On the other hand, the higher ratio of young, less experienced teachers and the small percentages of teachers in the middle and next largest ranges accounted for the Eastern Region's lowest average pay in this location (Table 8.3).

In the Rural areas the range of variation in the smallest and next smallest ranges of experience is comparatively limited. However, larger disparities prevail in higher ranges. The Central Region ratios in the next largest and largest ranges respectively are seven times and twice those of Khartoum. However, despite the lowest ratio of less experienced staff and the highest ratios in all the other ranges of experience, the Central Region has the lowest average teacher salary (Table 8.3), whereas Kordufan has the highest. On the whole the average teacher's salary is lower in Rural areas in all regions as discussed earlier.

The discrepancies within the regions between the Urban and Rural locations in the ratios of teachers with different ranges of experience are limited. Yet the Urban Sector has the higher average pay while the Rural area has the lower in all regions, including Khartoum (Table 8.3).

To sum up, it is evident that the mean ratios of the Semi-Urban Centres are comparable in the percentages of all ranges of experience except the last two ratios, but the

Rural location has a higher ratio of less experienced teachers, a lower percentage in all the other ranges of experience; these factors affected the level of average teacher pay.

The discrepancies between regions in the ratios of experience levels are wider within the Urban Centres than in the Rural area. The region with more experienced teachers has the highest average pay and vice versa. In the Rural area the more experienced staff do not have the highest average salary; other policies may have contributed to that. Within Khartoum and the regions the slightly higher ratios of more experienced teachers in Urban Section may explain the wider variation in Urban/Rural average teacher pay.

9.4.3 Analysis of Teachers' Years of Experience by Region and Type of Schools:

As Table 9.11 displays, the mean ratios of all ranges of experience in all types of schools are similar and hold around the national average, except in the next largest and largest ranges.

In the Day Schools type the Eastern Region's highest ratio (50%) in the next smallest range is almost twice that in the Central Region (26%) but the latter region has the highest ratio in all the other range of experience. The seniority of staff in this Region's day schools may account for the highest average teacher's salary (Table 8.4).

In the boarding type, Kordufan Region has the highest ratios of less-experienced teachers in the smallest (49%) and next smallest (6 - 10 years) ranges (22.5%); each ratio is 1.6 times those in the Central Region. On the other hand, the Central Region, in this type of school, has the highest ratios in the middle, next largest and largest ranges of experience, twice that of Khartoum, Kordufan and Khartoum respectively. Nevertheless, Kordufan Region has the highest average teacher's pay (Table 8.4). Other criteria may have been applied here, as this is the Region's national school. However, in the Day and Boarding type, although Kordufan ratio of the less-experienced teachers is

Table: 9.11

Percentage of Teachers with 1-5 years of Experience, 6-10 years, 11-15 years, 16-20 years and those with over 21 years of Experience by Region and Type of Schools.

Type of School	Years of Exp.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Day Schl	1-5	29.8 (11.4)	50.0 (.)	26.2 (11.8)	48.7 (8.1)	48.4 (15.4)	42.4 (16.2)
	6-10	27.2 (8.5)	23.1 (.)	27.4 (14.0)	26.3 (9.4)	20.5 (4.8)	23.3 (8.3)
	11-15	28.1 (12.2)	19.2 (.)	16.5 (9.5)	13.1 (3.7)	16.8 (7.7)	17.4 (8.5)
	16-20	7.5 (8.2)	17.7 (.)	17.6 (12.1)	10.6 (3.8)	11.4 (7.6)	12.0 (8.4)
	21 +	7.5 (4.9)	- -	12.3 (16.4)	1.4 (2.8)	12.3 (2.8)	4.6 (8.3)
Boardg Schl	1-5			30.2 (.)	49.0 (.)	42.9 (.)	40.7 (9.6)
	6-10			14.0 (.)	22.5 (.)	17.9 (.)	18.1 (4.3)
	11-15			18.6 (.)	14.3 (.)	7.1 (.)	13.3 (5.8)
	16-20			30.2 (.)	14.3 (.)	28.6 (.)	24.4 (8.8)
	21 +			7.0 (.)	- -	3.6 (.)	3.5 (3.5)
Day and Boardg Schl	1-5	44.5 (16.2)	57.5 (8.5)	50.4 (10.5)	60.5 (.)	54.6 (.)	51.7 (11.0)
	6-10	18.2 (2.4)	23.3 (19.4)	10.6 (5.6)	15.8 (.)	18.2 (.)	15.9 (6.4)
	11-15	19.0 (4.7)	8.0 (5.1)	19.3 (7.5)	13.2 (.)	13.6 (.)	16.0 (7.2)
	16-20	16.0 (14.4)	7.7 (1.9)	18.7 (12.4)	10.5 (.)	9.1 (.)	14.5 (10.7)
	21 +	2.2 (3.9)	3.4 (3.0)	- -	- -	4.6 (.)	1.5 (2.6)
Col Total	1-5	37.2 (14.9)	55.6 (7.9)	37.7 (16.0)	50.7 (7.9)	48.4 (14.7)	45.0 (14.9)
	6-10	22.7 (7.4)	23.3 (1.6)	18.6 (12.9)	23.9 (8.4)	20.3 (4.6)	20.8 (8.3)
	11-15	23.6 (9.6)	10.8 (7.0)	17.9 (8.0)	13.3 (2.9)	16.1 (7.6)	16.7 (8.0)
	16-20	11.7 (11.5)	7.7 (1.6)	19.1 (11.7)	11.2 (3.3)	12.2 (8.2)	13.5 (9.4)
	21 +	4.8 (4.9)	2.6 (3.0)	6.2 (12.2)	0.9 (2.3)	2.5 (2.7)	3.6 (7.0)

* Standard Deviation in Parenthesis.

1.4 times that in the Northern Region yet the highest percentage within each range of experience is twice the lowest. Interestingly, the Northern Region has the highest average teachers' pay (Table 8.4) although it does not enjoy the highest ratios of more experienced teachers; other factors may have contributed to that. Although the Central Region has the lowest ratio of those with 6 - 10 years of experience (10.6%) which is half that in the Eastern Region, it has the highest ratio of those with 11 - 15 years of experience.

Within each region the Day Schools have the lowest ratio of less-experienced (1 - 5 years) and the higher, if not the highest ratio, in each range of experience. Interestingly, the higher the range of experience the wider is the discrepancy between the same region. In the most experienced range (over 21 years) the Northern Region Day Schools' ratio is three times as high as the Day and Boarding type, whereas the Central Region has the highest ratio in Day Schools and no teachers with this level of experience in Day and Boarding.

In summary it may be noted that variations among and within regions in the ratio of teachers in each range of experience by type of schools are considerable. Disparities are marked in the first and second ranges of experience in Day Schools and Day and Boarding Schools respectively. However, in the last three ranges of experience, the ratio of teachers differs markedly among regions in all types of schools.

9.4.4 Analysis of Teachers' Years of Experience by Region and Kind of School:

Table 9.12 indicates that the discrepancies between the mean ratios of teachers in Girls' and Boys' Schools in the different ranges of teaching experience is very limited; all cluster around the national averages. However, in both kinds of schools, these mean ratios conceal large discrepancies among regions.

Table: 9.12

Percentage of Teachers with 1-5 years of Experience, 6-10 years, 11-15 years, 16-20 years and those with over 21 years of Experience by Region and kind (Gender) of Schools.

Kind of School	Years of Exp.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Girls School	1-5	42.1	61.2	52.5	58.6	42.8	48.6
		(28.9)	(7.7)	(6.5)	(2.7)	(14.9)	(14.2)
	6-10	23.9	23.9	12.5	16.2	22.1	19.5
		(4.4)	(2.4)	(5.8)	(0.6)	(5.3)	(6.4)
	11-15	24.6	5.1	18.9	13.3	20.5	18.2
		(11.2)	(0.6)	(7.7)	(0.1)	(6.7)	(8.1)
	16-20	8.1	7.4	13.9	11.9	11.4	11.4
		(11.5)	(2.7)	(2.7)	(2.9)	(8.8)	(6.8)
	21 +	1.4	2.3	1.1	-	2.6	1.8
		(1.9)	(3.3)	(2.4)	-	(3.0)	(2.6)
Boys School	1-5	34.7	50.0	28.5	46.8	53.5	42.4
		(8.2)	(0.0)	(12.6)	(6.2)	(13.2)	(15.2)
	6-10	22.1	22.7	22.5	27.7	18.6	21.8
		(9.2)	(0.6)	(15.0)	(7.7)	(3.3)	(9.3)
	11-15	23.1	16.6	17.3	13.3	12.2	15.7
		(10.6)	(3.8)	(8.6)	(3.8)	(6.3)	(7.8)
	16-20	13.6	8.0	22.3	10.8	12.9	15.0
		(12.7)	(0.5)	(14.1)	(4.0)	(8.1)	(10.8)
	21 +	6.6	2.8	9.5	1.4	2.5	4.9
		(5.1)	(3.9)	(14.9)	(2.8)	(2.6)	(8.7)
Col Total	1-5	37.2	55.6	37.7	50.7	48.4	45.0
		(14.9)	(7.9)	(16.0)	(7.9)	(14.7)	(14.9)
	6-10	22.7	23.3	18.6	23.9	20.3	20.8
		(7.4)	(1.6)	(13.0)	(8.4)	(4.6)	(8.3)
	11-15	23.6	10.8	17.9	13.3	16.1	16.7
		(9.6)	(7.0)	(8.9)	(2.9)	(7.6)	(8.0)
	16-20	11.7	7.7	19.1	11.2	12.2	13.5
		(11.5)	(1.6)	(11.7)	(3.3)	(8.2)	(9.4)
	21 +	4.8	2.6	6.2	0.9	2.5	3.6
		(4.9)	(3.0)	(12.2)	(2.3)	(2.7)	(7.0)

* Standard Deviation in Parenthesis.

Boys' Schools' lower mean ratio of the less-experienced teachers and higher mean ratios of those at more senior levels can account for the higher mean average teachers' salary (Table 8.5).

Within Girls' Schools the Central Region percentage of teachers with less experience is less than five times the Northern Region's. In the next smallest range the Northern and Eastern Regions is twice that in the Central Region but, in the middle range Northern Region has the highest percentage, almost five times that in the Northern Region. In the more experienced range, the next largest Central Region, again has the highest ratio, almost twice that in the Eastern Region, whereas, in the largest range, Khartoum highest percentage is more than twice the Central Region's. However, the Northern Region's lowest ratio of less-experienced teachers, highest ratios of the next smallest and middle ranges, and comparable ratios in the last two ranges could explain the highest average of teachers' salary (Table 8.5).

On the other hand, in Boys' Schools, Khartoum ratio of less-experienced is almost twice that in the Central Region whereas Kordufan ratio in the next smallest range is 1.5 times Khartoum's. Northern Region's highest ratio in the middle range of experience is twice that in Khartoum, 1.4%. however, in this kind of school, it is also the Northern Region that has the highest average teacher salary, although most of its ratios of ranges of experience are average or higher than average.

It is important to note that Girls' Schools within each region have the higher ratios of less-experienced teachers and a level percentage of experienced teachers, especially in the last two ranges; except in Khartoum where ratios in both kinds of schools are comparable. However, Boys' Schools have the highest average pay or identical pay in all regions, except in Khartoum.

To sum up, it is noticeable that variations in the mean ratios of teaching experience in Girls' and Boys' Schools are very limited. Discrepancies in Girls' Schools are

considerable in the percentages of experience in the first three ranges of experience but in Boys' Schools it is wider in the first range and considerable in all the other ranges. It is interesting to note that Boys' Schools have the higher average pay and the Northern Region has the highest average pay in both Girls' and Boys' Schools, higher for the latter; not accounted for only by the seniority of staff.

In concluding the discussion on the Teachers' Years of Experience it is interesting to record the high ratio of less-experienced, newly-recruited teachers. This can have serious consequences for the quality of education, taking into consideration that more than three quarters of these teachers have no initial or pre-service training, as discussed earlier. As there is an adequate supply of university graduates in all relevant specializations for the teaching profession, it may be more cost-effective to adopt the 'Post Graduate Certificate of Education' programme to raise the teachers' professional qualifications. However a striking characteristic of teachers' years of experience ranges is the systematic decline in the ratios with more years of experience. It clearly indicates the inability of the education system to retain more experienced, more trained teachers.

The variations in the ratios of less-experienced and different ranges of experience within each size is extremely wide among regions, the locations, types and kinds of schools and even within the same region. A clear policy of distribution of experienced teachers is not indicated. Hence average teacher salary is higher in the Urban Sector and in Boys' Schools.

At this stage it is important to identify the type and strength of relationship between average teacher salary and these teachers' attributes, which are known to influence it and examine how they all relate to total unit expenditure and unit expenditure on teachers salaries. Table 9.13 shows, as expected, that average teacher salary is significantly related to higher range of teaching experience, 11-15 years and over (r = .4848, .3997, .3830

Table: 9.13
Correlation Coefficient

	TUE	ATS	UETS	Untra	Exp1-5	Dip&MS	Exp6-10	Exp11-15	Exp16-20	Exp21+	TTI	U.grad
ATS	.2482 SIG .089											
UETS	.7324** SIG .000	.2243 SIG .125										
Untra	.0902 SIG .542	-.2378 SIG .104	.0274 SIG .853									
Exp1-5	-.3691* SIG .010	-.7755** SIG .000	-.3221 SIG .026	.3328 SIG .021								
Dip&MS	-.1431 SIG .332	.0629 SIG .671	.0519 SIG .726	-.3901* SIG .006	-.0881 SIG .552							
Exp6-10	.6187** SIG .000	.2747 SIG .059	.5532** SIG .000	-.1474 SIG .317	-.3798* SIG .008	.0608 SIG .681						
Exp11-15	.2053 SIG .162	.4848** SIG .000	.2009 SIG .171	-.0702 SIG .635	-.4904** SIG .000	.0180 SIG .903	-.1033 SIG .485					
Exp16-20	-.1116 SIG .450	.3997* SIG .005	.0855 SIG .563	-.0914 SIG .537	-.4763** SIG .001	.1709 SIG .245	-.2061 SIG .160	.1734 SIG .238				
Exp21+	.1146 SIG .438	.3830* SIG .007	.0027 SIG .986	-.4104* SIG .004	-.5372** SIG .000	.2136 SIG .145	.2305 SIG .115	.0700 SIG .636	.0683 SIG .645			
TTI	-.1753 SIG .233	-.1430 SIG .332	.0528 SIG .721	-.5101** SIG .000	.0622 SIG .675	.2578 SIG .077	-.2476 SIG .090	.1437 SIG .330	.1382 SIG .349	.0983 SIG .506		
U.grad	-.4280* SIG .002	-.1176 SIG .426	-.2564 SIG .079	.0006 SIG .997	.1040 SIG .482	-.1436 SIG .330	-.2559 SIG .079	.0652 SIG .660	.0259 SIG .861	-.1748 SIG .235	-.0046 SIG .975	
Sch.s	-.4175* SIG .003	.1773 SIG .228	-.1174 SIG .427	-.2968 SIG .041	-.1030 SIG .486	.5881** SIG .000	-.1656 SIG .261	.1664 SIG .258	.3935* SIG .006	.1421 SIG .335	.2805 SIG .053	.2885 SIG .047

* - SIGNIF.LE.01 ** - SIGNIF.LE.001 (2-TAILED, " . " PRINTED IF A COEFFICIENT CANNOT BE FOUND)

respectively). Interestingly, the strength of the association declines with more experience. It may be due to the smaller number of teachers the higher the experience pyramid and hence the influence of their salary level. The strongest negative correlation is with newly recruited, inexperienced teachers, 1-5 years, (r = -.7755); highly significant (at .001 level). Average salary is also negatively related to untrained and graduates of university and higher teachers training Institutes. This clearly indicates that training is synonymous to experience - in that it comes later in the teacher's life - and that the higher the number of untrained and new graduates the lower the average salary. On the other hand, total unit expenditure and unit expenditure on teachers pay are strongly and positively related (r = .6187 and .5532 respectively) with a lower range of experience, 6-10 years; most probable because the majority of teachers are in this range and that affects the total salary bill. Correlations between total unit costs and new graduates and those with limited experience 1-5 years are negative and fairly strong; significant (at .01 level). As other studies indicated the higher the number of new teachers at the bottom of the salary scale the lower the unit costs. It is important to note that the ratio of teachers with higher qualification (Dip&MS) and the ratio of those highly experienced (16-20) are positively related (r = .5881 and .3935) to the school size, and significant at .001 and .01 levels respectively. Similar to other empirical research, large well established schools retain the highly qualified and experienced staff.

9.5. Conclusion:

To sum up the analysis of teachers characteristics, it is interesting to note that the large majority of secondary schools teachers possess the necessary qualification for teaching at this level (84.3%); contrary to many countries in the region. Yet, a high percentage lack pre-service, professional training, described by researchers in the field

as 'essential' for the teacher to do a proper job. This may have an adverse effect on the teaching and learning conditions as most schools lack the highly experienced staff that may guide beginner teachers in their early years.

Nevertheless, striking variations are observed between regions in the distribution of teachers by qualification, types of training and years of teaching experience; not less within the region. Generally, the Large Schools Size, the Urban Centres, the Day Schools Type and Boys Schools have the highest percentage of qualified staff, professionally trained, holders of post-graduate degrees, the largest percentage of those in the higher ranges of experience and the least ratio of untrained.

In this situation where almost all teachers have the required qualification and in-service training does not have a high financial returns, teachers salaries are determined by seniority and years of experience. This, clearly indicates that teachers compensation system is based on teaching experience. As such, the marked disparities in teachers' years of experience are accountable for the variations in average teacher salary between and within regions, as revealed above. The strong positive correlation between higher ranges of experience and the average salary, and between the ratio of teachers with higher qualification (Dip&MS) and the ratio of those highly experienced (16-20) and the school size further confirm that large well established schools attract highly qualified, experienced teachers and thus have the highest salaries.

CHAPTER TEN

BOARDING SCHOOLS COSTS

10.1. Introduction:

Reduction of unit costs, in all levels of education, in both developed and developing countries, was a matter of great concern in the past. Recently the need for such a measure is more urgent as the financial situation becomes more stringent. Cohn and Riew (1972) summarized the problem thus: "Considering the large magnitude of the resources going into public education and the present financial strain confronting the state and local governments, the question of how we can minimize the costs of schools is of a paramount importance". In developing countries the situation is far worse. "All relevant statistical data indicate that the cost of educational investment must be reduced if its profitability is to increase and if further expansion or improvement is to take place, despite budgetary constraints" (Psacharopoulos and Woodhall, 1985).

Research studies in many developed countries drew attention to the high per pupil expenditure, and to the lower quality of schooling in many small-size schools in sparsely populated and remote rural areas. Hind (1977) warned that rural depopulation had called into question the economic viability of many rural institutions and even the quality of schooling. As school budget is tied to the number of pupils small schools cannot afford the high costs of expensive facilities, offer fewer optional subjects and, with fewer students attending specialized classes, per unit costs are relatively more expensive. According to Kenny (1982) "students who attend a small school may not receive the same quality of education as students who attend a large school with the same instructional resources per student".

Thus, out of the many options available, centralisation of small schools in sparsely populated areas became more favoured in the late sixties and early seventies. Coombs

and Hallak (1972) reported that in Norway, the U.S.S.R. and Ireland small rural schools, as well as a large number of independent school districts in the U.S.A. were consolidated into larger units in order to achieve better education at a feasible cost. As Hirsch (1969) noted, the policy of consolidating metropolitan area governments was widely advocated on the premise that it would reduce the per capita expenditures of local government services. At higher levels of education, for instance secondary, academic, technical or comprehensive schools, teachers' salaries constitute a high percentage of the education budget and school equipment and facilities are extremely expensive. Riew (1966) believed that for a satisfactory high school programme various equipment and provisions for science laboratories, language, music and vocational training are basic and essential. Such expensive provisions, demanded by present day education, can only be borne by institutions where the number of pupils are large enough to use fully the specialized capacity and lower the unit costs.

As discussed later in Chapter 11, studies investigating economies of scale or size have revealed the considerable amount of savings gained as the scale of public schools operations became larger and the influence of larger size on the quality of education (Riew, 1966). According to Coombs and Hallak (1972) "as a general rule, the more advanced the level and the more scientific or technical the program, the larger the institution's size must be to achieve acceptable costs and a satisfactory educational program". However, this level of cost and standard of provision is achieved, in developed countries (in urban and rural locations) and, in developing countries (mostly in urban centres) through transporting or bussing students to and from schools. Kenny (1982) noted that the total cost of a given quality of schooling is minimized by expanding the school until the increase in average transportation costs associated with adding one more student is just offset by the decrease in average instructional costs associated with adding one more student. The Committee for Economic Development Study

(1959) highlighted the maximum and minimum ranges of student transportation to schools - "In only 19 states, ... is the average geographic area covered by a school system as much as 225 square miles - equivalent to an area 15 miles square ... in 21 states it is less than 49 square miles". In developing countries, even the latter, smaller radius (7 miles) may not be an easy target to reach in the absence of adequate public transport in rural areas. In many developing countries transportation outside the big cities and towns is a problem, even in normal conditions. During the rainy season the unpaved roads are inaccessible and most villages are cut off from the pole city they surround. Nevertheless the attractive notions of consolidating smaller primary schools in the rural areas and expanding institution size at higher levels to gain economies of size as the scale of the operation in these establishments becomes more efficient are achieved through providing 'boarding facilities' within or outside the school premises. "Up to a point it is cheaper to transport day students from a wide area but, beyond a certain radius (much narrower in developing countries) boarding facilities become essential" (Coombs and Hallak, 1972). However this optimum radius differs according to the level of education and the age of students. Chesswas and Hallak (1972) estimated that, in Uganda, (secondary education) a day school could economically serve pupils who were living up to a distance of 65 miles; beyond this distance it was necessary either to replace the day schools by boarding schools and provide boarding facilities or to build new day schools.

On the other hand, Coombs and Hallak (1987) noted that "some advocates of boarding argued that it is qualitatively superior to day schooling because the learning environment is better than in students' homes", but they noted that "there are not any empirical studies of which we are aware that cast light on these matters". However, research studies in developing countries revealed that boarding schools made a significant contribution to student academic achievement. Alexander and Simmons' (1975) review of

related literature asserted the "... the removal of the student from the home environment into a learning environment at school did have an important impact on his performance ... the longer he remains at school and the more he has studied the subject being tested the higher will be his achievement".

Thias and Carnoy's (1969) study of secondary education in Kenya related student performance in the Cambridge School Certificate examination (dependent variable) to a number of independent variables, including 'percentage of boarders'. They found that one of the only two significant variables was the boarders' numbers: "the more boarders in the student body, the higher the score". This was an important finding in an African context where boarding schools serve rural students who come, generally, from poorer families. That may indicate that if students of a lower socio-economic class are exposed to an environment conducive to learning it may modify the influence of their home background. But Simmons' (1972) study of Tunisia's rural and urban primary schools, which regressed scholastic achievement in Arabic, French and arithmetic against out-of-school variables, school-inputs and family background, did not include the 'boarding' variable. However, the importance of good homework conditions and the physical conditions of home study (which were found to have a significant effect on achievement) may imply the crucial role of boarding facilities. Interestingly, this "is consistent with the negative impact on achievement of living on a farm and its alternative demands on a student's time" in this study" (Alexander and Simmons, 1975).

Carnoy and Thias' (1974) large scale study of Tunisian secondary education tested seven dependent variables against three major blocks comprising home background, pupil characteristics (including whether boarding at school) and teacher characteristics. Out of these seven only current year grade point average (GPA) was found to be well explained by the independent variables. One of the five explanatory variables which was consistently, positively

significant across most grades of secondary school at a 0.01 level of significance at most, was 'whether the student boarded at school'. Nevertheless, the reviewers of these studies were wary of making a policy recommendation to increase boarding facilities on the basis of this later study. As the socio-economic status was generally found not significant in determining student achievement in this study, they suspected that "it is possible that boarding is a proxy for SES and that it picks up most of the effects of home background, since only the relatively well-off can afford to send their sons to boarding school" (Alexander and Simmons, 1975). This notion, however, was refuted by the study on Kenya, where boarding schools which served the lower socio-economic classes in the rural areas proved to be the most important variable in explaining student examination scores. However, it is legitimate here to recall Heyneman's (1986) conclusion on the influence of socio-economic class on academic achievement in low-income countries: "the evidence from Africa appeared to deviate the most from what one would expect, given the findings from industrialized countries". This was asserted by Silvey's (1972) Ugandan study when he reported that parental education (of high socio-economic students) was not related to scholastic achievement performance in 'any meaningful way'. Moreover, Murphree (1973) found, in Zimbabwe, higher performance from children of illiterate homes than from the more privileged.

Eventually, Alexander and Simmons (1975) conceived that boarding "may indicate a broader hypothesis, namely that the important schooling variables are those which increase the student's exposure to learning and to the schooling environment, even to the point of living there full time". On the other hand, other studies (Carnoy, 1971a) indirectly supported the findings of Kenyan and Tunisian studies, above, that the length of exposure to a schooling environment had an important impact on achievement which in this case was the 'number of hours students attend school'. On the whole the 'boarding variable' is one of "those

policies which positively influence performance in some studies but have negative or no influence in others" (Alexander and Simmons, 1975).

Beebout's (1972) study of upper secondary level in West Malaysia was one of the latter type. The research attempted to relate an index of performance (as indicated by the difference between entrance examination and completion examination scores at this level) to student background, school inputs, out-of-school educational inputs such as 'boarding school or not' as well as conditioning factors which might modify school inputs. He found no influence of the variable 'boarding school' on the student's performance, contrary to the studies in other developing countries cited above. Hence Alexander and Simmons (1975) concluded that "... the extension of boarding facilities cannot be recommended for all developing countries without pilot studies being undertaken". Nevertheless the boarding school benefits extend beyond the school output to the student life-time earnings. Heyneman's (1980) data on Malawi revealed that the distinction between a boarding and a day secondary school was the third strongest of five predictors of later earnings in a regression equation. Schiefelbein et al.. (1983) argued that "the Malawi Government places students with the highest scores on the Primary School Leavers Examination in boarding schools and then allocate the remainder to day-schools. Hence, part of the observed relationship between school type and examination performance may be due to student selection rather than school quality".

However, it is evident that schools in developing countries do make a difference and this difference may be achieved if the student is removed from his home environment, (which is less conducive to learning) and exposed to a better one at school. Although boarding school impact on student achievement was not significant in all studies, "nevertheless it should be regarded as a variable with high potential to improve student performance" (Alexander and Simmons, 1975).

A Boarding-school, as defined by the International Dictionary of Education, is "a school providing accommodation and meals for the majority of its pupils". This system of schools was first introduced into many African countries by colonial governments and Christian missionary societies. Gadsby (1980) quoted an advertisement that summarized the objectives of boarding schools in the nineteenth century "A boarding school to be opened ... Such parents as may be inclined to intrust them (the teachers) with the education of their children may depend upon the utmost attention being paid to their health, morals and instruction".

In the Sudan the concept of boarding education dates back to the seventeenth century when the Koranic schools system, 'Khalawi', was established. "This system of free and voluntary education, with its free and voluntary boarding facilities, not only catered for the needs of the community but also provided for the spiritual needs of the individual, moulding him in the stream of life through its character training and enabling him to enter and participate in the social and cultural life of the community" (Beshir, 1969). It is rather interesting to note the emphasis of both boarding systems on the 'morals', 'character training' and 'spiritual needs' of their clientele despite the difference in time, distance and (more importantly) religious beliefs. Burkhardt (1819), referred to in Beshir (1969), noticed that "wherever young men are sent to them (the Shaigia Tribe) from the adjacent countries for instruction the chief of the Ulama distributes them among his acquaintances in whose houses they are lodged and fed as many years as they choose to remain". On the other hand boarding schools in secular education were known only during the Turkish Rule. According to Beshir (1969) a primary school was established, on the Egyptian pattern, in 1853 to admit the sons of tribal chiefs from Dongula, Khartoum, Sennar and Kassala and also the sons of Turkish personnel resident in Khartoum. He reported that the course would

last for three years and all the students (7 - 12 years) would be resident.

During the Anglo-Egyptian colonization the concept of boarding schools gained more momentum. Secondary education was full-boarding in the rural areas (being outside the capital, Khartoum). Although the main objective might have been the gains from economies of size, explicitly the aims were "... to bridge the gulf between the educated classes of the towns and the majority who lived in the country-side, and ... to educate the rural population and broaden the outlook of the educated townsmen" (Beshir, 1969). The first three full-boarding secondary schools (established in the late 1940s), namely Wadi Siedna (Khartoum), Hantoub (Central Region) and Kor-Taget (Kordufan) are operating as national schools, their catchment areas are all regions: "to promote national unity and peaceful co-existence, and understanding between the country's future elites". However, Coombs and Hallak (1987) reported that advocates of boarding also claim that "boarding promotes national unity by bringing students from different regions and groups together in schools", although they found no empirical studies to support this.

After independence (and to date) these reputable, full-boarding schools, similar to the situation in Malawi, above, accept students with the highest scores in the 'Intermediate School Certificate Examination'. However, students in all levels compete for boarding facilities and are accepted into vacancies in this type of school according to their scores in terminal examinations (except at the lower levels) but the endorsement of universal goals such as 'equality of educational opportunity', 'equity', not only in 'access to' but 'success in education' necessitates the expansion of this system to facilitate the acceptance of students from deprived socio-economic classes and those in remote rural areas. Initially, boarding schools were established to achieve economies of size and hence as a measure of cost reduction. So "it has become customary to set up boarding houses in which are housed pupils from remote places who

fill vacancies in low density schools" (Education Sector Review, 1977).

The continuous increase in social demand for education at all levels and the need for more boarding schools raised the costs of education. The Sudanese Education Sector Review (1977) showed that the number of boarders at the primary level was 10.2%, at intermediate 22.6%, in the academic secondary 30.9%, but in technical education 98.6%

It is interesting to note the increase in boarding facilities at the higher and more expensive levels of education. Hence, the above Review recommended the "abolishing of boarding at the primary level and allowance for it at other levels only in cases of extreme necessity, while inviting the parents and the public to participate in boarding expenses".

Table 10.1 indicates that, a decade after this recommendation, the number of boarders is on the increase. The high growth rate of the school population reveals that the apparent decline in ratios from 1975 does not mean reduction in numbers. Thus abolishing this facility, even at the primary level, may not be possible in almost all regions except Khartoum. It is important to record that the averages for the whole of the Sudan conceal striking variations between regions at all levels of education. In basic education (primary), Khartoum abolished boarding facilities and the Central Region is almost approaching that stage (0.5%) but Kordufan, with an enrolment rate of 42.5% and Darfur, with only 38.8% (Education Statistics 1987/88) have 17.4% and 11.6% of their primary children in boarding-schools. Instead of abolishing boarding these regions need more facilities if UPE is to be achieved as planned. In the Intermediate level the discrepancy extends from only 1.1% in Khartoum to 37.2% in Kordufan. Again, at the academic secondary level, Khartoum has only 3.4% in boarding schools, whereas the Northern Region ratio is 58.3%. On the other hand the national average for technical education is 47.4%. This average includes 100% boarding schools for agricultural education but no such facilities for womens' Education; that

Table: 10.1

Number of Pupils, Boarders and their ratios at different levels of general education in 1987/88 by Region.

Region		Primary	Inter-mediate	Academic Secondary	Technical Secondary
Northern Region	Pup	190293	54087	17451	
	Bo	4237	14704	10167	
	%	2.2	27.2	58.3	
Eastern Region	Pup	186254	34129	9066	
	Bo	6713	5345	1987	
	%	3.6	15.7	21.9	
Central Region	Pup	579977	123503	31240	
	Bo	2671	12780	13174	
	%	0.5	10.4	42.2	
Kordufan Region	Pup	283690	38766	9999	
	Bo	49377	14410	4159	
	%	17.4	37.2	41.6	
Khartoum	Pup	278498	96529	27916	
	Bo	-	1025	936	
	%	-	1.1	3.4	
Darfur Region	Pup	239171	26101	7311	
	Bo	27635	7228	2499	
	%	11.6	27.7	34.2	
All Sudan	Pup	1,932496	399426	170341	*17770
	Bo	90633	55492	32922	8414
	%	4.7	13.9	19.3	47.4

Source : Compiled by the researcher from the Educational Statistics Book, 1987/88, Ministry of Education Khartoum Sudan.

* Only Government schools - no aided schools included.

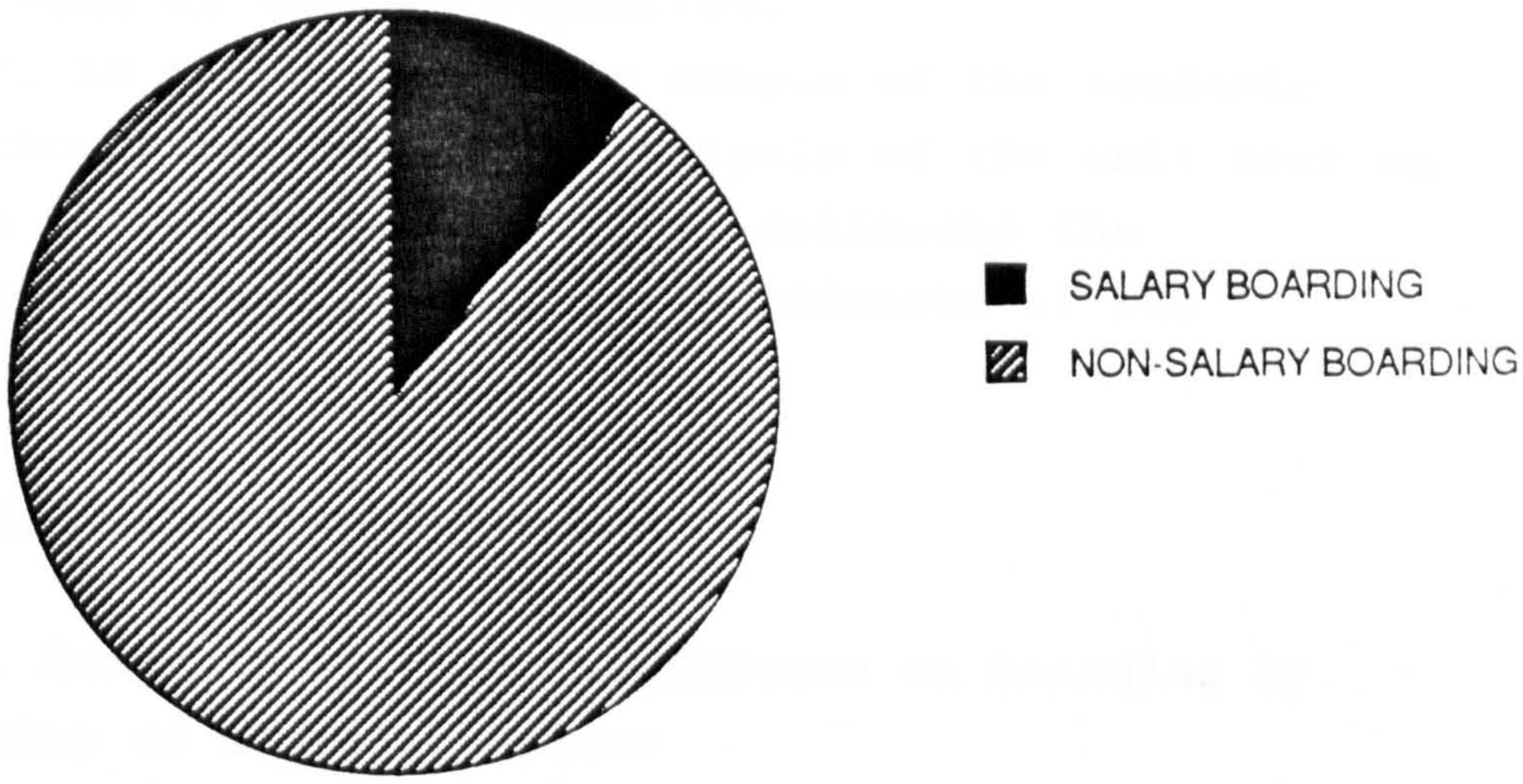
influenced, adversely, the latter type which used to accept a very high percentage of girls from the rural areas.

However, although boarding schools were believed to be a solution for reducing unit costs in otherwise small rural schools and at higher levels, it proved to be very expensive and a heavy burden on many developing countries' squeezed education budget. Radi (1982), in a study of secondary schools in Morocco found that the boarding schools cost was 2.7 times as high as day schools at lower secondary and 1.9 times as high at upper secondary. A more recent study of general education in the Sudan (Salih, 1986) found that the unit costs on boarding at the secondary level is 1.3 times as high as the day schools, 2.2 times as high at the intermediate (lower secondary) and as high as 2.6 times that at Primary. In the 1975/76 academic year the unit cost on boarding for academic secondary schools was found to be £s 23.12, only 19.6% of the total per pupil expenditure on schooling (Sudanese Education Sector Review, 1977). This emphasizes the long-term rising trend of unit costs on boarding facilities which, due to high inflation, are paid for a declining quality of service. Coombs and Hallak (1987) recently asserted the importance of analysing separately expenditure on day schools and on boarding schools to highlight such problems. They claimed that "separate unit costs figures ... for secondary boarding and day schools ... will serve many more useful purposes more accurately, than broader averages for mixed categories".

The data on boarding in academic secondary schools included 17 schools, three full boarding national schools and fourteen mixed day and boarding schools. Most of the regions are represented by one or two schools in the different contexts. Although, statistically, information from such a small number of schools may not be reliable, at least it may give some indication about boarding costs in these situations. Figure 10.1 displays the components of the unit costs on boarding - namely salary boarding and non-salary boarding. It clearly reveals the dominant ratio of non-salary expenditure, mainly on food stuffs which are more

Figure 10.1

Components of Unit Expenditure Boarding



readily affected by the high rate of inflation than wages generally. The following discussions on boarding expenses would throw light on the costs of this facility and may question whether the gains from economies of size justify the expenditure incurred.

However, variations in per pupil costs on boarding are hypothesized to be a function of a number of explanatory variables. The first one which gained overall consensus is the number of boarders or the 'size of the boarding house'.

This can be understandable as, at least, the boarding budget for food, staff and miscellaneous, is calculated on a per boarder basis; the larger the number of boarders the higher is the expenditure on feeding them. The second function is the size of the school itself. Tibi (1989) noted that "the size of the institution may also be considered as an explanatory factor in salary expenditure relating to boarders, in so far as some of the non-teaching (administrative) staff work both in relation to boarders and also as part of the general organization of the

establishment". The third factor is the location of the boarding house, the region it is in and whether this is an urban centre or rural area makes a difference. Finally, whether the boarding facility serves Girls' Schools or Boys' may explain some of the discrepancies.

However, in the case of this sample of the academic secondary schools the following analysis of the unit cost on boarding, in the above sequence, may delineate the behavioral pattern and principal determinants of the boarding schools costs.

10.2 Unit Expenditure on Boarding:

10.2.1. Analysis of Unit Expenditure on Boarding by Region and Size of Boarding House:

As Table 10.2 displays the national average per pupil expenditure on boarding is £s 1047.93 - note, however, that the unit cost on Boarding only is 1.7 times as high as the per pupil costs of schooling, £s 617.34 as Table 7.1 earlier shows. It is important to note that the mean per boarder costs of the Boarding House sizes do not show any logical progression as the size range increases.

Striking discrepancies are obvious within the same boarding house size. In the small Boarding House size of (up to 300) per boarder costs in the Central Region is 58.7% of that in Kordufan, in the (301 to 400) size it is 54.9% of that in the Northern Region and in the largest size (of over 600) it is only 46.2% of that in the Kordufan Region. It is noticeable that for all the other regions and Khartoum the per boarder costs are above the national average in all Boarding House sizes. The extremely low costs per boarder in the Central Region, however, pulled down the mean costs in the three respective Boarding House sizes and lowered the national average.

On the other hand, wide variations are observed within each region, but are less marked than the inter-regional level. Although the discrepancy within the Northern Region between the different boarding-house sizes is 21%, in

TABLE: 10.2

Total Unit Expenditure (£s) for Boarding by Region by No of Boarders

No of Boarders	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 up to 300		1286.3156	1119.7690	762.4630	1298.0430		1066.9416
		1	3	2	1		7
		1286.32	3359.31	1524.93	1298.04		7468.59
		.	83.6167	311.1074	.		260.1572
2 301 to 400		1057.9011		580.2120			699.6343
		1		3			4
		1057.90		1740.64			2798.54
		.		290.4429			336.5781
3 401 to 600		1096.1455				1620.9433	1446.0107
		1				2	3
		1096.15				3241.89	4338.03
		.				216.4608	339.4583
4 over 600 Boarders				770.8222	1668.0096		1069.8847
				2	1		3
				1541.64	1668.01		3209.65
				21.9894	.		518.2247
Column Total		1146.7874	1119.7690	686.7438	1483.0263	1620.9433	1047.9303
		3	3	7	2	2	17
		3440.36	3359.31	4807.21	2966.05	3241.89	17814.81
		122.3386	83.6167	232.9656	261.6059	216.4608	393.5530

Kordufan it is 21% and even more than 32% in the Central Region. In all regions Kordufan has the highest per boarder costs in the largest size, followed by Khartoum.

Discussions of the components of per boarder costs and their indicators may reveal the factors that contributed to this level of costs in this Region.

10.2.2 Analysis of Unit Expenditure on Boarding by Region and Size of School:

Table 10.3 demonstrates the variations between and within regions in the various school sizes. The mean costs per boarder reveals, unexpectedly, an increasing cost pattern as that size of school increases. In the smallest size (up to 400) the mean costs, £s 818.74, is only 70.4% of that in the largest size (over 800 boarders) £s 1162.97.

Parallelling the situation in the previous Table 10.2 the Central Region has the lowest per boarder costs within each school size; 50%, 43% and 47% of the highest costs in the Eastern Region, Khartoum and Kordufan Region respectively. As all the regions and Khartoum have per boarder costs above the national average and the various school sizes means, it is the Central Region costs that pushed down these averages. Kordufan Region, as noted previously, has the highest per unit costs, followed by Khartoum. In each region disparities are observed but are far lower than that between regions. Although minimal in Eastern and Northern Regions they are as high as 28.5% in Kordufan and even 45% in Central Region. Further analysis may shed more light on this unique situation.

10.2.3 Analysis of Unit Expenditure on Boarding by Region and Location of Schools:

Table 10.4 exposes the discrepancies in per boarder expenditure by region and location of the establishment. It is important to note that the mean costs in the Urban and Rural locations are almost identical and above the national average, but they are more than twice that in the Semi-urban centres.

TABLE: 10.3

Total Unit Expenditure (£s) for Boarding by Region by Size of School

Size	Mean / Count / Sum / Std Dev	REGION Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1			1095.0000	542.4769			818.7384
up to 400			1	1			2
			1095.00	542.48			1637.48
			.	.			390.6929
2		1172.1084		695.6717	1298.0430	1620.9433	1036.2505
401 to 800 pupil		2		5	1	2	10
		2344.22		3478.36	1298.04	3241.89	10362.50
		161.5134		271.3396	.	216.4608	439.2663
3		1096.1455	1132.1535	786.3710	1668.0096		1162.9666
over 800 pupils		1	2	1	1		5
		1096.15	2264.31	786.37	1668.01		5814.83
		.	114.2946	.	.		322.6143
Column Total		1146.7874	1119.7690	686.7438	1483.0263	1620.9433	1047.9303
		3	3	7	2	2	17
		3440.36	3359.31	4807.21	2966.05	3241.89	17814.81
		122.3386	83.6167	232.9656	261.6059	216.4608	393.5530

TABLE: 10.4

Total Unit Expenditure (£s) for Boarding by Region by Location

Location	Mean / Count / Sum / Std Dev	Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Urban		1146.7874	1119.7690	833.2350	1298.0430	1774.0043	1124.6747
		3	3	3	1	1	11
		3440.36	3359.31	2499.71	1298.04	1774.00	12371.42
		122.3386	83.6167	129.2667	.	.	280.2450
2 Semi-urban				489.3266			489.3266
				2			2
				978.65			978.65
				345.1859			345.1859
3 Rural				664.4239	1668.0096	1467.8824	1116.1850
				2	1	1	4
				1328.85	1668.01	1467.88	4464.74
				172.4592	.	.	537.3142
Column Total		1146.7874	1119.7690	686.7438	1483.0263	1620.9433	1047.9303
		3	3	7	2	2	17
		3440.36	3359.31	4807.21	2966.05	3241.89	17814.81
		122.3386	83.6167	232.9656	261.6059	216.4608	393.5530

Disparities within the Urban and Rural areas are striking. In the Urban Sector Khartoum per boarder costs are more than twice that in the Central Region; whereas in the Rural area Kordufan unit costs is more than two and a half times that in the former region. It is evident, again, that the Central Region has the lowest per boarder costs in these locations which reduced their mean costs and the national average.

Urban Centres are more favoured in the Central Region and Khartoum with higher per boarder expenditure whereas Kordufan spends more per boarder in Rural areas. However, the disparities between the two locations is 28.5% in Kordufan and 20.9% in Khartoum, but in the Central Region it is more marked, over 70%. The discussion of the components of this variable, later, may explain the situation.

10.2.4 Analysis of Unit Expenditure on Boarding by Region and Kind of Schools:

Table 10.5 shows that Girls' Schools' mean per boarder expenditure is below the national average and only 76.1 % of that in Boys' Schools. In Girls' and Boys' Schools Kordufan Region's per boarder costs is more than twice the respective costs in the Central Region. It is obvious that the Central Region has the lowest per boarder costs in Girls' Schools and in Boys' as well, whereas Kordufan has the highest in both kinds of schools.

In all regions Girls' Schools have the lower per boarder costs, except in the Eastern Region. However, the discrepancies between Girls' and Boys' Schools amount to 17% in the Central Region and more than 22% in Kordufan. This lower level of expenditure per boarder in the former region decreased the mean cost per boarder of each kind of schools.

To sum up this discussion it is interesting to note the high costs per pupil on boarding. The costs of boarding two students may pay for educating 3.4 at this level. However, there are wide discrepancies within the same size of boarding-house and school, the same location and kind of school and, to a limited extent, within each region, in

TABLE: 10.5

Total Unit Expenditure (£s) for Boarding by Region by Kind of School

School	Mean / Count / Sum / Std Dev	REGION: Northern Region 1	Eastern Region 2	Central Region 3	Kordufan Region 4	Khartoum 5	Row Total
1 Girls	Mean	1057.9011	1153.9860	631.3607	1298.0430		898.6698
	Count	1	2	4	1		8
	Sum	1057.90	2307.97	2525.44	1298.04		7189.36
	Std Dev	.	83.4188	313.9025	.		359.2862
2 Boys	Mean	1191.2305	1051.3350	760.5879	1668.0096	1620.9433	1180.6062
	Count	2	1	3	1	2	9
	Sum	2382.46	1051.34	2281.76	1668.01	3241.89	10625.46
	Std Dev	134.4706	.	26.5081	.	216.4608	393.3640
Column Total	Mean	1146.7874	1119.7690	686.7438	1483.0263	1620.9433	1047.9303
	Count	3	3	7	2	2	17
	Sum	3440.36	3359.31	4807.21	2966.05	3241.89	17814.81
	Std Dev	122.3386	83.6167	232.9656	261.6059	216.4608	393.5530

these variables. All the regions' per unit costs are above the national average, but the Central Region's extremely low per pupil expenditure on boarding pulled down the respective means and the national average. On the other hand Kordufan and Khartoum have the highest unit costs, often twice that in the Central Region. Generally it is the Urban location and Boys' Schools which have the higher expenditure on boarding. Analysis of the components below may give a better explanation.

After this global analysis of the per unit expenditure on boarding it is important to discuss the main components, namely per pupil costs on salary-boarding and the unit costs on non-salary boarding. The analysis of the unit expenditure on salary-boarding and its indicators and the unit expenditure on non-salary boarding and its sources of finance may throw light on the real determinants of these discrepancies.

10.3 Unit Expenditure on Salary-Boarding:

The unit expenditure on salary-boarding comprises the salaries and wages of the Boarding-House administrative and service personnel divided by the number of boarders served. This component is, surprisingly, very high in some developing countries, almost equivalent to the ratio spent on all other boarding expenses including food-stuffs.

Radi (1982) found that the cost per student on boarding administration amounted to 1053.77 dirhams, which is 46.4% of the total expenditure per pupil on boarding. However, in the Sudan there is no separate administration for the boarding facility. A small committee appointed at the school level is responsible for boarding administration. This committee is headed by the Director (principal) of the school, his/her deputy, two senior members of teaching staff; a representative of the school workers and the students are members, with the school accountant acting as the Treasurer. Their duties are administrative and include checking the supplies from the contractor, the dry rations donated to all boarders by the 'World Food Programme' and

even the quality of food offered daily. However, other younger members of the teaching force supervise the students in the hostels in return for lodgings and free meals. It is interesting to note that in some teacher training institutes in India residing on the campus is compulsory as "the philosophy of basic education stipulates community living as a necessary experience to develop skills of adjustment, fellow feeling, team spirit and co-operation" (Teacher Training in India, 1983). The official syllabus of these institutes includes as an optional subject 'School and Hostel Community Life and its Management'. Nevertheless all the school staff supervise the late afternoon study in boarding schools and they receive an extra allowance for it.

However, it is difficult to calculate the time devoted by all the administrative staff to the boarding duties and hence to apportion the members' salaries or wages accordingly between school and practical expenditure. Hence, for practical reasons, the salary-boarding expenditure constitutes only the wages of the service personnel assigned to boarding activities, though it underestimates the other administrative expenses.

Boarding service personnel or workers include mainly kitchen staff, cooks, assistant cooks and dining service men and women, as well as those responsible for cleaning hostels and a number of guards as justified by the size of the boarding house. However, other semi-skilled labourers, such as electricians, carpenters, health workers and drivers are generally hired to serve in boarding schools only.

All boarding workers are paid, similarly to other school workers, according to the unified salary scale for public employees, as mentioned earlier in Chapter 8. Although they enjoy the normal allowances and benefits as prescribed in this scale they stand a better chance of being housed near the school at a minimal cost and, frequently, they are paid a fixed number of overtime hours, even on official holidays, whether they are on duty or not. This is supposed to compensate for eroded purchasing power and to

retain them for a longer period; such policies depend on the schools' ability to mobilize extra funds.

However, the unit expenditure on salary-boarding is determined mainly by two variables: the average boarding worker wage and the number of boarders per boarding worker. The first determines the total wage bill but the second is a good indicator of the rate of utilization of this category of personnel. The following analysis of the unit costs on salary boarding and its indicators would be by the variables indicated above, and in the same sequence.

10.3.1 Analysis of Unit Expenditure on Salary-Boarding and its Indicators by Region and Size of the Boarding-House:

Table 10.6 shows that the national average unit costs on salary-boarding is £s 112.88, only 10.8% of total unit expenditure boarding. The national average boarding worker's wage is £s 2076.10. Interestingly, it is almost equal to the average school worker's wage, £s 2094 (Table 8.24), although among the former there are more semi-skilled workers, which should raise the average wage. In fact, most of the large boarding schools in the urban centres, which were re-organized into day-schools have retained most of their workers, if not all. The average wage for each of these categories of workers is almost one third of an average teacher's salary, (Table 8.2).

The national average number of boarders per boarding worker is 24.8. The large standard deviations observed for this indicator and the unit cost on salary-boarding indicate the wide variations concealed in each average.

It is important to note that the mean of each indicator and, hence, the mean per boarder costs on salary-boarding of the various size ranges indicate no logical pattern - which might have influenced the similar trend discerned earlier in the respective mean of unit costs on boarding (Table 10.2).

Variations both between and within the regions are considerable. The disparity between the Northern Region and Khartoum in the 401 to 600 size is only 16%, which is accountable for the small differences in average boarding

Table: 10.6

Unit Expenditure on Salary Boarding and Its Indicators
by Region and Number of Boarders.

Size of Bos/Ho	UESB and Indic.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Up to	UESB *	137.40 (.)	144.93 (8.1)	68.72 (52.6)	294.63 (.)		143.47 (78.5)
300	Av. Wage *	2394.86 (.)	2055.01 (169.4)	1779.25 (430.3)	2095.17 (.)		2030.51 (290.8)
Bordrs	Bos/Wo	17.4 (.)	14.2 (0.4)	33.3 (19.2)	7.1 (.)		19.1 (12.8)
301	UESB *	91.55 (.)		42.41 (11.2)			54.69 (26.2)
to	Av. Wage *	1884.85 (.)		1766.68 (143.9)			1796.22 (131.5)
400 Bordrs	Bos/Wo	20.6 (.)		43.5 (11.0)			37.8 (14.6)
401	UESB *	145.53 (.)				125.40 (74.1)	132.11 (53.7)
to	Av. Wage *	2448.93 (.)				2414.49 (1477.8)	2425.97 (1045.1)
600 Bordrs	Bos/Wo	16.8 (.)				19.1 (0.5)	18.4 (1.4)
Over 600 Bordrs	UESB *			67.70 (2.8)	164.28 (.)		99.89 (55.8)
	Av. Wage *			2388.12 (135.3)	1841.06 (.)		2205.77 (330.0)
	Bos/Wo			35.4 (3.5)	11.2 (.)		27.3 (14.2)
Column Total	UESB *	124.83 (29.1)	144.93 (8.1)	57.15 (26.4)	229.46 (92.2)	125.40 (74.1)	112.88 (67.4)
	Av. Wage *	2242.88 (311.4)	2055.01 (169.4)	1947.83 (362.4)	1968.11 (179.7)	2414.49 (1477.8)	2076.10 (481.4)
	Bos/Wo	18.3 (2.0)	14.2 (0.4)	38.3 (11.4)	9.2 (2.9)	19.1 (0.5)	24.8 (13.9)

\# Standard Deviation in Parenthesis.
* UESB and Average Boarding-Worker Wage are in Sudanese Pounds (£s).

worker's wage and ratio of boarders per worker. But Kordufan's unit costs on salary-boarding in the smallest size (up to 300), and the largest size (over 600 boarders) is more than four times, and almost two and a half times that in the Central Region respectively. It is worth noting that this is attributable to the extremely unfavourable ratios of number of boarders per worker, 4.7 times and 3.2 times as high respectively, despite the differences in average wages.

In the (301 to 400) size it is the Northern Region's unit costs on this component that is more than twice the Central Region's. Similarly, this can be explained by the extremely high ratio of boarders per worker in the Central Region, more than twice that in the Northern Region, and the higher average wage in the latter. The Central Region has the lowest per pupil costs on salary-boarding in all the respective sizes, which can be explained by the extremely high ratio of boarders per boarder worker - despite a higher wage where it occurs.

The highest unit expenditure on this sub-unit is that of Kordufan's smallest size, £s 294.63, which is almost seven times the lowest expenditure within the Central Region, £s 42.41. It is attributable to the lowest number of boarders per worker in the former region and the highest ration in the latter. The Central Region's lowest average boarding worker's wage, with the highest ratios of boarders per worker, lowered the respective means of unit costs on salary-boarding and pulled down its national average; which reflects on the unit costs on boarding. This may imply that the small unit expenditure on boarding in all ranges of Boarding House sizes in the Central Region (Table 10.1) may account for these lowest unit costs on salary-boarding.

However, the discrepancies within the regions are comparatively smaller. In the Northern Region they amount to 58%, rise to 62% in the Central Region and even up to 79% in Kordufan, which can be explained by the variation in average boarding worker's wage and, more important, the rate of utilization of their boarding workers.

10.3.2 Analysis of Unit Expenditure on Salary-Boarding and its Indicators by Region and Size of Schools:

As Table 10.7 demonstrates, the mean costs per pupil on salary-boarding indicates a pattern of increasing cost as the school size increases similar to that indicated earlier by the mean unit of expenditure on boarding, Table 10.3. This can be explained by the increasing pattern of the average boarding worker's wage and the decreasing trend of the ratio of boarders per worker. The mean per unit cost on salary-boarding in the largest school size is 62.5% higher than that in the smallest size. It is accounted for by a higher average boarding worker's wage (30% higher) and a lower ratio of boarders per worker (only 59% of the latter). This may imply that the larger the school the higher the average boarding worker's wage and the more favourable the ratio of boarders per worker, therefore the higher the per pupil costs on its personnel.

As noticed earlier large discrepancies prevail between and within regions. Inter-regional disparities within the same size are even more pronounced. The Central Region has the lowest unit costs on Salary-boarding in all school sizes. However, in the small size schools its per boarder expenditure on this sub unit is 23.2% of that in the Eastern Region, whereas in the Medium and Large Schools sizes it is 20.3% and 42.4% of the respective costs in Kordufan Region. This is attributed to the extremely high ratios of boarders per worker, which cancel the effect of the higher than average wage in the largest school size.

Variations within the regions are comparatively smaller. They range from the minimum of 10% in Eastern Region, 27% in the Northern, 79% in Kordufan, to the maximum of the Central Region, where this component in the largest school size amounts to more than twice that in the smallest. In the latter region this can be explained by the highest average boarding worker's wage and the most favourable ratio of boarders per worker.

Inter-regional disparities within the same size are even more pronounced. The Central Region has the lowest

Table: 10.7

Unit Expenditure on Salary Boarding and its Indicators
by Region and Size of Schools.

Size of School	UESB and Indic.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Up to 400 Pupils	UESB *		135.55 (.)	31.50 (.)			83.52 (73.6)
	Av. Wage *		1863.75 (.)	1475.00 (.)			1669.38 (274.9)
	Bos/Wo		13.8 (.)	46.8 (.)			30.3 (23.4)
401 to 800 Pupils	UESB *	114.48 (32.4)		59.77 (28.8)	294.63 (.)	125.40 (74.1)	107.32 (79.6)
	Av. Wage *	2139.85 (360.6)		1973.46 (332.5)	2095.17 (.)	2414.49 (1477.8)	2107.12 (580.9)
	Bos/Wo	19.0 (2.2)		37.6 (12.9)	7.1 (.)	19.1 (0.5)	27.1 (14.5)
Over 800 Pupils	UESB *	145.53 (.)	149.62 (0.3)	69.70 (.)	164.28 (.)		135.75 (37.6)
	Av. Wage *	2448.93 (.)	2150.64 (50.0)	2292.47 (.)	1841.06 (.)		2176.75 (225.9)
	Bos/Wo	16.8 (.)	14.4 (0.4)	32.9 (.)	11.2 (.)		17.9 (8.6)
Column Total	UESB *	124.83 (29.1)	144.93 (8.1)	57.15 (26.4)	229.46 (92.2)	125.40 (74.1)	112.88 (67.4)
	Av. Wage *	2242.88 (311.2)	2055.01 (169.4)	1947.83 (362.4)	1968.11 (179.7)	2414.49 (1477.8)	2076.10 (481.4)
	Bos/Wo	18.3 (2.0)	14.2 (0.4)	38.3 (11.4)	9.2 (2.9)	19.1 (0.5)	24.8 (13.9)

\# Standard Deviation in Parenthesis.
* UESB and Average Boarding-Worker Wage are in Sudanese Pounds (£s).

unit costs on Salary-boarding in all school sizes. In the small size schools its per boarder expenditure on this sub unit is 23.2% of that in the Eastern Region, whereas in the Medium and Large Schools sizes it is 20.3% and 42.4% of the respective costs in Kordufan Region. It is attributed to the extremely high ratios of boarders per worker, which cancel the effect of the higher than average wage in the largest school size. These discrepancies may account for those observed in the per boarder expenditure, Table 10.3, above.

10.3.3 Analysis of Unit Expenditure on Salary-Boarding by Region and Location of Schools:

As Table 10.8 reveals, the Urban Sector has the highest mean costs on salary-boarding, £s 127.17, which is more than three times that in the Semi-urban Centres. This can be explained by the most favourable ratio of boarders per worker (19.9) and a comparable average wage.

Disparities within the same location are striking. In the Urban Sector, Kordufan, per pupil expenditure on this component is more than four times that in each of the Central Region and Khartoum. This can be explained by the extremely favourable ratio of boarders per worker (7.1) in Kordufan, the extremely high ratio (31.9) in the Central Region and the average ratio of 18.8 but the lowest average wage in Khartoum. In the Rural area Khartoum's sub-unit is almost three and a half times the Central Region's. It can be attributed to Khartoum's highest average wage and lower ratio of boarders per worker, whereas the Central Region, with comparable average wage, has the most unfavourable ratio - twice that of the Capital. Although in all locations the Central Region has the lowest expenditure per pupil on this component, Khartoum has an equivalent expenditure to that in the Urban Sector only. That may be attributable to the highest ratios of boarders per worker in the Central Region and the extremely low average wage in Khartoum supported by an average ratio. The resultant levels of unit costs of salary-boarding in the Central

Table: 10.8

Unit Expenditure on Salary Boarding and its Indicators
by Region and Location of Schools.

Loc. of School	UESB and Indic.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Urban	UESB *	124.83 (29.1)	144.93 (8.1)	74.00 (28.7)	294.63 (.)	73.00 (.)	127.17 (66.3)
	Av. Wage *	2242.88 (311.2)	2055.01 (169.4)	2166.20 (285.4)	2095.17 (.)	1369.56 (.)	2077.91 (319.8)
	Bos/Wo	18.3 (2.0)	14.2 (0.4)	31.9 (10.6)	7.1 (.)	18.8 (.)	19.9 (9.7)
Semi - Urban	UESB *			38.42 (12.4)			38.42 (12.4)
	Av. Wage *			1684.35 (27.4)			1684.35 (27.4)
	Bos/Wo			46.1 (14.2)			46.1 (14.2)
Rural	UESB *			50.60 (27.0)	164.28 (.)	177.79 (.)	110.82 (71.5)
	Av. Wage *			1883.74 (578.0)	1841.06 (.)	3459.42 (.)	2266.99 (862.4)
	Bos/Wo			39.9 (9.9)	11.2 (.)	19.5 (.)	27.6 (15.6)
Column Total	UESB *	124.83 (29.1)	144.93 (8.1)	57.15 (26.4)	229.46 (92.2)	125.40 (74.1)	112.88 (67.4)
	Av. Wage *	2242.88 (311.2)	2055.01 (169.4)	1947.83 (362.4)	1968.11 (179.7)	2414.49 (1477.8)	2076.10 (481.4)
	Bos/Wo	18.3 (2.0)	14.2 (0.4)	38.3 (11.4)	9.2 (2.9)	19.1 (0.5)	24.8 (13.9)

\# Standard Deviation in Parenthesis.
* UESB and Average Boarding-Worker Wage are in Sudanese Pounds (£s).

Region may have influenced the respective unit expenditure on boarding.

On the other hand, the discrepancies within regions in per boarder costs on salary are extremely large between the Urban and the other locations. Kordufan's Urban Schools costs per unit on this component is 79% higher than that in the Rural areas, whereas Central Region's Urban sub-unit is almost twice that in the Semi-Urban Centres. These discrepancies are attributable to the, comparatively, favourable ratio of boarders per worker in the Urban location in these regions, supported by the lowest average wage in Khartoum. But in Khartoum it is the Rural Area's per boarder costs on salary that are almost two and a half times the Urban Sector's. Although both locations in Khartoum have comparable ratios the Rural areas have the highest average wage within all regions and all locations.

10.3.4 Analysis of Unit Expenditure on Salary-Boarding and its Indicators by Region and Kind of Schools:

It is interesting to note that the means of per pupil costs on Salary-Boarding in Girls' and Boys' Schools are identical and equivalent to the national average, Table 10.9. This is accounted for by a lower average wage and a higher ratio of boarders per worker in Girls' Schools - and vice versa in Boys' Schools. But this identical mean costs on salary per boarder may not explain the observed variations in the unit costs on boarding, Table 10.5. The other component may provide a better explanation.

In Girls' Schools Kordufan's per unit costs on salary-boarding is more than five times that in the Central Region. It is attributable to the most favourable ratio of boarders per worker and the highest average wage in the former and vice versa in the latter.

Similarly, in Boys' Schools, Kordufan's per boarder expenditure on this component is almost three times the Central Region's. The most favourable ratio of boarders per worker in Kordufan may explain this highest cost per

Table: 10.9

Unit Expenditure on Salary Boarding and its Indicators
by Region and Kind of Schools.

Kind of Schl	UESB and Indic.	Northern Region	Eastern Region	Central Region	Kordufan Region	Khartoum	Row Total
Girls Schl	UESB *	91.55 (.)	142.47 (9.8)	58.19 (35.9)	294.63 (.)		112.99 (85.5)
	Av. Wage *	1884.85 (.)	2024.85 (227.8)	1926.82 (450.0)	2095.17 (.)		1967.13 (315.3)
	Bos/Wo	20.6 (.)	14.2 (0.6)	40.1 (15.6)	7.1 (.)		27.1 (17.7)
Boys Schl	UESB *	141.47 (5.7)	149.84 (.)	55.76 (12.2)	164.28 (.)	125.40 (74.1)	112.79 (51.9)
	Av. Wage *	2421.89 (38.2)	2115.32 (.)	1975.83 (296.9)	1841.06 (.)	2414.49 (1477.8)	2172.96 (595.0)
	Bos/Wo	17.1 (0.4)	14.1 (.)	35.8 (2.7)	11.2 (.)	19.1 (0.5)	22.8 (10.1)
Column Total	UESB *	124.83 (29.1)	144.93 (8.1)	57.15 (26.4)	229.46 (92.2)	125.40 (74.1)	112.88 (67.4)
	Av. Wage *	2242.88 (311.2)	2055.01 (169.4)	1947.83 (362.4)	1968.11 (179.7)	2414.49 (1477.8)	2076.10 (481.4)
	Bos/Wo	18.3 (2.0)	14.2 (0.4)	38.3 (11.4)	9.2 (2.9)	19.1 (0.5)	24.8 (13.9)

\# Standard Deviation in Parenthesis.
* UESB and Average Boarding-Worker Wage are in Sudanese Pounds (£s).

boarder, whereas the highest ratio, in the Central Region, may be responsible for the lowest cost.

Within both kinds of schools Kordufan has the highest expenditure on this sub-unit, whereas the Central Region has the lowest; variations in Girls' Schools are even more striking.

On the whole, the Eastern and Central Regions have similar per unit costs on salary-boarding in both kinds of schools but, whereas the Northern Region has a higher expenditure on this component (54.5%) in Boys' Schools Kordufan's per boarder costs in Girls' Schools is 79.4% higher. In both cases it is accountable for the higher average wage and the lower ratio of boarders per worker.

To sum up the discussion on per boarder costs on Salary-Boarding it is important to record the striking discrepancies between and within the regions. Kordufan has always the highest expenditure on this component, whereas the Central Region has the lowest, pulling down the mean costs of each of the respective explanatory variables and the national average. That is attributable to the most favourable ratio of boarders per worker in the former region, and the highest ratios in the latter, despite the level of average wages in both cases. The marked disparities in unit costs on salary-boarding may have influenced the level of unit costs on boarding in the respective variables.

The analysis of the other component, non-salary-boarding expenses per boarder, and its sources of finance may extend a more comprehensive explanation.

10.4 Unit Expenditure on Non-Salary Boarding by Sources of Finance:

10.4.1 Introduction:

Non-salary boarding expenses consist mainly of expenditure on food-stuffs, hostel furniture and kitchen utensils which, in the Sudan, claim the lion's share of the boarding budget as food prices have lately been escalating. But Radi's (1982) study on boarding schools found that

"Other expenses", including that on meals, amounts only to 53.6% of the total expenditure on boarding per student.

One of the objectives of the boarding facility is to achieve equity of access and success in education as research studies reported that "... nutritional status was found to be significantly related to performance in school" (Moock and Leslie (1985). Hence, the importance of adequate funding of this component cannot be overemphasized. Schiefelbein et al. (1985) warned that malnutrition has a substantial and long-lasting negative effect upon achievement gains, even among the academically most successful members of the lower socio-economic status group.

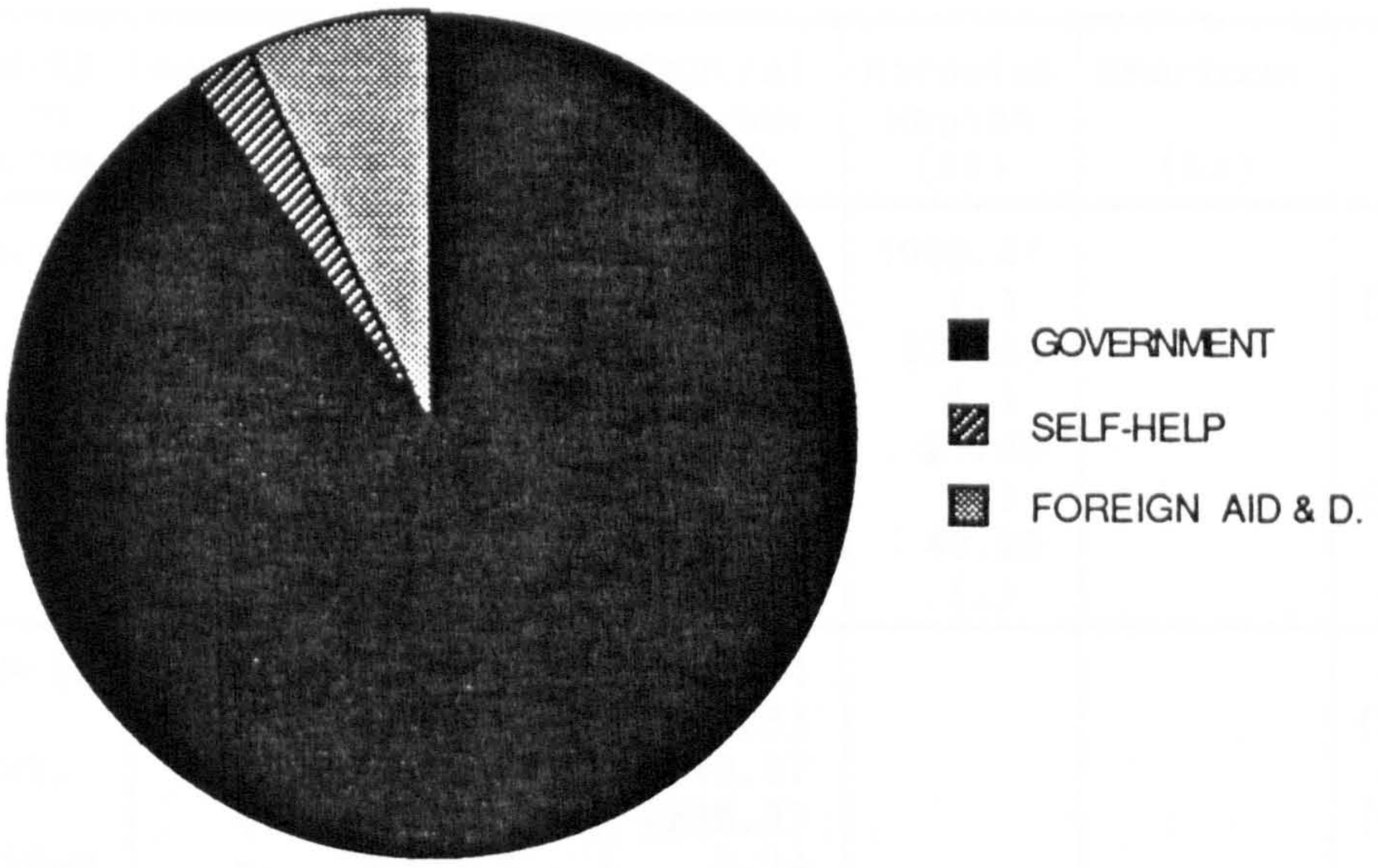
Non-salary expenses are financed, in the Sudan, from three sources: the regional government, non-government agencies such as parents and the public, and foreign assistance from sisterly and friendly countries and international organizations, primarily "the World Food Programme". This project began providing breakfast in some schools in the more backward provinces to improve pupils' nutrition but now "it provides meals for boarder students in hostels of many schools and breakfast (in needy areas) for day-pupils" (Sudanese Education Sector Review, 1977).

Figure 10.2, below, displays the national average per pupil expenditure on non-salary boarding by government, self help and foreign assistance. In spite of the small contribution of self-help and foreign resources as national averages these, in some regions, have a significant impact that supersedes that provided by the government.

The following discussion of the non-salary expenditure per student by sources of finance would highlight the extent of disparities between and within regions in this component as a result of the variations in government allocation, foreign assistance distribution, contribution by families and donations from the public.

Figure 10.2

Unit Expenditure Non-Salary Boarding by Sources of Finance



10.4.2 Analysis of Unit Expenditure on Non-Salary Boarding and Sources of Finance by Region and Size of Boarding-House:

As Table 10.10 reveals the national average unit expenditure on non-salary boarding is £s 935.05. The mean of per unit costs on non-salary boarding in the different range of size does not indicate any logical pattern, similar to that discerned in salary-boarding and hence in unit costs on boarding. The mean per boarder non-salary costs shows that the largest size of boarding house is mostly financed by the government (93.1%) whereas the smallest size is the most favoured from self-help and foreign assistance.

Inter- and intra-regional variations in per boarder cost on non-salary are extremely wide. As observed above, the Central Region has the lowest per boarder costs in all respective Boarding-House sizes. In the smallest and next smallest sizes the variation between the Central and Northern Regions is 65.6% and 55.7%, respectively. In the

Table: 10.10

Unit Expenditure on Non-Salary Boarding and its Sources of Finance by Region and Size of Boarding House.

Size of Bo-Ho	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Up To 300 Bordrs	UEN-SB	1148.91 (.)	974.84 (82.1)	693.75 (258.5)	1003.41 (.)		923.48 (204.5)
	Govt.	1148.91 (.)	855.98 (82.2)	517.33 (446.3)	931.64 (.)		811.88 (294.4)
	Self-H	- -	- -	134.52 (190.2)	21.88 (.)		41.56 (100.6)
	F. Aid	- -	118.87 (0.5)	41.90 (2.5)	49.90 (.)		70.04 (48.4)
301 To 400 Bordrs	UEN-SB	966.35 (.)		537.81 (279.3)			644.94 (312.9)
	Govt.	919.93 (.)		510.67 (289.9)			612.98 (312.9)
	Self-H	- -		0.74 (1.3)			0.55 (1.1)
	F. Aid	46.42 (.)		26.40 (22.9)			31.41 (21.2)
401 To 600 Bordrs	UEN-SB	950.62 (.)				1495.55 (290.6)	1313.90 (375.8)
	Govt.	901.03 (.)				1317.53 (45.9)	1178.69 (242.7)
	Self-H	- -				- -	- -
	F. Aid	49.59 (.)				178.02 (244.6)	135.21 (188.2)
Over 600 Bordrs	UEN-SB			703.13 (19.2)	1503.73 (.)		970.00 (462.4)
	Govt.			641.46 (43.2)	1458.46 (.)		913.79 (472.7)
	Self-H			41.87 (52.5)	- -		27.92 (44.0)
	F. Aid			19.80 (28.0)	45.27 (.)		28.29 (24.7)
Column Total	UEN-SB	1021.96 (110.2)	974.84 (82.1)	629.59 (211.2)	1253.57 (353.8)	1495.55 (290.6)	935.05 (355.9)
	Govt.	989.95 (138.0)	855.98 (83.2)	549.94 (255.8)	1195.05 (372.5)	1317.53 (45.9)	847.80 (349.1)
	Self-H	- -	- -	50.71 (100.5)	10.94 (15.5)	- -	22.17 (66.5)
	F. Aid	32.00 (27.8)	118.87 (0.5)	28.94 (19.8)	47.58 (3.3)	178.02 (244.6)	65.08 (83.3)

Standard Deviation in Parenthesis.

largest size, Kordufan, per boarder cost is more than twice that in the Central Region. In the next largest size the Northern Region's expenditure on this component is only 63% of that in Khartoum. Central Region's lowest costs pulled down the respective sizes' mean costs and lowered the national average of this component.

The disparity within each region is as high as 21% in the Northern Region, 30% in the Central Region (and even 30% in Kordufan).

However, the Regional Government finances 90% or more of the non-salary expenses in all regions in all sizes except in the smallest. In this size variation in public finance ranges from 100% in the Northern Region to 67.3% in the Central Region. The latter region is compensated for that by the highest percentage of self-help which is concentrated in this region and only the smallest size in Kordufan. Foreign assistance is distributed among all regions, except in the Northern Region's smallest size, and it ranges from 12.3% in Eastern Region to 2.8% in the Central Region.

10.4.3 Analysis of Unit Expenditure on Non-Salary Boarding and Sources of Finance by Region and the Schools' Size:

Table 10.11 presents the disparity in per pupil costs on non-salary boarding by the size of the teaching institution. The mean costs per unit displays an increasing cost pattern as indicated earlier by the unit expenditure on salary boarding and total unit boarding. Discrepancies are noticeable within each size of school. The difference between Eastern and Central Regions amounts to 87.8% in the smallest size but, in the Medium and Large sizes, Khartoum and Kordufan Region are more than twice that in the Central Region.

Within the regions the highest expenditure on this component is in the Largest size, where government finance is highest - except in the Northern Region. This may imply that the larger the school size the more resources are spent on this sub-unit. The range of variations within regions

Table: 10.11

Unit Expenditure on Non-Salary Boarding and its Sources of Finance by Region and Size of Schools.

Size of Schls	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Up To 400 Pupils	UEN-SB		959.46 (.)	510.98 (.)			735.22 (317.1)
	Govt.		840.00 (.)	201.78 (.)			520.89 (451.3)
	Self-H		- -	269.04 (.)			134.52 (190.2)
	F. Aid		119.46 (.)	40.16 (.)			79.81 (56.1)
401 To 800 Pupils	UEN-SB	1057.63 (129.1)		635.90 (247.8)	1003.41 (.)	1495.55 (290.6)	928.93 (402.3)
	Govt.	1034.42 (161.9)		595.16 (248.1)	931.64 (.)	1317.53 (45.9)	861.13 (351.2)
	Self-H	- -		16.18 (35.0)	21.88 (.)	- -	10.28 (25.0)
	F. Aid	23.21 (32.8)		24.57 (22.5)	49.90 (.)	178.02 (244.6)	57.52 (105.3)
Over 800 Pupils	UEN-SB	950.62 (.)	982.54 (114.6)	716.67 (.)	1503.73 (.)		1027.22 (294.3)
	Govt.	901.03 (.)	863.97 (114.6)	672.00 (.)	1458.46 (.)		951.88 (302.6)
	Self-H	- -	- -	5.07 (.)	- -		1.01 (2.3)
	F. Aid	49.59 (.)	118.57 (0.0)	39.60 (.)	45.27 (.)		74.32 (40.6)
Column Total	UEN-SB	1021.96 (110.2)	974.84 (82.1)	629.59 (211.2)	1253.57 (353.8)	1495.55 (290.6)	935.05 (355.9)
	Govt.	989.95 (138.0)	855.98 (82.21)	549.94 (255.8)	1195.05 (372.5)	1317.53 (45.9)	847.80 (349.1)
	Self-H	- -	- -	50.71 (100.5)	10.94 (15.5)	- -	22.17 (66.5)
	F. Aid	32.00 (27.8)	118.87 (0.5)	28.94 (19.8)	47.58 (3.3)	178.02 (244.6)	65.08 (83.3)

Standard Deviation in Parenthesis.

extends from 11.3% in the Northern Region, 24% in the Eastern and 40.3% in the Central to almost 50% in Kordufan. However, these large discrepancies may question the validity of the norms and regulations that govern the distribution of resources within the same region and between regions.

However, as indicated above, 90% or more of non-salary expenses in the Medium and Largest school sizes are financed by public allocation, but for the smallest size there is a marked variation in this type of finance. It seems that the Central Region is running its boarding facility mostly through self-help (more than 52.1%) and foreign assistance (7.9%).

10.4.4 Unit Expenditure on Non-Salary Boarding and Sources of Finance by Region and Location of Schools:

It is interesting to note (Table 10.12) that the mean unit cost on non-salary boarding in Rural locations is 42.3% higher than that in the Urban Sector. Variations among and within regions are quite marked. As noticed above the Central Region has the lowest costs in all locations on this component. Khartoum in the Urban Sector, and Kordufan in the Rural area unit expenditure on non-salary boarding are more than twice that in the Central Region. Khartoum and the Central Region have the highest per boarder costs on this component in the Urban Sector, whereas Kordufan favours the Rural location. However, within these regions the discrepancies are 31.8%, 49.9% and 68.4% in Khartoum, Kordufan and the Central Region respectively.

Generally government finances 90% or more of non-salary expenses but there is considerable variation among regions in the different locations. In the Urban centres it ranges from 96.7% in the Northern Region to 79.4% in Khartoum. However Khartoum is compensated, here, by the highest allocation of foreign assistance - 20.6%. In the Rural areas the disparity ranges from as high as 99.6% in Khartoum to only 66.6% in the Central Region. The latter region can make this up only through the highest self-help contribution, 26.7%.

Table: 10.12

Unit Expenditure on Non-Salary Boarding and Sources of Finance by Region and Location of Schools.

Locn of Schls	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Urban	UEN-SB	1021.96 (110.2)	974.84 (82.1)	759.23 (102.2)	1003.41 (.)	1701.00 (.)	997.50 (269.7)
	Govt.	989.95 (138.0)	855.98 (82.2)	705.26 (114.7)	931.64 (.)	1350.00 (.)	903.20 (206.2)
	Self-H	- -	- -	26.23 (45.4)	21.88 (.)	- -	9.14 (24.0)
	F. Aid	32.00 (27.8)	118.87 (0.5)	27.74 (24.1)	49.90 (.)	351.00 (.)	85.16 (98.2)
Semi Urban	UEN-SB			450.91 (332.8)			450.91 (332.8)
	Govt.			430.00 (359.2)			430.00 (359.2)
	Self-H			1.11 (1.6)			1.11 (1.6)
	F. Aid			19.80 (28.0)			19.80 (28.0)
Rural	UEN-SB			613.83 (145.4)	1503.73 (.)	1290.10 (.)	1005.37 (468.1)
	Govt.			436.89 (332.5)	1458.46 (.)	1285.05 (.)	904.32 (577.2)
	Self-H			137.05 (186.7)	- -	- -	68.53 (133.7)
	F. Aid			39.88 (0.4)	45.27 (.)	5.04 (.)	32.52 (18.4)
Column Total	UEN-SB	1021.96 (110.2)	974.84 (82.1)	629.59 (211.2)	1253.57 (353.8)	1495.55 (290.6)	935.05 (355.9)
	Govt.	989.95 (138.0)	855.98 (82.2)	549.94 (255.8)	1195.05 (372.5)	1317.53 (45.9)	847.80 (349.1)
	Self-H	- -	- -	50.71 (100.5)	10.94 (15.5)	- -	22.17 (66.5)
	F. Aid	32.00 (27.8)	118.87 (0.5)	28.94 (19.8)	47.58 (3.3)	178.02 (244.6)	65.08 (83.3)

Standard Deviation in Parenthesis.

10.4.5 Analysis of Unit Expenditure of Non-Salary Boarding and Sources of Finance by Region and Kind of Schools:

Table 10.13 illustrates the variation in the mean unit expenditure on non-salary boarding between Girls' and Boys' Schools; a difference of almost 36%.

In Girls' Schools the Central Region has the lowest per boarder expenditure on non-salary items - £s 573.17 - only 58% of that in the Eastern Region. The Central Region, also, has the lowest costs per boarder on this component in Boys' Schools but only 46.9% of that in Kordufan Region. However, within all regions, except the Eastern, Girls' Schools have the lower per boarder costs on this sub unit.

Discrepancies in all the regions are considerable; in Central Region 23%, and largest in Kordufan Region, 50%.

Generally, public finance in both kinds of schools is around 90% and more, except in the Central Region Girls' Schools, which enjoy the highest contribution from self-help donations. On the other hand the Eastern Region's Schools have the highest allocation from foreign assistance.

To sum up the discussion on per boarder costs on Non-Salary expenses and sources of finance it is extremely important to record the striking variations between the various regions in the same size of boarding-house school in each location and kind of school. Generally less marked disparities are observed within each region for government financed per pupil costs on this component but, for all the other sources, they are drastic. However, no logical progression is discerned by the size of boarding-house or number of boarders, but an increasing cost pattern is displayed as the school size increases.

The Central Region's extremely low per pupil expenditure by government and by foreign assistance influenced the respective means and even the national average. The Urban Sector has the highest per unit costs on non-salary by government and by foreign sources, whereas the Rural area has the highest per pupil expenditure by self-help. On the whole, Boys' Schools have higher government

Table: 10.13

Unit Expenditure on Non-Salary Boarding and its Sources of Finance by Region and Kind of Schools.

Kind of Schls	UEN-SB & Fin. Source	Northern Region (£s)	Eastern Region (£s)	Central Region (£s)	Kordufan Region (£s)	Khartoum (£s)	Row Total (£s)
Girls Schl	UEN-SB	966.35 (.)	1011.51 (73.6)	573.17 (281.2)	1003.41 (.)		785.68 (294.1)
	Govt.	919.93 (.)	892.50 (74.3)	455.39 (321.0)	931.64 (.)		682.27 (322.4)
	Self-H	- -	- -	86.93 (127.0)	21.88 (.)		46.20 (94.1)
	F. Aid	46.42 (.)	119.01 (0.6)	30.85 (20.6)	49.90 (.)		57.22 (41.2)
Boys Schl	UEN-SB	1049.76 (140.2)	901.50 (.)	704.83 (16.3)	1503.73 (.)	1495.55 (290.6)	1067.82 (368.1)
	Govt.	1024.97 (175.3)	782.93 (.)	676.00 (6.9)	1458.46 (.)	1317.53 (45.9)	994.93 (317.8)
	Self-H	- -	- -	2.43 (2.5)	- -	- -	0.81 (1.8)
	F. Aid	24.80 (35.1)	118.57 (.)	26.40 (22.9)	45.27 (.)	178.02 (244.6)	72.08 (110.8)
Column Total	UEN-SB	1021.96 (110.2)	974.84 (82.1)	629.59 (211.2)	1253.57 (353.8)	1495.55 (290.6)	935.05 (355.9)
	Govt.	989.95 (138.0)	855.98 (82.2)	549.94 (255.8)	1195.05 (372.52)	1317.53 (45.9)	847.80 (349.1)
	Self-H	- -	- -	50.71 (100.5)	10.94 (15.5)	- -	22.17 (66.5)
	F. Aid	32.00 (27.8)	118.87 (0.5)	28.94 (19.8)	47.58 (3.3)	178.02 (244.6)	65.08 (83.3)

Standard Deviation in Parenthesis.

support per pupil whereas Girls' Schools are favoured with more unit expenditure from self-help and foreign assistance.

After this detailed, fairly comprehensive, discussion of boarding costs per pupil it is important to have a more rigourous analysis. The procedure would be via stepwise regression analysis to identify the main determinants of unit expenditure on boarding and each of its components, and then Enter method is used to include all the remaining explanatory variables. in the following sequence: number of boarders, size of the school as represented number of classes, region, location and kind of school but, before carrying out the regression analysis, a correlation coefficient is calculated to evaluate the type and strength of the relationship between the explained and explanatory variables.

Table 10.14 displays that there is a weak positive non-significant relationship between unit expenditure boarding and unit expenditure on non-salary boarding on one hand and the number of boarders on the other but there is a negative, though weak, relationship between unit costs on salary-boarding and the number of boarders. It is interesting to note that the relationships between each of the dependent variables and the school size as represented by number of classes are relatively stronger than that observed with school size as indicated by enrolment. However, only the number of boarders per boarding-worker - boarder worker ratio - has a strong negative relationship between the unit expenditure boarding and unit expenditure on salary and non-salary boarding ($r = -.7868, -.8873, -.7377$) respectively and all significant at the highest level (.001). The strong positive significant relationship between the average boarding-worker wage and school size is an indicator that the larger schools have also the better paid ancillary staff. These independent variables were entered in the regression equation to quantify the proportion of variance in the dependent variables they would explain, as the next analysis would reveal.

Table: 10.14
Correlation Coefficient

	UEB	UESB	UEN-SB	N.Bo	Sch.S	N.Cl	Reg	Loc	Kind	N.Bo/W
UESB	.8039** SIG .000									
UEN-SB	.9828** SIG .000	.7598** SIG .000								
N.Bo	.0848 SIG .746	-.1285 SIG .623	.0668 SIG .799							
Sch.S	.3554 SIG .162	.5294 SIG .029	.3284 SIG .198	.2622 SIG .309						
N.Cl	.4228 SIG .091	.5315 SIG .028	.3684 SIG .146	.3565 SIG .160	.9537** SIG .000					
Reg	.2096 SIG .419	.0345 SIG .895	.1534 SIG .557	.3753 SIG .138	.1171 SIG .428	.0867 SIG .558				
Loc	-.1809 SIG .487	-.1809 SIG .487	-.1809 SIG .487	.3946 SIG .117	-.2382 SIG .103	-.2030 SIG .166	.0510 SIG .731			
Kind	.3127 SIG .222	.1684 SIG .518	.2887 SIG .261	.4289 SIG .086	.0732 SIG .621	.0738 SIG .618	-.0734 SIG .620	-.0337 SIG .820		
N.Bo/W	-.7868** SIG .000	-.8873** SIG .000	-.7377** SIG .001	.2210 SIG .394	-.4485 SIG .071	-.4907 SIG .045	.0639 SIG .807	.3083 SIG .229	-.1203 SIG .646	
ABo-WW	.1985 SIG .445	.4828 SIG .050	.1740 SIG .504	.1568 SIG .548	.5588* SIG .020	.4907 SIG .045	-.2442 SIG .345	-.1795 SIG .491	.1684 SIG .518	-.2059 SIG .428

* - SIGNIF.LE.01 ** - SIGNIF.LE.001 (2-TAILED, " . " PRINTED IF A COEFFICIENT CANNOT BE FOUND)

Table 10.15 shows the results of the regression of the unit expenditure on boarding and its components against the explanatory variables as indicated above, school size is represented by number of classes. Surprisingly, stepwise analysis has singled out the number of boarders per worker as the most important variable that explained solely 70.26% of the variance in unit expenditure boarding, 59.46% of that in unit expenditure on non-salaries and 67.63% of salary boarding per pupil. Region, the second variable selected, contributed around 12% to the explained variation in unit costs boarding and that on non-salaries ($100R^2$ = 82.85 and 72.88 respectively). The other variables were entered together; including 'region' for unit costs salary-boarding. However, all the remaining variables raised the explained variance to 88.48%, 83.21% and 81.49% respectively. It indicates that the number of boarders, school size and boarding-worker wage have extremely limited explanatory power in case of the unit costs on boarding and each of its components. This is contrary to Tibi's (1989) conclusion that "the proportion of variance in boarding institution unit expenditures explained by the number of boarders is in general quite high". Nevertheless, the number of boarders is significant for all dependent variables when entered after the other variables; indicating that it can contribute to the explained variations within the overall context. The positive regression coefficients of unit expenditure boarding and non-salary boarding per pupil imply that both increase as the number of boarders increases - diseconomies of size - but the negative coefficient of unit expenditure salary boarding indicates that it declines with the increase in number of boarders - economies of size.

It is important to note that the location and kind of school have no influence on the unit expenditure boarding or its components. The highest proportion of variation in salary-boarding per unit is explained by the ratio of boarders per worker alone, whereas in the unit costs boarding and non-salary per boarder it is both the boarder worker ratio and region.

Table 10.15

Regression of Unit Expenditure on Boarding, on Non-Salary Boarding and on Salary Boarding Against Size of Boarding House, Size of School, No. of Boarders per Worker, Average Boarding Worker's Wage, Region, Location and Kind of School.

Independent Variables	Dependent Variables: U.E.B.			U.E.N-S.B.			U.E.S.B.		
	Reg.Coeff	$100R^2$	t values.	Reg.Coeff	$100R^2$	t values.	Reg.Coeff	$100R^2$	t values
Stepwise:									
1. No. of Bo. per B-W.	-23.6850	70.26	-7.809**	-25.7880	59.46	-6.428**	-2.8969	67.63	-3.631**
							Enter:		
2. Reg.	74.1874	82.85	2.013*1	59.1287	72.88	1.469	15.0587		1.881
Enter:									
3. Average Bo.W.W	- .0831		· .911	- .1238		·1.242	.0407		2.054*
4. Sch. S.	-17.5996		·1.451	-21.5084		1.623	3.9088		1.483
5. Bo-H S.	121.5140	88.48	2.296*	146.1870	83.21	2.529*	-24.6729	81.49	·2.146*

10.5. Conclusions:

In concluding this chapter on boarding schools costs it is important to highlight how a facility established to reduce costs and achieve equity ended as a heavy financial burden. Disparity in per boarder costs and its components among and within regions is quite marked. Interestingly, analysis by boarding-house size or number of boarders reveals no logical progression, and by school size it illustrates an increasing cost pattern in the per boarder costs and its components. Central Region's much lower costs pulled down the respective means and the national average in all contexts.

All salary-boarding costs and 90% or more of the non-salary boarding expenses are financed by the regional governments. However, some regions are more favoured by self-help contributions and donations, for example the Central Region, others by foreign assistance allocations, for instance the Eastern Region.

The correlation matrix shows that there is no link between the per boarder costs or its components and the number of boarders, contrary to other research findings. But their relation to the size of schools, as indicated by the number of classes, is much stronger. The regression results revealed that the number of boarders per worker stood out as the sole determinant of the variations in total unit expenditure boarding, unit expenditure on non-salary boarding expenses and on salary boarding; region contributed to the variance explanations in the former two.

CHAPTER ELEVEN

ECONOMIES OF SIZE AND DETERMINANTS OF UNIT COSTS AND OUTPUT IN SECONDARY SCHOOLS

11.1. Introduction:

As the discussion in Chapter Five indicates, the analogy of education with industry is now an acceptable fact. Today, titles such as 'Education as an Industry', 'An Analysis of the Education Production Process', 'Scholastic Achievement: Its Determinants and Effects in the Education Industry' and 'The Economics of Schooling' are commonly found as books, research papers and articles in specialised and general journals and newspapers. Such titles and many others, as well as casual references, explicitly identify education with industry and, as such, the norms and specifications of production in firms and plants should be applicable. One of these norms is the notion of economies of scale which originated in economic theory on the operation of firms and industries. The basic assumption in this economic concept is "... the achievement of increased quantities of a **standard*** unit of output per **standard*** units of inputs as size of plant or firm or industry increases" (Hough, 1981). The strict application of this concept to the education process is, however, fraught with theoretical and practical difficulties. Theoretically the assumption of standardised inputs and outputs may not be satisfactorily feasible in education production. Research studies show that school inputs can be classified into two categories: those endogenous to the schools and others which are exogenous. The former are inputs directly controlled by the school administrators or school policy makers which can be further segmented into two components. "First the observable 'macro' organizational and process characteristic of the school, such as class organization, curricula,

* The researcher's emphasis.

departmentalization, and length of the school days" (Hanushek, 1985). These are supposedly standard, reproducible educational practices, but practical implementation reveals wide variations. The second component is the immeasurable teachers' personal characteristics and skills which are reflected in "... the care, attention and effort they are prepared to invest in the preparation, delivery and follow-up of their lessons" (Harrold, 1987). More direct analysis "... confirms that important dimensions of teacher quality are not captured by measured teacher attributes" (Hanushek, 1972; Murnane and Phillips, 1981). This confirms the difficulty of assuming 'standard units' of inputs, even in the policy or school-controlled elements.

On the exogenous, non-policy controlled inputs, research dating back to the Coleman Report of 1966 emphasised the importance of the socio-economic factors and family background as major determinants of the quality of schools output. Some went to the extreme, stating that, "The characteristics of a school's output depend largely on a single input, namely the characteristics of the entering children" (Jencks, 1972).

Thus, what seems, apparently, to be the same quality and quantity of inputs, result in heterogeneous output. However, education "... is a sector where the relationship between inputs and outcomes (output) is much less clearly identifiable than in most sectors of production of goods and services" (Orivel, 1985). In studies of economies of scale, as well as other cost analysis studies which relate the various educational inputs to the educational output, the adequate measurement or identification of the latter is of paramount importance. Such claims antagonise educators who emphasise that educational outcomes are immeasurable (and that) nothing is more damaging to the true purpose of education than to allow the quantifiable and examinable aspects to dominate over the truly educational. Nevertheless, "... because of the multidimensional nature of educational output and measurement problems, researchers

have resorted to using alternative 'output' measures such as student enrolment or average daily attendance (ADA)" (Tsang, 1988). Others prefer standardised achievement test scores in different subjects, college continuation or even drop-out rates. The appropriateness of each of these (and others) as 'proxies' or measures of output is not certain and test scores are highly criticised as they "... tend to focus ... on cognitive effects and ignore other important non-cognitive effects of schooling" (Woodhall, 1988). Although different studies measure 'output' either qualitatively or quantitatively, a school produces both (and many other) effects which may influence pupils' later performance in the work place and their quality of life. Not to overlook the fact that, "... the educational process is cumulative; inputs applied sometime in the past affect students' current levels of achievement" (Hanushek, 1986). The notion of homogeneous outputs in economic theory applied to plants and industry may not have an educational equivalent. Thus, "... some reject the line of research entirely because they do not believe that educational outcomes are (or can be) adequately quantified" (Hanushek, 1985).

Another methodological difficulty of applying the concept of scale to education is the 'technology of production' which dictates the relevant set of inputs required. Its counterpart in education is a learning theory. Research in the field "... is focused on small scale individual experiments rather than comprehensive studies of multiple influences, (and as such) would be of relatively less value in structuring the nature of general programs and services for the vast body of students" (Cohn and Millman, 1975). Thus, it is noticeable that "... almost all educational analyses begin with laments about the lack of any learning theory that is suitable" (Hanushek, 1985). Moreover, the concept of economies of scale assumes technical and economic 'efficiency'; a term used to describe the relationship between standard inputs and standard output in production. Some educators even "... argue that efficiency and productivity are inappropriate concepts to

apply to education as a whole" (Vaizey et al., 1972). However, education, on top of this, is torn between two types of efficiency; internal efficiency, which desires more output for the same resources, and external efficiency which is concerned with higher productivity in the post-schooling workplace. Whereas these two types may be complementary, often they can contradict each other. Unfortunately, there is not yet a single measure of output that incorporates both these types of efficiency. Nevertheless, "much of the observed interest in school system performance relates to the perceived importance of schooling to future capabilities of students; ... if schools were perceived to perform a simple monastic role, it is inconceivable that they would receive the attention and interest that they do" (Hanushek, 1985).

The interest in the existence of economies of scale or, more relevant to education, economies of size in schools or institutions, overshadowed the basic concern about whether the quality of output thus 'produced' is better. "It is not at present satisfactorily possible to assess whether pupils at a larger school emerge with some extra and possibly unquantifiable ingredient or attribute whether desirable or otherwise, as compared with pupils at a smaller school" (Hough, 1981). An analysis of data collected for the 'Quality Measurement Project' indicated that "... nowhere in the study is there a significantly positive relationship between size and performance" (Kiesling, 1967). In spite of that, traditionally, larger schools, especially at the secondary level, are claimed to benefit their students "... through better and more varied curriculums, better classifications, better facilities, especially in such subjects as science and music, contact with better teachers, opportunities to participate in better and more varied extracurricular activities, wider social opportunities and experiences" (Campbell, 1964). No wonder, as it is there that the larger concentrations of senior, well experienced and highly paid teachers and other auxiliary personnel are to be found. Nevertheless, despite the inconclusive

evidence about the linkage between the school or institution size and the quality of its output, scholars and researchers' continued belief in economies of size is not shaken. However, recent reviews of research demonstrate that many studies have concentrated on the question of economies of scale and have examined the relationship between size of school and per pupil costs, assuming that the level of output does not vary (Woodhall, 1988).

Several practical difficulties may limit the applicability of this concept. Although directors (principals) of schools or educational institutions can estimate the operating costs of their establishments annually through the routine budget proposals, it may not be possible for them to assign required resources accordingly. "There is, hence, only a vague link between size and resources and it does not always reflect a choice made on the basis of precise criteria" (Tibi, 1987). However, "... most educational systems do not consider a major and central objective the optimum use of inputs to maximize their outcomes, not only in public education system, but even in supposedly competitive private institutions" (Orivel, 1985). Research studies reveal that "... there is a remarkably consistent finding that schools are not economically efficient" (Hanushek, 1985). Thus, some real resources (including space and equipment, as well as teaching staff) are not fully utilised, whereas the study of economies of size "... in the strict sense of the term, ... must exclude the effect due to variations in the use of resources depending on size" (Tibi, 1985). As empirical studies reveal the existence of economies of size in some types of institutions, researchers are encouraged to refine their methods and attempt to tighten control as to which kind of relationship between expenditure and size may qualify for an effect of scale. Tibi warned against the kind of economies of scale achieved by virtue of the amount of some real resources used, which may be more than offset by price fluctuations heading in the other direction. As the main issue of such cost analysis may be efficient

utilisation of scarce resources, he even claimed that economies of scale do not necessarily mean that unit expenditure will drop when size increases. Those responsible may decide that "... the resources (thus) released may well be assigned to new activities or used to improve conditions for existing activities" (Tibi, 1985). Most important for a decision maker is whether this type of cost analysis can be used to design and organise schools or institutions' networks. The controversy is whether cost alone would be taken into consideration in planning the size of schools. However, even if there is an economic advantage, "... it is not evident how far this one factor should weigh in a decision which must inevitably take into account factors such as the demographic distribution of the population" (Cumming, 1971), as well as the universal right of 'equity of access' to education in developing countries' set-up. Such a line of thought encourages instead the idea of 'standard size'. This notion of standard or 'optimum' size schools, though different from that of economies of size, may be more relevant to the education sector. As it promotes efficiency in the sense of full exploitation of real resources and physical facilities, it has been successfully applied for the use of critical resources; namely classrooms, both all-purpose and specialised rooms, and teaching staff. This concept is enhanced by the notion of microplanning which "... starts from a very detailed analysis of the coverage of the educational system and of the teaching/learning conditions in each region or sub-region before making any suggestions or proposals for the future" (Hajjar, 1983). Nevertheless, the whole approach of economies of scale implies the efficient utilisation of financial and real resources as noted above. Thus the real challenge remains as to whether, "... there is an optimum organisation of schools which has, as one of its features, schools of the most economic size, given a specific set of educational objectives and considerations" (Cumming, 1971). In this respect, cost functions are employed to "... help to throw light on the way total or average costs change in

relation to the size of an institution or system" (Psacharopoulos and Woodhall, 1985).

Adoption of this concept in educational cost analysis and research studies as to how education expenditure varies with size is relatively new. It is only "since the late 1960s (that) numerous studies have been conducted to estimate cost functions and economies of scale for the traditional schools and universities in developed countries" (Tsang, 1988). In the USA and the UK, particularly, "data restrictions have forced researchers to make some concessions that limit the applicability of their results" (Jimenez, 1985). In both countries important school expenditure data is aggregated at a higher level; at the state or school district level, and at the local education authority level respectively. Thus, the difficulty of obtaining data at the relevant level forced researchers to investigate economies of scale at the district level in the USA, or merely to compare educational expenditure in large and small local authorities in the UK. At both levels of aggregation, "... to draw deductions in terms of economies of scale would seem to be rather meaningless" (Hough, 1980) as "... to begin with, the unit of analysis ... does not correspond to the research question at issue" (Tsang, 1988).

This type of cost analysis can be more relevant given the empirical base on which they are built. Conclusions based on information aggregated at macro levels does not permit an understanding of how costs affect the quality of the learning process. "... aggregate level data mask much of the information that may be of interest" (Jimenez, 1985). Thus, "this approach has also detracted attention from the school as a focus for analysis, despite the fact that the school is the most critical organization unit in the formal education system" (Stromquist, 1982). Hough, therefore, stressed that "... it can hardly be doubted that the closest analogy to the economist's 'production unit' is the (individual) school, although some of the US studies have argued otherwise" (Hough, 1981). However, Wales (1973) quoted two important problems when the school district costs

were related to average school size in the district. "First it fails to distinguish between the scale effect at the district and at the school level. Second, unless there is a strong relationship between the size of the district (always hypothesized) and the size of all schools within the district, the effect on costs of differing school sizes cannot be isolated" (Wales, 1973). "Moreover, most cost studies either do not control for difference in the quality of their students, or if they do, do not distinguish between quality imparted by school, which is thus part of the output of the school, and that inherent in the student" (Jimenez, 1985). However, "... it is clearly desirable to keep cognitive achievement and non-school inputs constant when investigating the relationship between educational expenditure and school size" (Kenny, 1982). Transportation costs are another important input in some developed countries, especially where economies of scale is achieved because of a consolidation policy; smaller schools, or even school districts, are merged into larger units to reduce total costs. Kenny (1982) even claimed that, "the cost of schooling can be broken down into two components: the transportation cost associated with getting students to and from schools and the cost of instructing students when they are in school". But "few cost studies have made an attempt to incorporate transport costs into the analysis of scale economies" (Jimenez, 1985).

Nevertheless, there are successful attempts to examine economies of size in different types and levels of educational establishment in developed and developing countries. The literature of the developed countries is reviewed first, followed by attempts in developing countries later.

11.2. Economies of Size in Developed Countries:

The field of economies of scale or 'size' in the operation of 'state' or 'public' schools has received considerable attention in the last two decades. Earlier studies in this field in the USA and UK were mostly

conducted at school district or local authority level, as mentioned earlier. In these previous studies in the USA (Hirsch, 1959; Schmandt and Stephens, 1960), data for elementary and secondary schools were combined into individual units. As these two levels operate differently, they "... should be considered as two distinct industries, and joint treatment results in mixing two possibly dissimilar tendencies" (Riew, 1966). Variations in schools 'quality' were not accounted for effectively. One of the earlier researchers to attempt to handle the problem of data limitation at the school level was Riew (1966). His article, 'Economics of Scale in High School Operation', may be claimed to be the first attempt to study the effect of scale operation at the individual school level. He could achieve that by selecting districts with only one high school. His study included 109 four- and three-year high schools that survived the tests of 'accreditation' and 'non-exceptionality' [schools with exceptionally higher than average teachers' salaries were eliminated], to reduce variations in the standard or quality of schools. Analysis of the operating costs excluded transport costs (as the difference between sparsely and densely populated areas was negligible) as well as other costs of auxiliary services. Capital costs were not included. Riew, as with Hirsch, constructed an index of quality and used proxies to reflect teacher qualifications, the breadth of the programme and the degree of specialisation in instruction. He regressed per pupil costs against average daily attendance (ADA), as size indicator, and the other independent variables. He assumed a parabolic relationship between per pupil costs and size, but a linear relation between costs and the other independent variables. He found that per pupil operating expenditure decreased as schools became larger and concluded that "... within the range of enrollment of less than 200 to 701-900, advantages of a larger school may be considered overwhelming". He argued that beyond this limit, though, unit costs rose (giving a U shape), but "... these large schools distinguish themselves with broader curricula,

higher proportion of faculty holding advanced degrees and teachers with more experience". In fact, he implied a trade-off between reduced unit costs and quality of education, as indicated by the quantity and variety of advanced courses in schools, when he stated that "... these improvements in standards more than compensate for the differences in expenditures". However, he revealed the 'kind' of economies of scale he believed in when he added, "this then may be construed as an economy". This is supported later by Tibi when he claimed that economies of scale does not necessarily imply reduced unit expenditure, as mentioned earlier in this chapter. It is important to note that only 18.3% of the variation in per pupil expenditure was explained by size of school or enrolment when he held the other variables constant.

A parallel pioneering research on this period in the UK was Cumming's study of primary and secondary schools in Scotland in 1971. Data related to primary schools reveals that rolls range from 2 or 3 pupils in the remote Highland areas to over 600 pupils or more elsewhere. However, Cumming reported that "for schools with rolls up to 80 pupils there are considerable ranges of outlays and considerable economies of scale, whereas schools with rolls of more than 80 pupils do not show the same range of per pupil outlays, nor do they have the marked variation due to size". In the secondary schools a sample of 23 education authority schools and 18 grant-aided schools was selected. But neither in the former heterogeneous sample (in respect of the 'amount in years' and type of education they offer) nor in the latter more homogeneous sample (offering a broadly similar academic type of education) can economies of scale be detected. For both types of secondary school he concluded that "... there is no discernible mathematical relationship between per pupil outlays on Teachers' Salaries and school roll". Though economies of size do exist in small rural schools, Cumming raised an interesting point with wide social and political implications: "... there are other factors which must be weighed up, however difficult it

may be to measure their importance against direct cost considerations" (Cumming, 1971). The merging and closure of village schools has been lately a matter of concern in many countries. "It has been suggested that when its school closes a village 'dies'... young people no longer want to live there, other services deteriorate and the community suffers" (Bell, 1985). In developing countries where good roads usable all the year round are few, busing children is almost impossible. This might have an adverse effect on democratisation of education and reduction of educational disparities between urban and rural communities. Moreover, planning the size of schools on an economic basis alone may deprive the education budget of a substantial source of finance. Generally, only those schools within the community boundaries can get its support, contributions and donations, in this time when self-help in cash and kind is an essential proportion of school expenditure. Schiefelbein's (1981) study of rural schools in Colombia indicated that private contributions were a significant part of the total cost for rural primary schools; ranging from 15% to 48% of the total cost. He found that private contributions in kind are common in rural areas, especially the poorest rural areas.

Academically, "the opponents of consolidation claim that students lose through increased breaks in their education, loss of contact with local teachers who know the community and the families well, spending time on commuting which might be spent with greater profit on other activities, and fewer opportunities to participate in extracurricular activities" (Campbell, 1964). In developing, and less developed countries in Africa and Asia, the rural primary school serves as a cultural and educational centre. It is not expected to serve its clientele only, but to act as a 'change-agent' in the rural scene. Since independence, education literature has been dominated by "... the question of what role the (local) primary school can and should play in promoting rural development" (Hanson, 1980). In this context, it is more

appropriate to include non-economic effects of education in planning school size; it is a case for cost-effectiveness.

A series of researches, at the school district level, was conducted by Cohn (1968, 1971, 1975). Cohn's (1968) study of 377 Iowa high school districts was based on school districts that had only one high school, (excepting five of them). Similar to previous studies, ADA was assumed as a proxy for the number of pupils enrolled. School quality was represented by gain in academic achievement as a result of two test scores for the same class in different years. He regressed the quality proxy against a number of school inputs which include average teacher salary, number of assignments per teacher, and number of credit units offered; ADA at this stage was included as an independent variable. The results were not encouraging as most of the input coefficients were statistically insignificant and R^2 values very low (0.05, 0.06, 0,07). He admitted much intercorrelation between the variables, but no adjustment was made for the resultant multicollinearity. He concluded that the use of test scores as a proxy for school quality had not been very successful. However, his estimation of school quality by this criterion was at least superior to his predecessor's index, developed through average school inputs. The subsequent regression equation of per pupil costs in these schools against ADA, ADA^2, the inverse of ADA and other school inputs indicated the existence of significant economies of scale. It was evident that 13% of the variation in per pupil costs was explained by ADA and ADA^2 alone, while 22% by the inverse of ADA. He concluded that the positive and significant coefficient of ADA^2 indicated that the long-run cost curve is U-shaped and the optimum school size was estimated to be about 1,500 pupils ADA. However, in spite of the claim of a U-shaped cost curve, the researcher could not specify an upper limit within the range of the data.

In the early-1970s the subject of scale economies involving the operation of public schools received considerable attention in the USA, mainly because this

concept was employed as evidence in judicial proceedings by both defendants and plaintiffs to support their case for equality of resource allocation in schools. In the famous Hobson v. Hansen case, the defendant tried to convince the court that economies of scale explained the difference in expenditure. The plaintiffs, however, replied with a regression analysis discrediting that point. The judge "... was put in the awkward position of having to evaluate econometric research in order to reach his decision" (Michelson, 1972).

In another study on school districts in Alberta, Canada, Shapiro (1973) related the average unit cost in these districts to the district's size and to other variables which were assumed to affect unit costs in education. In the absence of relevant data to measure differences in quality of output he substituted variables that might influence the demand and supply of teachers. He found, due to the geographically dispersed districts in this province, that consolidation of school districts in greater sizes, in fact, increases cost. He concluded that "... it seems quite likely that substantial economies in terms of costs would be made by consolidation of many of the small districts in Alberta and it is quite likely that economies could be gained as well through consolidation of a number of the larger districts as well".

Hind's (1977) study attempted to determine how the costs per pupil of primary schools in New South Wales, Australia, varied with school size. He collected data relating to 116 individual schools, with enrolment range between 9 to 928 pupils. Recurrent costs were grouped into two categories: instruction and administrative costs (mainly wages and salaries), and maintenance of buildings and equipment costs. Two cost functions, based on the schools' data, were estimated using single equation least squares for each category of costs. Scattergrams of simple linear regression of administrative and instructional costs per pupil, and maintenance costs per pupil, plotted separately against average pupil enrolment, displayed curvilinear

relationships of hyperbolic forms in both cases. The regression equations showed that 80% of the variations in the former costs were explained by size alone, whereas it was only 60% for the latter costs. He concluded that "... the statistical results confirm the hypothesis of the existence of economies of size in the provision of educational services at the primary school level". However, economies were exhausted by the 100 pupils' enrolment level, and the 200 pupils' for the instructional and administrative per pupil expenditure, and the maintenance costs per pupil respectively; beyond the 600 pupil enrolment level diseconomies set in.

Burkhead, Fox and Holland's (1967) study of Chicago High Schools is one of the few studies based at the individual school level in USA then. Data for the thirty-nine schools were collected for different indices of school output such as achievement in composite test scores, post-high school intentions and dropouts, and for inputs variables pertaining to measurable components of recurrent expenditure and socio-economic characteristics that affect the quality of student input. The model was employed, mainly, to examine the relationship between the pattern and level of resource allocation and other socio-economic factors on the school output. Size of school was introduced to test how the scale effect of average variable costs influence the output also. The High Schools' Attendance areas were grouped into four income classes. The researchers concluded that, "the major input and process variables show a slight U-shaped curve". A possible explanation, due to the above-mentioned groupings, is that higher per pupil costs was observed in both the upper and lower-income groups for different reasons. In the former social class, higher per unit expenditure might be due to more experienced, senior teachers who generally prefer to dwell and work in these areas. The higher costs per pupil in the latter social class would be due to additional resources allocated to maintain discipline in these neighbourhoods' schools. These left the median-income

attendance areas, at the flat bottom of the U, with average per unit costs. A more recent study by Kenny (1982), on California public high schools, was based on two sets of data. One, at the individual student level, from 'Project TALENT'; a stratified random sample of all US students in grades nine through twelve in 1960 - out of which a sub-sample of 4,300 twelfth grade males with complete information on seven measures of cognitive achievement, was selected. The second, more aggregate data at the school district level, were the 1970 census tracts apportioned among school districts' attendance areas, providing detailed information on socio-economic variables. Results from each of the two sets were assumed to complement and check each other. This is another study that disaggregated per pupil costs into two components: transportation costs and instructional costs. The evidence implied that, other things being equal, children in large high schools learned more than children in small high schools. Kenny found that instructional or 'effective' schooling inputs were 17 to 37% more expensive in a high school of 300 than in one of 1,448 that hired the same quality teachers, paid the same wage rates and with the same pupil:teacher ratio, holding socio-economic variables constant. The conclusion was that the cost of achieving economies of scale in rural high schools (usually the small size) was 17 to 37% higher than in urban high schools (the larger size) because of the higher costs of transportation in the rural areas.

Osburn's (1970) study of high school districts in Missouri attempted to determine the relationship between school size and per pupil expenditure. It was based on 1966 data for 433 school districts with high schools. He regressed per pupil expenditure (dependent variable) against a number of selected independent variables, including school classification that reflected the breadth of curriculum, tax levied, district wealth, educational attainment of county residents, percentage of high school enrolment (as he failed to obtain separate elementary and high school statistics), size of school ADA, and ADA^2, and teacher salary as a proxy

for teacher qualification. He found that the net saving for increasing school size from 200 to 2,244 students (the optimum size calculated) was only 47 dollars per student. Comparing this with Riew's (1966) study of Wisconsin High Schools (mentioned above) that displayed a substantial level of saving per pupil as size increased, he assumed that the latter excluded transport costs from his calculations of expenditure. Osburn concluded that his study "... provides guide-lines regarding the added costs incurred if the 'optimum size' school was not provided". In a reply to this charge, Riew (1971) pointed out that Osburn employed an expenditure function model as it included variables such as 'the tax levy' and 'assessed valuation per pupil' that affect the demand and cost. Yet, "... to determine the optimum level of operation and economies or diseconomies of scale one needs a cost function, not an expenditure function" (Riew, 1971).

Dawson's (1972) study of public secondary schools in the province of Ontario, Canada, was motivated by a consolidation plan of the school districts. He attempted to analyse secondary schools in single and multiple school boards in an attempt to measure the existence of economies of scale. Total costs (TC) were regressed on average daily attendance (ADA) (X_1), ADA weighted by quality index 'A' (X_2), and ADA as weighted by quality index 'B' (X_3). Total costs data was collected for 377 school boards including current operating costs and capital outlays. Boards who failed to submit the latter data were omitted from the sample. In contrast to Osburn (1970) who argued that "... the latter components of expenditure (capital outlays) reflect the influence of past events on local school spending ... unsystematic bias would have resulted if total expenditures per pupil had been used rather than current expenditure". The quality index 'A' of output was measured by achievement in test scores, whereas index 'B' compared quality of inputs as reflected in teacher experience, pupil:teacher ratio, teacher turnover, and number of

teachers with a BA degree. Three separate cost equations of the form:

$$TC = a + bX_1 + cX_1^2 + dX_1^3$$

$$TC = a + bX_2 + cX_2^2 + dX_2^3$$

$$TC = a + bX_3 + cX_3^2 + dX_3^3$$

were estimated for each of the academic, and commercial /vocational programmes (streams). All equations were estimated using the stepwise regression programme. He found that single-school boards, with the exception of one, reported either constant returns or continuing economies of scale. On including all school boards, "the results were not so clear", to quote his own words. He concluded that only with the post-consolidation cost structure, "... it should be possible to see with a greater degree of accuracy whether economies of scale do, in fact, exist in this area".

In a study of elementary and secondary education in British Columbia, Wales (1973) tried to identify how far costs per pupil depends on the size of school and school district. He acknowledged two serious limitations of previous studies, aggregation of per pupil costs components, and use of school district level data, and claimed to avoid them. He analysed five major operating cost categories: teachers' salaries, other instructional costs, operations expenses, maintenance and repair, and school district administrative costs. The first four components were school specific operating expenses. As data for teachers were available at the school level, teachers' costs per pupil equation was estimated using schools as observations. The other three categories, aggregated at the district levels, were assumed to behave differently, thus three forms of regression equations were estimated. Consequently, districts' administrative costs, being of a joint nature, were assumed to depend on the increase in enrolment rather than on individual school size, and hence a regression equation was estimated separately. He found that each of the components of operating costs at school level, except that of maintenance and repair, for which evidence was weak, initially decreased as school size increased. The average

administrative costs at the district level decreased with district size but eventually (and if the largest school districts were included) a rising average cost curve was inevitable. However, Wales criticised the U-shaped average cost curve conclusions in previous studies where aggregated operating costs were related to average school size, as indicated by district total enrolment divided by school number. He concluded that the results he obtained through careful statistical analysis, "... illustrate the misleading nature of (this) naive approach".

The amount of saving in resources which the notion of economies of size may achieve added another dimension to the issue. In the USA, the accumulation of literature on scale economies in school districts was promoted by various needs, including consolidation of services to reduce per unit costs and equality of resource allocation in ethnic minorities areas. But in the United Kingdom, following Cumming's study, "there seem to have been no previous studies in England and Wales of how expenditures vary with size of secondary school or with the size of local education authority" (Hough, 1981)*. However, Hough (1981) examined, for the first time, data for individual schools in four English local education authorities for evidence of economies of size in the operation of primary and secondary schools. The statistical technique employed was linear and multiple regression. He regressed total recurrent costs against total number of pupils, number of pupils squared and number of pupils cubed, in complete groups of secondary schools in each of the four LEAs for the three consecutive years (1974/5 - 1976/7) covered by the study. The same programme was repeated for groups of primary schools, where relevant, and subsequently for homogeneous sub-groups of secondary schools. He used total costs to estimate the equations in this study to avoid any bias (that might have) been introduced into the results by the use of ratios as a variable in the regression equations. He found that the

* See Hough (1981) for an extensive literature review.

coefficient of multiple determination for all the equations range between 0.85 to 0.88 which indicated that 85 to 88% of the variations in total costs in these LEAs' primary and secondary schools were explained by the size of the institution. He concluded that, "there is very clear evidence for economy of size in primary schools, with the largest schools having the lowest per pupil average costs; no minimum point emerges", but for secondary schools, whether grouped according to LEAs or in homogeneous sub-groups, there was no such strong evidence. However, considering the heterogeneity of the secondary schools in the sample raises the question whether initially there were 'standard' inputs, a given assumption in the notion of economies of scale, to test the effect of scale in the operation of these schools. As the author noted, "... an average over one whole school ... must conceal much wider variations in the costs of educating pupils at different levels in the school, ... or taking different subjects".

Much literature was compiled for studies in developed countries which were conducted to estimate cost functions and economies of scale for the 'traditional school'; some examples have been reviewed above. "But such attempts have been relatively recent and few in number in developing countries" (Tsang, 1988).

11.3. Economies of Size in Developing Countries:

One of the earliest studies to examine evidence of economies of scale in a developing country was Chesswas and Hallak's (1972) study of Uganda. They assumed that, because of economies of scale, the larger the schools the lower per pupil costs on all headings or components of expenditure, and the smaller or newer the school, the higher the unit expenditure. They concluded that, "... the evolution of the size of the school appears to have a significant impact on unit expenditure, (economies of scale), only for fixed cost items such as 'non-teaching staff' and 'administration'". This implies that they used disaggregated unit costs and each component was tested separately for scale economies;

aggregated average unit expenditure has been a serious drawback for many studies.

Another study of cost analysis in secondary schools in Morocco aimed to measure per pupil costs in relation to the size of the school. Proust's (1972) study was based on a representative sample of 23 secondary schools grouped into five different sizes. It was found that there was no relationship between the size of a secondary school and the cost per pupil, though some schools had higher costs than others. It was, however, considered premature to draw conclusions about size economies as small schools in rural areas were under-represented and the data covered mainly large urban schools. It is interesting to note that a decade later, a study of Morocco secondary schools found that unit expenditure for teachers and most indicators did not vary as a function of size. Tibi's (1981) study was based on a sample of 68 secondary schools that constituted 12.9% of this level, including lower, upper and combined lower and upper secondary schools. He used different techniques to relate per pupil costs to size. But, even when unit expenditure and indicators were ranked by size in quartiles, again there was little variation in inter-quartiles comparison. He concluded that, "this situation is due to the very strict control exerted in the way money is distributed to schools". However, the regular increase in each component as school size increased indicated that affluent schools got more of any one resource considered.

The above study was part of the IIEP project (1981-84), discussed earlier, to study the behavioural characteristics of educational costs in traditional schools in developing countries. As most of the individual studies in this project were not published, Tibi (1987)* undertook an intensive cross-country analysis which included an attempt

* As this book is originally in French, Mr. Tibi permitted me to refer to an unpublished version translated by Professor Hough; I am grateful to Mr. Tibi and Prof. Hough.

to identify the relationship between the size of the institution and total recurrent expenditure, as well as recurrent per pupil costs. The study used three different, and complementary analytical techniques to measure the variations in unit expenditure, its components and related indicators. This detailed disaggregation was justified as necessary "... in order better to appreciate the possible economies of scale or of size". First, unit expenditure, components and relevant indicators were grouped according to size categories as indicated by number of pupils or number of classes. Comparing these different categories revealed the trend in variation as a function of school size. Thus institutions were ranked by increasing unit expenditure, grouped into quintiles and the related components and indicators were calculated for each quintile. This gave a more homogeneous classification and inter-quintile comparisons more quickly indicated variations by size. Finally, a regression analysis of expenditure on size was carried out. However, Tibi (1987) noted that, "... if we work from unit expenditure, we risk introducing bias into our estimation of the coefficients of the adjustment function (as) unit expenditure is a ratio in which size figures as the denominator". In this respect it is important to record that in educational costs analysis, "some writers, including some of the leading authorities in this field, have in at least some instances used variables in the form of ratios in calculations of correlations or regression equations without any particular reference to the fact that to do so may be problematic" (Hough, 1981). Hence, Tibi proceeded from total expenditure to identify the best adjustment function and the possible minimum point of unit expenditure. Unit expenditure was regressed on institution size to allow the variations explained by size in both total and unit expenditures to be compared. Before regressing total expenditure against size, a correlation coefficient matrix was calculated to test for any high inter-correlation between the explanatory variables, size, location and region, for example. As the study aimed to

determine the proportion of the variations in total expenditure explained by all the variables together, it was decided to deliberately ignore any multi-collinearity and proceed with the regression analysis. A third degree polynomial function was used in which size was selected as the main explanatory variable and the other variables, including non-public resources, were introduced in linear form - where they do have an effect. Tibi found that between 75% and over 95% of the variations in total expenditure was explained by size in the majority of cases. Only for Nepalese secondary schools did the percentage fall to 60%, and it dropped to less than 30% for Indonesian first and second cycles and the Sudanese primary schools. On the whole, a higher proportion of variation in unit costs on teachers' salaries than that in non-teaching salaries was explained by size, and to even less extent than variation in non-salary expenditure. Certain establishments, in Nepal and the secondary schools of the Sudan, did not comply with this trend. In some countries the proportion of variation explained by size was almost the same in total expenditures or components in the primary and secondary levels, for instance, Venezuela and the Congo. In Indonesia and the Sudan a number of differences were observed in the educational levels and some of the components, whereas in Nepal significant differences related to each component and each educational level. Finally, in the large majority of cases, the number of classes as an explanatory variable was equally as good as, if not better than, the number of pupils. This applied, at the primary level, to the Congo and Venezuela and, in secondary education, to Algeria, the Congo, Indonesia (private schools at the 1st and 2nd cycles), Morocco, Sudan and Venezuela. Tibi concluded that, generally, total expenditure and its components were well explained by size, especially when indicated by the number of classes. The exception to this rule were educational levels in which total expenditure and components varied significantly within the same size. This indicated the existence of wide disparities in resource level for

institutions. However, and more important to the issue under discussion, Tibi emphasised that, "... to the limited extent that there is a relationship between unit expenditure and size, unit expenditures tend to diminish as a function of size mainly because the large institutions are also those where the number of pupils per class is higher". Interestingly, the small percentage of unit expenditure explained by size is shared by other studies in developed countries, for instance Riew (1966).

Some of the few individual studies in this 'Project', published in a summary form, for training material or for seminars, are quoted here. The study in Indonesia (Tibi, 1985) attempted to examine to what extent observed variations in unit expenditure might be explained by the effect of scale economies. Unit expenditures, components and main indicators, including pupils per class, teachers per class and average teacher salary for lower and upper secondary schools of public and private status were ranked by size as represented by the number of classes they obtained. Tibi concluded that "unit expenditures in Indonesia decreased systematically as school size increases" implying the existence of economies of size in the operation of these schools.

Similarly, in the study of Nepal (Sharma, 1982), primary, lower and upper secondary schools were arranged by size as defined by the range of pupils enrolled from below 50 pupils to 300 and over, matched by the relevant teacher costs per pupil. The study hypothesized that the larger the school the more influential it might be in obtaining additional budgets and teachers which might lead to an increase in unit costs. It was found at every level that the higher the enrolment, the lower the per pupil costs on teacher salaries. This continued up to a certain enrolment level, after which the pattern was less clear. The study concluded that "... up to a certain level economies of scale hold, thereafter the greater influence of a large school in obtaining more resources becomes the more important factor". In other words, it is the senior director (head teacher)

found in these schools who, usually, has 'good contacts' and as such can be granted access to more resources.

The preliminary results of the Thailand study (Racha-Intra, 1982) found that small schools with less than 12 classes had the highest per unit costs (3474.98 baht), whereas the largest, with 72 or more classes, had the lowest costs (1820.05 baht); the middle group, from 12 to 71 classes, clustered around the average costs for the whole country (2525.21 baht). This finding implies that economies of size did exist in operating secondary schools. It is of interest to note that this sample of schools included lower, upper and combined schools, all compared as 'like with like'. Cumming (1971) noted that, "... taking 'quality' in its descriptive rather than evaluative sense, ... it is clearly in doubt just how legitimate is a comparison of the costs of different schools which are known to vary in quality". Riew (1966) even remarked that, "... it is futile to attempt an inquiry into size-cost relations without taking into account the variations in educational programmes and the variations in quality". However, the study concluded that, "this result and others needs further investigation".

The study of the Sudan (Salih, 1986) on educational costs treated separately primary, intermediate and secondary schools and found that there was clear evidence on the existence of economies of scale at all levels. The schools were arranged by size of enrolment (from less than 200 to 800 and more pupils) with two hundred intervals. The main economies were found, at the primary level, in non-salaried expenditure as allocated by the local education council. Similarly, economies of scale did exist in the intermediate level, but seem to stem, mainly, from non-salary expenditure and school workers' wages. At the secondary level, it is interesting to note that scale economies were regained from expenditures on teachers' and non-teaching staff salaries. It is worth noting that the number of schools included in this sample (as mentioned earlier) was 90 at the primary

level, 54 at the intermediate level, but only 25 at the secondary level.

One of the few studies in developing countries that viewed the traditional school as a multi-product firm producing two types of educational services - primary and secondary levels - was conducted in two Latin American countries. Jimenez's (1985) study used a sample of 43 primary and secondary school in Bolivia and 41 primary schools in Paraguay. Originally the data was collected from seven countries for the School Achievement Survey sponsored by ECIEL (Programa de Estudies Conjunatos de Integracao Economice da Am-Latina) in 1975. Owing to the problem of reliability of cost data and the smaller school sample for the other countries, only the above two could be included. The study employed flexible cost functions and used enrolment data adjusted for school quality as indicated by achievement in two test scores. He found that primary schools in both samples exhibited economies of size, with the provision of secondary level held fixed. Similarly, in the secondary schools of Bolivia, economies of scale did exist, with the quantity of the primary output held constant. Including transport costs did not alter these findings. It is interesting to note that the multi-product formulation of the Bolivian sample estimation allowed the comparison of school costs for those which provided both primary and secondary services, and those which offered only one. There were no significant complementarities that meant lower costs for combining the two levels. The study concluded that there was some scope to choose between labour and non-labour inputs in the Bolivian sample and the size of the physical plant for schools in Paraguay was excessive. However, it is worth noting that this study found that neither the location nor the proprietary nature of schools had a significant influence on the costs. Jimenez was cautious to note that, "this finding may not be generalizable since the sample under-represents rural public schools". Another unique study on developing countries used disaggregated data at school level for primary schools in

Bolivia and Paraguay to test for scale economies as well as the effect of size on academic achievement (Mingat and Tan 1987). Academic achievement was measured by two different tests: the mean for reading score and science score. Average total costs and average variable costs per pupil were related to the pupil:teacher ratio and categories of school size (small, medium, large). They found that both average total and average variable costs (and pupil:teacher ratio in the Bolivian sample) decreased with size, whereas the academic achievement was positive and increasing with size in both tests. In the Paraguay sample, though average costs decreased from small to medium size, it increased again and the effect of size on academic achievement was negative. They noted that small primary schools (less than 200 pupils) usually had higher than average costs but large schools (1,000 pupils and over) were particularly difficult to manage, supporting Wiles' (1961) viewpoint (cited in Chapter Five) that "the managerial capacity has a threshold". They concluded, after reviewing data for most Latin American countries, that "... little evidence is available on scale effects and results are not conclusive".

Economies of size are found, also, in diversified secondary education. Curricula diversification has flourished over the last two decades in many developing countries, mainly based on the rationale that "diversified curricula would enable a more effective articulation between education and the labour market" (Psacharopoulos and Velez, 1987). Colombia is one of many countries which sought the World Bank assistance to build nineteen comprehensive secondary schools. A review of these schools by Psacharopoulos and Loxely (1983) revealed that between 1975-79 average costs per student fell from 8,053 to 5,166 pesos, but average costs in some small schools were 60% higher than larger schools. They concluded that an increase in enrolment of the small schools with higher costs might enable them to operate more efficiently. As with educational media, this type of school has very high fixed

capital costs and expansion of each school size would promote economies of sale.

As observed above, very few cost function studies on traditional schools included capital outlays as proxies for capital costs or even pin-pointed its importance. One of the earlier studies that insisted on including capital cost data was Dawson (1972) where "schools which did not supply capital data are omitted from the sample". King and Wall (1977) highlighted the contribution of capital costs to size economies when they found that per pupil construction costs of gymnasiums fell by 50%, and per pupil annual operating costs by more than 20%, as student populations increased from 400 to 2,200. Hough (1981) emphasised that "where evidence for economies of size can be found from examination solely of current operating costs, the result must understate the total scale effect. ... where a study finds a 'border-line' result ... a high probability that, in total, economies of size do exist". Tibi (1985) noted that "economies of scale in schools were likely to be more pronounced in the case of capital expenditures where the buildings, equipment and furniture were fully utilised". However, students (indicating operating costs), as well as schools (physical facilities), are important elements in the educational production process (Fox, 1981). Some researchers indicated that the omission of capital inputs may even affect the potential that school buildings and equipment can be used efficiently. Others suggested that such limitation, "can lead to significant estimation errors" (Tsang, 1988). However, the problem is that capital cost data is difficult to obtain. This was regarded as extremely problematic in both developed and developing countries as discussed earlier. In a study of size economies this has to be estimated for each individual school if it is to be meaningful. Moreover, it seems relatively unimportant to calculate capital costs in studies which examine economies of size in a search for a reduced per pupil cost for the provider (the state) where schools are built by local communities. Generally, developing countries suffer a

serious limitation in data on capital costs, particularly of a detailed nature that is highly demanded in size economies analysis. It is notable that, "... earlier studies indicated that annualised capital expenditure represented no more than 5 to 10% of total unit expenditure and as such economies of scale relating to capital expenditure probably have a rather limited total impact" (Tibi, 1989). However, 'total cost' is highly emphasized in all studies of instructional media where economies of scale gains loomed high from the substantial part of capital costs in its overall costs. A wide range of extensive analysis of cost functions of the new instructional media, however, existed for the planning stage (Chau, 1972) and after implementation (Eicher and Orivel, 1975). Educational media are used in three directions: "(a) to improve the quality and relevance of traditional schools; (b) to lower the costs of education or curb its rising costs; (c) to improve access to education in rural areas" (Jamison, 1972). However, due to the relatively high ratio of fixed costs of these technologies (mainly of buildings, equipment and production) compared to the variable costs that increase with student numbers and reception, economies of scale were expected, from the early beginning, when a certain level of audience was served. Chau's (1972) study of introducing instructional television in primary schools in the Ivory Coast anticipated that average total costs would vary as a function of audience size. The post-implementation evaluation of this reform indicated that average costs fell sharply until the number of pupils reached 200,000-300,000. Beyond this threshold, fixed costs were negligible, indicating the exhaustion of the economies of size. Other educational reforms that used instructional television included El Salvador's IIT system and Mexico's Telesecundaria. Both of them were accompanied by a reduction in unit costs (Unesco, 1977). Nevertheless, "... 'little media' such as the radio are more cost-effective than 'big media' such as television" (Tsang, 1988) because of the large 'start-up' costs of the latter. A number of countries utilised instructional radio to satisfy

social demand for basic education in rural areas, Mexico's Radioprimaria, and to promote teacher education and non-formal education, as in Nepal (Unesco, 1977).

The above review displays the limited number of studies on economies of size in the operation of traditional schools in developing countries, despite the need for such cost-reducing measure in these countries. Tsang's (1988) literature review on developing countries concluded that "further research on cost functions and economies of scale in traditional education should be encouraged". In this perspective, this endeavour is hoped to be a contribution in this area.

11.4 Economies of Size in the Sample Schools:

The data on academic secondary schools is used to identify the relationship between the total recurrent unit expenditure and each of its components and school size. In an attempt to avoid some of the serious limitations in previous studies, data was collected at the individual school level (as mentioned earlier) to evaluate school-level costs and verify the existence of economies of size. Per pupil recurrent expenditure is disaggregated (and more detailed) into its six components, namely, unit expenditure on teachers' salaries, additional (extra) periods, administrative salaries, non-teaching staff salaries, school workers' wages and on non-salary expenses. However, for the purpose of examining economies of size, only the total unit expenditure (TUE) and the major sub-units such as unit expenditure on teachers salaries (UETS), unit expenditure on administration salaries (UEAS), unit expenditure on workers wages (UEWW) and unit expenditure on non-salary expenses (UEN-S) are retained. As the non-salary component included contributions from the local communities and parents, as well as foreign aid in cash and kind, it is further disaggregated to account for the effect of non-public resources (UEN-PR).

This sample of schools allows for 'like' to be compared with 'like' because all these institutions are senior

academic secondary schools, at the same level, and following the same curriculum or programme. All of them are public schools, financed mainly by public funds which are distributed according to the same norms and regulations; boarding expenses are analysed separately. Moreover, their pupils are only those who passed the selective examination at the end of the intermediate (junior secondary) school level. All these indicate that differences in standards or quality among these schools may be very narrow.
Nevertheless, there are other limitations to the study. For instance, inputs related to capital costs are not included due to the problems of obtaining such data referred to above.

At the outset, it is important, to establish the type and quantify the strength of the relationships between the dependent variables:
Total unit expenditure (TUE),
Unit expenditure on teacher salaries (UETS),
Unit expenditure on administration salaries (UEAS),
Unit expenditure on workers wages,
Unit expenditure on non-salary expenses (UEN-S)
and the independent variables:
School size as indicated by number of pupils (Sch.S) and as represented by number of classes (N.Cl),
Region (Reg), Location (Loc), Kind of school (Kind),
Unit expenditure on non-public resources (UEN-PR).
Table 11.1 shows the correlation coefficients between the explained and the external explanatory variables including non-public resources. It is important to relate the dependent to the independent variables at this stage to determine the type, and degree of association they experience. The inter-relationship between the explanatory variables is calculated to examine the extent of inter-correlation. Correlations between the independent variables are particularly interesting as "any large inter-correlations between the independent variables ... can substantially affect the results of multiple regression analysis" (Hanushek, 1985). Tibi (1987) noted that it could

be difficult to disentangle the separate effects of exogenous variables which are highly inter-correlated unless sophisticated statistical techniques were used. Hanushek observed that since discussion of multi-collinearity in educational research by Bowles and Levin (1968), it was taken as an almost ever-present but lamentable fact of life in estimation. He argued that in fact multiple regression analysis is used because there are correlations among the 'independent' variables. Nevertheless, as Table 11.1 displays, it is clear that there is no high correlation between the independent variables to create a problem of multi-collinearity. Interestingly, total unit expenditure and each of its component have a negative, stronger correlation with the school size as represented by total enrolment rather than by number of classes or sections. Size of school, as indicated by the number of pupils, is the more important predictor for both levels of expenditure, unit costs and each of the sub-units. In principle, it indicates the existence of economies of size in the operation of these schools. However, except for the unit expenditure and unit costs on administration salaries, all the coefficients are very low and non significant. It is astonishing to find that there is almost no association between unit expenditure on teachers' salaries and the size of the institution. Whether an important resource and major contributor to total unit costs and to the educational process as a whole is allocated by a criterion that does not include the requirements of the institution as represented by its size, needs further investigation. However, it is interesting to note that the correlation coefficient of total unit expenditure is quite considerable and fairly strong ($r = -.4175$); significant at the highest level tested (at .01). Unit costs on administration salaries, as would be expected, evidenced a comparatively stronger negative correlation ($r = -.7009$) and highly significant (at .001 level). Using the computer, a scatter diagram was drawn for each and different mathematical models were examined in search for the best fit for the data under consideration.

Table: 11.1
Correlation Coefficient

	TUE	UETS	UEAS	UEWW	UEN-S	UEN-PR	Sch.S	N.Cl	Loc	Type	Kind
UETS	.7324** SIG .000										
UEAS	.4851** SIG .000	.1461 SIG .322									
UEWW	.6649** SIG .000	.4518* SIG .001	.3611 SIG .012								
UEN-S	.4894** SIG .000	-.0353 SIG .812	.1908 SIG .194	.2331 SIG .111							
UEN-PR	.3112 SIG .031	-.0111 SIG .940	.1686 SIG .252	.1664 SIG .258	.6541** SIG .000						
Sch.S	-.4175* SIG .003	-.1174 SIG .427	-.7009** SIG .000	-.1764 SIG .230	-.2676 SIG .066	-.2197 SIG .133					
N.Cl	-.3493 SIG .015	-.0473 SIG .749	-.6685** SIG .000	-.0816 SIG .581	-.2211 SIG .131	-.2461 SIG .092	.9097** SIG .000				
Loc	-.2401 SIG .100	-.3070 SIG .034	.1730 SIG .240	-.1344 SIG .362	.0321 SIG .828	.0194 SIG .896	-.1786 SIG .224	-.2030 SIG .166			
Type	-.2065 SIG .159	-.3536 SIG .014	-.0846 SIG .568	-.2844 SIG .050	.2548 SIG .081	-.1120 SIG .448	.0450 SIG .761	.0437 SIG .768	.2667 SIG .067		
Kind	-.0031 SIG .984	-.2715 SIG .062	.2013 SIG .170	.2410 SIG .099	.2349 SIG .108	.1891 SIG .198	.0909 SIG .539	.0738 SIG .618	-.0337 SIG .820	-.1234 SIG .403	

* - SIGNIF. LE .01 ** - SIGNIF. LE .001 (2-TAILED, " . " PRINTED IF A COEFFICIENT CANNOT BE FOUND)

It is interesting to note that for both dependent variables the third degree polynomial equation seems to be superior to the quadratic models as it gives the best fit and hence the highest R^2 for this indicator of size; R^2 increased considerably. Tibi (1987) advocated that the advantages of a polynomial function for taking the size effect into account are considerable. "This is a simple function which can take a number of forms and which can therefore easily be adapted to the phenomena to be studied, especially as the resulting average cost function may show a minimum point (economies of scale)". The resultant equation is of the form:

$$Y = a + b_1X + b_2X^2 + b_3X^3$$

where

Y represents Total unit expenditure or unit expenditure on administration salaries

a constant

b_1, b_2 and b_3 are the regression coefficients

X is the total number of pupils enrolled.

The results are presented below, first for the total unit costs and then for the unit expenditure on administration salaries which has the strongest negative correlation with total enrolment as noted above.

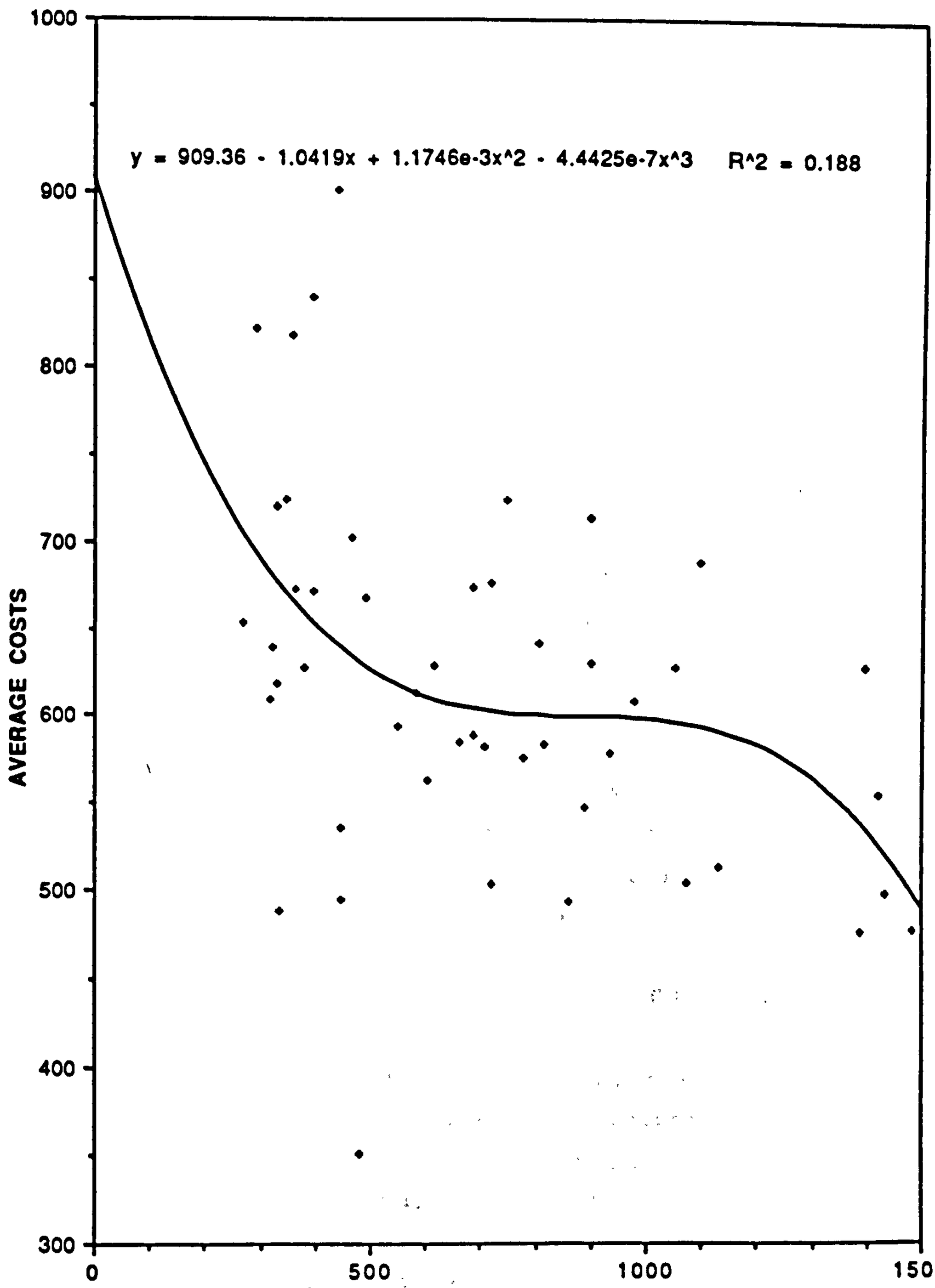
a) The relationship between total unit expenditure and school size resulted in the estimated equation:

$$Y = 909.36 - 1.0419X + 0.0011746\ X^2 - 0.00000044425\ X^3$$

The result is also presented in graph form. Diagram (11.1) displays the relationship between the unit expenditure and enrolment. It is clear that unit expenditure declined with increase in enrolment up to a limit (700 pupils), after which the curve becomes flat showing an L shape, a pattern observed in the average costs, Diagram 5.6 (cited in Chapter Five), and thereafter (at around 1200) it continues decreasing further with larger size. It is important to

Diagram: 11.1

Total Unit Expenditure in Academic Secondary Schools



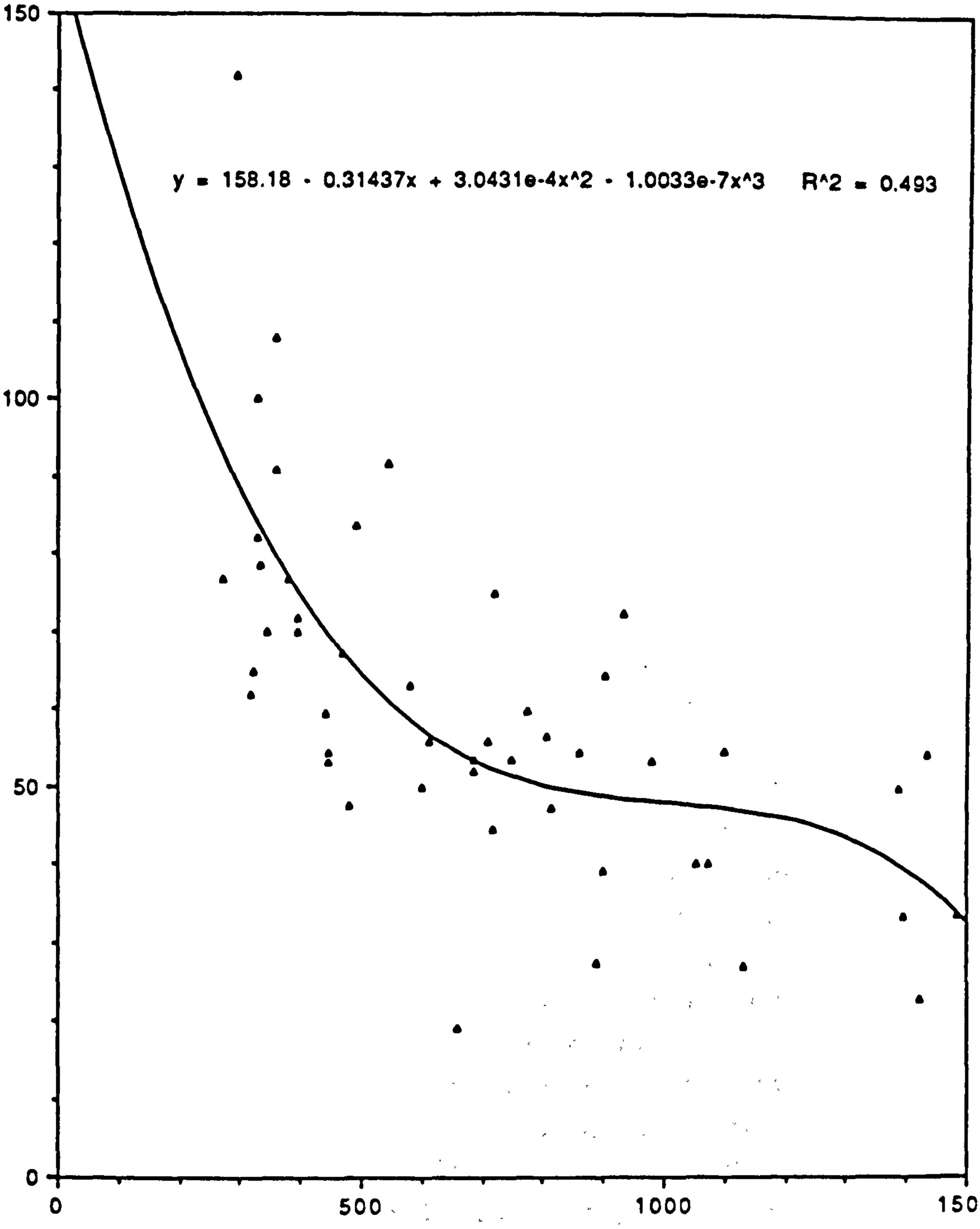
note that at the horizontal section of the L unit costs decreased to around £s 600 and after that it declined to as low as £s 500. This model explained almost 19% of the variations in unit expenditure ($100R^2$= 18.8). It is evident that, though unit expenditure is negatively correlated with the institution size, the percentage of the variance explained is very small; at best 18.8%. It may imply that only this small percentage of total resources is distributed to individual schools in proportion to size as number of pupils enrolled. However, this finding is similar to some studies cited above. The fact that size of the institution explained only a limited variance in per pupil costs is commonplace in the literature; experienced earlier in developed countries (Riew, 1966) and more recently in a number of developing countries (Tibi, 1987). However, Tibi (1989) reported that "in a majority of developing countries less than one-third of the variation in total unit expenditure and often less than 10% is explained by size". Strangely enough, he noted three exceptions; one was 'secondary schools in the Sudan'. This confirms the hypothesis that the process of allocating resources to schools according to the number of pupils may not retain the same characteristics over time. On the other hand, unit expenditure on administration salaries and total enrolment relationship is represented by the equation:

$$Y = 158.18 - 0.31437X + 0.00030431\ X^2 - 0.00000010033\ X^3$$

and displayed in graph form. As Diagram 11.2 shows, the relationship between unit expenditure on administration salaries and school enrolment has a similar pattern to that observed above. In this case the model explained almost 50% of the variance ($100R^2$ =49.3) in school administration costs per pupil. As expected, non-teacher costs do not increase, beneath a standard level, with the increase in enrolment and hence increase in school size leads to gains of economies of scale. However, this pattern of behaviour has important policy implications. The expansion of this level can be

Diagram: 11.2

Unit Expenditure on Administration Salaries



achieved at a lower cost by increasing the enrolment of already existing schools to exhaust the economies of size.

It is noteworthy to record that economies of size in Sudan secondary schools were achieved through unit costs on teachers and non-teachers salaries (Tibi, 1987). The finding of this study emphasizes the importance of collecting data on unit expenditure and its components at regular intervals as not all of them do retain their characteristics over time; they change differently.

However, one of the prime reasons for cost analysis is its relationship with other factors that determine its variability in the various settings; that would be the focus of the next section.

11.5 Determinants of Unit Costs:

The correlation coefficients computed above, Table 8.32, Table 9.13 and Table 11.1, identify many policy controlled, school inputs as well as exogenous factors that have been frequently investigated by researchers and are found to be significantly related to the unit expenditure. However, in spite of the fact that all these factors have been found related to unit costs in some studies in a number of countries, they might not hold true in other settings or might not share the same intensity of the relationship.

These factors can be classified into two sets: an increase in the first group simultaneously increases the unit costs or expenditure. The first group includes average teacher salary, enriched curriculum, extra non-budgetary resources in cash or kind, average worker wage and teacher training. The increase in the second group is more welcomed for economic reasons. These include size of school, class size, pupil teacher ratio and number of pupils per worker. Although research findings differ from one country to another some school inputs are included in almost all studies as major determinants of unit costs. Intuitive judgement pinpoints the size of school as the most objective factor for delineating the quantities of resources needed and as such the increase in school size or increase in class

size decreases the unit costs as resources would be used more efficiently. Similarly, the higher the pupil teacher ratio the heavier the average teacher load and the larger the number of pupils per worker the lower the costs per pupil. On the other hand, the more qualified, trained and experienced the teachers the higher the average salary. Prior beliefs assert that the broader and more enriched the curriculum the higher the unit expenditure; good education is expensive. Although, boarding expenses are analysed separately, the existence of a boarding facility in the school, despite its contribution to student performance, is demanding on teaching staff time and administration; as such it may increase per pupil costs. That may also decrease costs if some resources acquired for the boarding house are redeployed for the benefit of the school. However, it is important to identify the most powerful explanatory variables from this long comprehensive list of factors that may increase unit expenditure and those that can reduce it. In this case, a stepwise regression (partial correlation) is employed to identify the major determinants of unit expenditure and delineate the relative contribution of each in explaining its variations. Here the independent variables are entered into the equation or removed if they satisfy the test of tolerance; the tolerance of a variable being the proportion of its variance not accounted for by other independent variables in the equation. Table 11.2 displays the six variables that survived this test and which are selected as significant determinants of the unit costs. Interestingly, each of the six factors has the expected sign. The three that have positive signs are non-public resources, average curriculum load and average teacher salary. It is understandable that extra resources in cash or kind would increase the level of unit expenditure though that enhance the standard of school inputs as these resources are meant to supplement the limited public funds. Similarly, an enriched curriculum is expensive as more equipment and facilities are indispensable and so is the cost of highly qualified experienced teachers as reflected

in the increase in average salary. Thus any increase in the level of these raises the unit costs. On the other hand, the negative signs of school size, pupil teacher ratio and number of pupils per worker imply that increase in these factors decreases the unit expenditure.

Table 11.2

Determinants of Total Unit Expenditure

Indep.Vari	Reg. Coeff	100R2	% Contribution	t values
1. Pupil TR	-7.497	42.53	42.53	5.370
2. UEN-SNPR	1.181	62.78	20.25	8.963
3. A.T.S.	0.046077	77.36	14.58	6.607
4. Sch.Size	-40.576	84.62	7.26	5.941
5. P.W.R.	-1.303	88.39	3.77	3.929
6. A.C.L.	4.917	90.72	2.33	3.214
7. Constant	356.897			

However, all these explanatory variables are highly significant (at .001 level), except the average curriculum load which is significant (at .05). As a group they explain over 90% of the variations in unit costs ($100R^2 = 90.72$). It is interesting to note that the school size appeared to be the most powerful factor that influences unit costs. In terms of the magnitude of the regression coefficients (see Table 11.2), the total enrolment emerged to be the most important variable in reducing the unit costs of secondary schools. A unit increase in enrolment is expected to reduce the unit expenditure by £s 40.57. Nevertheless, school size explains only 7 percent of the variations in unit costs. The second important factor is the pupil teacher ratio which explains more than 42% of the variance in unit expenditure

($100R^2 = 42.53$). Interestingly, a unit increase in the pupil teacher ratio can reduce unit costs by £s 7.50; relatively far below the magnitude of school size. However, Yeomans (1971) explained that "the greater the variations of the dependent variable which the regression equation can explain the more reliable will be the predictions and estimates based upon this model". Consequently, the independent variable that explains the greater variations of the dependent variable may be its most powerful predictor and estimator. The third factor as a cost reducing measure is the pupil worker ratio. Although this variable explains only 3.8 percent of the unit costs variations, its unit increase reduces expenditure per pupil by £s 1.30. The reduction in costs owing to this factor is not as high as the increase in school size or the pupil teacher ratio. Nevertheless, increase of such factor, in contrast to that in pupil teacher ratio or class size, is welcomed as such an increase would reduce cost without reducing the quality of education.

As expected, the increase in average teacher salary, curriculum load and non-public resources increases the unit costs. It seems that improvement of the curriculum is the most expensive endeavour. A unit change in the curriculum provision increases per pupil costs by £s 4.91. Surprisingly, the increase in unit costs as a result of one unit increase in average teacher salary is extremely low, £s 0.05 (5 piasters); similar only to Longe's (1982) finding in Nigeria. It indicates, contrary to prior beliefs, the limited influence of changes in teachers salaries on unit costs, in relation to the other factors.

In summary, it is important to note that the pupil teacher ratio, the unit expenditure on non-public resources and the average teacher salary explain 77% of the variations in unit costs. Yet, the school size followed by the pupil teacher ratio are the most significant factors that can reduce unit costs.

11.6 Determinants of School Output:

As data on the results of the 'Sudan School Certificate Examination' (S.S.C.E.) for 1988-89 (the period covered by this study) became available, it is possible to examine a series of important relationships. The successful pupils are those who passed at least five basic subjects including Arabic and English Languages, Mathematics and Religious Education (Islamic or Christian). The Percentage of Successful Students per Third-Grade (% Success) in this external, national examination is used as a proxy of school output or a quantitative indicator of quality. However, this information is highly useful for relating educational performance to per pupil expenditure and the size of the institution. Performance/size and performance/expenditure associations have been subjects of serious debates and discussions, although the large number of studies on these issues had contradictory results. The above review of literature reveals how consolidation supporters, for districts or individual schools level, believed that larger schools could offer greater quality and breadth of curriculum at lower cost than smaller schools, hence 'more value for money'. Large schools are synonymous with better facilities, more experienced and qualified faculty and higher level of achievement and outcome. "The consolidation argument and merging of small schools have usually proceeded on a quality of schooling basis, (i.e.) the larger school provides more options, etc., without reference to cost" (Michelson, 1972). A study by Kiesling (1967) for school districts in New York State related educational performance to per pupil expenditure and the size of the administrative unit. Initially, the data were collected in the late 1950s for the 'Quality Measurement Project' for New York State. He attempted to control quality variations between districts through isolating socio-economic characteristic and individual pupil intelligence; qualities not imparted by the school. Output of formal education was represented by the average school district pupil achievement, while the independent influences were the net current expenditure per

pupil in weighted average daily attendance and size as measured by ADA. The statistical technique employed was multiple regression estimation. He found "little aid and comfort ... for the popular notion that larger school districts do better than small ones". It is interesting to note that "the relationship (size/performance) is best fitting when the variable is transformed into its logarithm, which means that performance drops quickly at first and then more slowly with increasing size. Thus Kiesling's conclusion was disappointing as he noted that "... nowhere in the study is there a significantly positive relationship between size and performance". However, he cautiously remarked that "further work will be required before such findings ... can be accepted with confidence". A similar conclusion emerged from Cohn's (1968) study of performance in Iowa high schools - cited earlier. He concluded that "the best educated guess that might be made of such results is that the condition of decreasing returns to scale is the most likely state of the educational industry". Levin et al. (1971) confirmed that all of the studies that have tried to relate school or school district size to education outcomes have found either no relationship or a negative one between student enrolments and the level of education outcome". Hind (1977) cautiously reported that "the evidence is indecisive because most studies have suffered from a number of methodological shortcomings".

On the other hand, the notion that 'good' education is 'expensive' has always been the indefensible argument of educators to secure more money from the Treasury. "It is commonly assumed that a larger, or more valuable, educational product can be realized when schools are able to utilize more resources" (Cohen, 1975). Thus, "... serious questions have been raised about the effectiveness of the educational system and the apparent inability of additional expenditures to improve educational outcomes" (Averch et al., 1972). Hanushek (1985) observed that expenditure studies frequently assume that expenditure differences index quality differences. Moreover, Rizzuto and Wachtel (1980),

after reviewing recent literature that uses data on resource inputs into schooling as a proxy for quality, concluded that "... finally, expenditures per student have a positive effect on the level of educational attainment". That line of thought is questioned by many other researchers in this field. Psacharopoulos and Woodhall (1985) argued that although many studies used expenditure per pupil to measure quality of outcome that "cannot explain input-output relationships since the very question that needs to be answered is whether increasing inputs does lead to an increase in either the quantity or quality of output". They concluded that "many input-output studies have found little connection between expenditure per pupil and achievement". A similar conclusion was offered earlier by Kiesling (1967). He found that "the expenditure-performance relationship for most populations is disappointingly weak (and) ... greater educational return per dollar (exists) at lower expenditure levels".

Hough and Warburton's (1986) study related O-level success per fifth-form pupil in each of thirty schools in one Local Education Authority to per pupil recurrent costs in three successive financial years and to the relevant socio-economic variables from the census data. They found, as expected, that only the socio-economic explanatory variables, such as social class, emerged as the most important predictor for the three sets of results presented by the study. More relevant to the issue under discussion, they reported that the regression results were confusing, the coefficients were always very small (0.009), and never statistically significant except in one instance. Hence, "no meaningful conclusions can be drawn regarding linkage between expenditure per pupil and external examination success at the level of individual schools". They emphasized the need to replicate similar analysis, with a larger sample than the "thirty schools", elsewhere.

Nevertheless, in spite of the large number of studies that have been undertaken in the last decade to relate educational output to the institution size and/or per pupil

school expenditure, the results have been contradictory and at best inconclusive. The only exception to all that is the recent viewpoint of the Education Secretary in the U K, quoted in the Guardian (1991), that "There is no automatic connection between socio-economic factors and performance and certainly no connection between levels of spending and performance".

However, as the relevant data is available it may be timely to report, for the first time, on the association between per pupil expenditure and school size on one hand and the Percentage of Success per Third Grade in the Sudan School Certificate, on the other. This Certificate is equivalent to the British O-level examination but it is of more importance in Sudan. Successful students at this level compete for admission to universities and higher educational institutions or, alternatively, enter the workforce.

It is important to note, regrettably, that for this analysis no data is available on the socio-economic profile of the schools sample catchment areas. Neither is there any information on individual pupils socio-economic background, innate intelligence or abilities. "These differentials would be particularly important in developing countries where there is apt to be much segmentation by socio-economic strata in the student bodies among schools" (Jimenez, 1975). However, even where such data was available, empirical evidence reveals that school inputs have a more critical role in developing countries than in developed. Schiefelbein and Simmons (1978) found that "the proportion of explained test score variance attributable to school quality was lowest in developed countries such as Austria, Japan, Sweden and the USA, but it was twice or three times as high in Brazil, Botswana, India and Thailand. They concluded that "the less developed a society, the smaller the influence of home background on achievement and the greater effect of school variables". Heyneman (1980) and Heyneman and Loxley (1983) observed that wealthy school children did not perform better in achievement tests in less developed countries. Yet, much comfort is found in Noonan's

(1976) comment that "... in thinking about the relationship between expenditure and achievement, it is necessary to distinguish between policy and non-policy variables". This viewpoint is supported by experience nearer to home. In Ethiopia, Abraha, Beyene and Dubale (1991) argued that "As community characteristics, even when data are available, are more difficult to influence in the short run, the analytic strategy is to look separately at those school factors that may be manipulable by the educational authorities". On similar lines, Levin (1974) wrote "it is essentially these school inputs that are of particular interest to economists (and educators) in their quest for efficiency, for these resources represent the ones that are purchased by the school budget and for which resource allocation decisions can be made". Backed by empirical evidence from developing countries, Schiefelbien and Farrell (1983) advocated that "changes in achievement level are explained primarily by differences in the quality of the educational experience received rather than differences in family background".

Hence, as the data on school resources or 'policy variables' such as the pupil teacher ratio, average curriculum and teacher loads, class size, types of teachers qualifications and training and years of teaching experience as well as other costs all summarised in the per pupil recurrent expenditure are available, the decision to report this study was taken. However, this exploratory study has other limitations. Similar to other research on developing countries, on this topic, it is based on cross-sectional data though this may be compensated by the selective admission of all students in this sample schools. Otherwise, as Lockheed (1987) observed "cross-sectional data is incapable of distinguishing factors related to initial level of performance from those responsible for improvement in performance". Moreover, the study focuses on material inputs and treated schools from different regions as homogeneous regardless of inter-regional differences in resources. Nevertheless, as noted above disparities within

the same region in educational resources are sometimes more marked than among regions.

As a measure or proxy for educational output, the Percentage of Successes per Third Grade is considered appropriate. Katzman (1968) used as an output the percentage of all Sixth Grades who passed the entrance test to the "prestigious Latin School". However, different output surrogates have been used in the literature in the absence of a general agreement about a single measure of educational outcome.

At the outset it is important to quantify the type and strength of association between the Percentage of Successes per Third Grade and school size and the per pupil recurrent expenditure, as well as other relevant variables. The latter include a number of policy controlled variables that appeared to influence student performance in previous literature; these include the characteristics of the school, class and teachers. Research studies indicate that larger, well maintained schools with more resources contribute to a higher percentage of student achievement. Similarly, the larger classes found in these schools offer broader more enriched curriculum that use frequently text-books and library books. Prior beliefs regarded schools with a high rate of educational wastage - repetition, dropout, and dismissal - as less conducive to learning and their students lack academic achievement motive. However, empirical evidence reveals the significant impact of schooling norms such as pupil teacher ratio, average teacher load and average curriculum load; these are closely related to academic learning time, which is a powerful correlate of student performance. It is also customary in research on factors influencing student achievement to analyse the determinants of instructional costs - teachers' qualification, training and years of experience. Intuitive judgement and research findings revealed that a higher level of success is ensured in classes of more qualified, trained and experienced teachers. Moreover, the number of boarders

in the student body is believed to influence the level of performance as discussed earlier.

Table 11.3 shows the correlation coefficients between the Percentage of Success per Third Grade (% Success) and the size of school and per pupil current expenditure as well as its relationship with all the above mentioned variables. Generally, all the coefficients are very low. It is important to record that % Success has a positive correlation with school size, class size but negative association with the pupil teacher ratio. Although the coefficients are very low, it may indicate that the larger the school and the classes and the lower the pupil teacher ratio the higher the level of student success. Interestingly, per pupil expenditure has also a positive coefficient (r = .0671), although it is even lower than that of school size. More stronger and highly significant correlations are noted with other school variables. Higher level of training, postgraduate studies for example Master and Diploma degrees (Dip&MS), is positively correlated (r = 0.5351) and highly significant (at .001 level). This association is a strong support for research finding on the importance of higher qualifications and training. Other significant negative correlation is observed, mainly with the ratios of educational wastage: dropout ratio (for D.R, r = .5011), repetition ratio (for R.R, r = .4144) and dismissal ratio (for Dis.R, r =.3641). As expected, high ratios of educational wastage indicates the lack of schoolwide recognition of academic success. It is interesting to note the positive correlation between % Success (although all the coefficients are non-significant and low) and the various ranges of years of experience. The higher the range the stronger the association; highest for Exp 21+ years (r = 0.2305). It is equally important to observe the negative correlation between % Success and newly hired teachers, Exp1-5 years (r = -0.3151). This may be contrary to the viewpoint that experience may be synonymous to obsolescence. The importance of training is further emphasised by the negative coefficient of the 'untrained'

Table: 11.3

Correlation Coefficient

	TUE	Dip&MS	UEN-TP	Exp11-15	No.B	UEN-S	ATS	U.grad	UETS	UEAP
% Success	.0671	.5351**	-.1632	.1988	.2570	.1316	.2373	-.2150	.1362	-.1763
	SIG .651	SIG .000	SIG .268	SIG .176	SIG .319	SIG .373	SIG .104	SIG .142	SIG .356	SIG .231

	UEAS	Cl.S	ACL	UEPC	UERM	UEStat	UEFM	UELib	UETB	UNTR
% Success	-.2140	.1466	.1238	-.1299	-.0183	.2297	.3949*	.1261	.1992	-.2981
	SIG .144	SIG .320	SIG .402	SIG .379	SIG .902	SIG .116	SIG .005	SIG .393	SIG .175	SIG .040

	TTI	Exp1-5	PTR	Exp6-10	Sch.S	Exp16-20	Exp20+	DIS.R	R.R	D.R
% Success	.2347	-.3151	-.0551	.1750	.2442	.1983	.2305	-.3641*	-.4144*	-.5011**
	SIG .108	SIG .029	SIG .710	SIG .234	SIG .094	SIG .177	SIG .115	SIG .011	SIG .003	SIG .000

* - SIGNIF. LE .01 ** - SIGNIF. LE .001 (2-TAILED, " . " PRINTED IF A COEFFICIENT CANNOT BE FOUND)

(UNTR) variable. Other manipulable school inputs, such as average teacher load, number of teachers per class, average curriculum load, unit expenditures on library, text-books, stationery, furniture maintenance and teachers' salaries are positively related to % Success. As asserted by prior beliefs and research studies all have the expected sign, though the coefficients are extremely low. An exception is the unit expenditure on furniture maintenance (UEFM); with a fairly strong correlation (r = .3949) and significant (at .01 level). Interestingly, this is similar to Rutter et al.'s (1979) finding that pupil outcomes were better in schools that were kept in good order and in good decorative conditions. That may imply that the physical facilities, including furniture, in Sudan, are in bad condition to the extent that the better maintained and looked after the schools the more they are conducive to learning and the higher the ratio of success.

However, the analysis of the relationship between Percentage of Success of Third Grade students and unit expenditure and school size and related variables is carried out in two steps. First, linear multiple regression is applied to determine the contribution of each of the significant variables, discussed above, to the Third Grade students' level of success. The Enter Method was used to regress the Percentage of Success, as a proxy of output, in turn against unit expenditure and school size; each followed by the significant variables. As Table 11.4 reveals, the regression coefficient for unit expenditure is very weak (.02474) though with the expected sign, taking into consideration the squeezed budget, but it explains only 2.7% of the variations in % Success ($100R^2 = 2.74$); the t value is non-significant. The total variation explained by all the variables together is 47.5%. However, only the "Ratio of teachers holders of post-graduate diploma and Masters degrees" (Dip.&MS) is significant (at .05 level) and explained more than 50% of the explained variation; contributed 25.45%. This indicates the importance of

teachers' higher qualifications and professional training for the improvement of student performance.

Table 11.4

Factors Influencing % of Success in S.S.C.E.
(Enter/Unit Expenditure)

Indep.Vari	Reg. Coeff	$100R^2$	% Contribution	t values
1. Unit Exp	.02474	2.74	2.74	1.219
2. Ratio of Dip & Ms	.719712	27.92	25.45	1.758
3. U.E.F.M.	.280968	28.04	2.59	1.018
4 Dis.Ratio	-1.2988	35.76	7.72	1.547
5 Rep.Ratio	-.670376	45.02	9.26	0.676
6 Dr.Ratio	-1.8723	47.50	2.48	1.390
7 Constant	68.1906			

Table 11.5 shows the regression of the percentage of success against school size and the same set of related variables. Although school size appeared to have a higher contribution in explaining % Success ($100R^2 = 7.06$) more than twice the unit expenditure, and the regression coefficient is relatively higher but has the opposite sign and non-significant; implying, even if significant, that the smaller the school size, the higher the percentage of success. Only the ratio of teachers with postgraduate diplomas and Masters' degrees (Dip.&MS) appears to be the best explanatory variable, explained 17%, of the variations in % Success with the expected sign and significant (at .05). It emphasises, again, the prime importance of teachers' certification and higher qualifications in developing countries' setting.

The second step in the analysis is to regress the Percentage of Success per Third Grade students against all

the variables, discussed above in the correlation summary; believed to increase student achievement and are significant in a number of studies. Stepwise regression is carried out to identify the most significant predictors of % Success.

Table 11.5

Factors Influencing % of Success in S.S.C.E.

(Enter/School Size)

Indep.Vari	Reg. Coeff	$100R^2$	% Contribution	t values
1. Sch.Size	-2.5111	7.06	7.06	0.716
2. Ratio of Dip & Ms	.7709	24.14	17.08	1.698
3. U.E.F.M.	.2939	25.63	1.49	1.003
4. Dis.Ratio	-1.3047	32.75	7.12	1.536
5. Rep.Ratio	- .7528	42.92	10.17	0.734
6. Dr.Ratio	-2.1604	46.27	3.35	1.598
7. Constant	89.5345			

The result is astonishing. Only the variable the "Ratio of teachers with Postgraduate Diplomas and Masters' degrees" (Dip&MS) emerged as the best and only predictor of the percentage of success. As Table 11.6 shows, it explained, solely, 57.68% of the variations in % Success and is significant at the highest level (.001). This finding supports the empirical evidence on the importance of teacher higher qualification and professional training. Schiefelbein and Simmons' (1981) review of studies on developing countries indicated that performance of regularly certified teachers exceeded the performance of teachers with less formal training. Research studies in Asia and Latin America revealed that higher teachers' qualifications had a positive effect at the secondary level where, due to the limitation of resources, effective learning depends heavily on the

teacher's leadership skills in managing the instructional tasks. It emphasises the research finding that teachers' certifications and years of education are important, especially in the situation of developing countries, where effective learning depends heavily on classroom-teacher

Table 11.6

Factors Influencing % Success
(Stepwise Method)

Independent Variables	Constant	Regression Coefficient	$100R^2$	t Value
1. Ratio of teachers with Dip.&MS.	68.8637	1.3386	57.68	4.522

centred activities. Husan, Saha and Noonan (1978) concluded their review of studies on developing countries that "contrary to the arguments, the evidence suggests that trained teachers do make a difference". Earlier, Coombs and Hallak (1972) predicted that "a better-trained teacher does not necessarily need more provision of resources for teaching and learning ... he might even need less". However, acquiring such high qualifications is costly under the prevailing economic conditions of the Sudan. Although the finding is important, more important is the costing of the regression coefficients to find out the most cost effective input in raising achievement. Psacharopoulos (1985) doubted if the studies on student achievement in developing countries were aware of the financial implications of their findings; "how many (of these studies) have costed the regression coefficients of the independent variables ?". Nevertheless, though it may not be the most cost effective input, it signals out the importance of teacher continuous education and upgrading as the crucial factor for improving school output.

1.7 Conclusion:

The above analysis explores three critical topics:
a) per pupil costs/school size relationship,
b) the determinants of unit expenditure and
c) the twin relationship Performance/school size and Performance/unit expenditure. In addition to these, other school inputs and policy controlled variables are examined to explore whether they determine the unit expenditure and/or influence the Percentage of Success per Third Grade.

It is found that, contrary to many studies that related the size of the establishment to the unit costs in secondary education, the academic secondary schools of Sudan experience economies of size. A more important policy implication, in the prevailing conditions of austerity, is that enrolment at this level can be expanded at lower costs to exhaust economies of size, as costs per pupil further decreased as the enrolment increased. This economy is mainly achieved through the unit expenditure on administration salaries, though all other components have an inverse relationship with the school size.

The determinants of unit costs seem to be the school size and the pupil teacher ratio, both are highly significant and a unit increase in each would reduce, between them, unit expenditure by almost £s 48.

Interestingly, similar to other findings, the Percentage of Success per Third Grade is not influenced by the size of the institution or the unit expenditure; both coefficients are non significant. However, the ratio of teachers with post-graduate diplomas and masters' degrees emerged as the sole, highly significant predictor of the percentage of students success. An indication that teachers make the difference, especially in developing countries where effective learning, due to the limitation of resources, depends on the teacher 's ability and resourcefulness in benefiting his students, though the price of such high qualifications, as a way to increase students' achievement, may be prohibitive.

CHAPTER TWELVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

General Summary:

The Sudan is endowed with a wide variety of untapped natural resources including a substantial reserve of oil. Since independence, the country has been struggling to explore and develop these abundant resources and build its infrastructure as a precondition for overall development and promotion of its people's standard of living and welfare.

The key role of education in economic production and its contribution to individual and social development has been well recognised by the Sudanese nation. Empirical evidence has revealed that education is an investment in human capital (Schultz, 1961) and that human resources rather than capital income or material resources constitute the ultimate basis for the wealth of nations (Harbison, 1973).

This high valuation of education, supported by the strong correlation between economic growth and education in developed countries, has increased the expectations and hopes of developing countries. In fact the ability of government in these countries to finance the ever growing demand for education has "become one of the most important means by which these governments have established a sense of legitimacy in the eyes of their citizens ... (hence it is) an issue of critical political importance" (Carnoy et al., 1982).

The Sudan, eager, upon independence, to boost literacy and economic progress, has embarked on a huge programme of expanding school enrolment. Development of education has been identified as one of the highest public priorities as it is the producer of trained manpower for national development. For parents, being highly motivated by the promotion of the better educated to the prestigious 'white collar' posts, it becomes a symbol of status, progress and a

means to more equal income distribution. The demand for more education at higher levels has escalated and the number of schools, pupils and teachers increased in the last three decades to unprecedented levels. A large quantity of real and financial resources has been invested in the education sector to democratise opportunities and achieve equity of access and success from primary to university level.

In this time of unprecedented expansion and declining economic growth any profound thinking about education must from the start include economic considerations despite Confucius's wisdom "no nation goes bankrupt educating its people". The cost of education, in the Sudan as in other developing countries, has been rising faster than other costs because of its highly qualified manpower whose administered salaries are increasing without a commensurate increase in output or its quality. On the other hand, the rate of increase in GDP, which has been severely hit by natural and man-made disasters, has not kept pace with increases in educational expenditure. Escalating inflation has almost crippled the national economy and limited its capability to supply even more urgent basic needs such as clean water and a healthier environment.

To-day the education system has developed into a large industry with a complex organisation and administration; the Ministry of Education is the largest single producer and employer of educated manpower. Similar to other industries of its size it requires an examination of its various multidimensions. Cost aspects seem one of the important if not the most important dimension that need to be investigated thoroughly. Although it is not advocated that cost alone should be considered in planning educational development yet without financial support educational plans are only intellectual exercises.

In the prevailing economic crisis and financial stringency the importance of the study of costs for educational planning cannot be overestimated; it delineates what is economically feasible and what is not. It is certainly vital for projection of real, physical and

financial resources needed for educational expansion. A study of cost components of expenditure - such as salary and non-salary expenses - reveals the nature of the education production and whether it is labour or capital-intensive. Such an investigation would show to what extent is the salary and non-salary combination efficient and balanced. Recently, the declining ratio of non-salary expenses, in most countries of Sub-Saharan Africa, has constrained student achievement.

In a country like the Sudan, the computation of unit costs to compare intra and inter-regional variations due to the diversity of the physical environment and the heterogeneity of the inhabitants is, as discussed earlier, essential. The relevant data about the extent of disparity between regions and its magnitude using a quantified yardstick - the unit costs - can direct the planners effort in combating the persistent differences and promoting more equitable distribution of resources. A study by level of education can rationalise investment strategies by calculating the economic implications of expanding the different levels and thus show whether investment of the scarce resources is most cost effective. In the absence of such a study the number of public universities has tripled - from three to nine - in the last two years while the enrolment ratio at the primary level is only around 50% of the age group; empirical research has indicated that investment in secondary and primary education has higher rates of return than tertiary level (World Bank, 1988). Blaug (1987), rightly, observed that "the over expansion of higher education in the Third World is associated with under investment in primary education and the vital importance of primary education in the development process is perhaps the principal point of agreement among virtually all economists who have ever studied the problems of education in the Third World". Unit costs is also an indicator of educational quality and internal efficiency of the system. A detailed breakdown of the unit expenditure by its major components and their indicators highlights the nature of the

teaching/learning process, diversity of options offered and intensity of the extent of resource utilisation, mainly teachers' resource use. In the prevailing financial constraint, the containment of unit costs is advocated as the way to secure more efficient use of resources.

It is evident that cost analysis is an indispensable tool in assisting planners and policy makers to take effective decisions regarding future expansion of education and projecting the necessary resources for it. Yet it needs to be based on relevant accurate and complete data. This data is not readily available as the earlier experience in educational planning revealed. The adopted educational development plans clearly indicate that budget data were deficient for planning purposes; they neither represented the actual resources invested nor included all resources used.

However, the problem of collection of educational data and, specifically, cost data, is attributable to two factors. The first stems from the vast size of the country, the scattered population and the inadequate, inefficient means of transport and communications which is deteriorating by the day instead of improving. In this situation personal contacts, interest and dedication to the cause is of prime importance for collection of timely, relevant and complete data. The second factor does not promote or contribute to this: that is the high turnover of educational planning staff at the Central as well as at the regional level. As this category of personnel is, relatively, highly qualified, they can compete for better paid jobs in and outside the country.

In the light of this situation and against such a background this study has been designed to verify three criteria of reliable cost data: actual, complete and accurate. It has been conducted at the school level to collect all statistics of actual expenditure from budgetary and non-budgetary sources. The researcher herself visited the 48 schools and administered the questionnaire (from the school records where available) with the help of the

director, his deputy and accountant to ensure as far as possible accurate and reliable data. As an exploratory study, it is a pioneering effort in exposing the intra and inter-regional magnitude of disparities in resources used within the same size and in similar locations, types and kinds of school; within regions variations, in some cases, are more profound. As the whole line of enquiry pursued aims to guide more effective educational planning and being conscious of the financial constraints under which the education authorities increasingly operate, the study employed rigourous techniques to investigate cost reducing and controlling measures such as the existence of economies of size in the operation of the sample schools operations. Similarly, it set out to delineate the major determinants of total unit costs, the unit expenditure on boarding and its components and the level of student success in the final national certificate - S.S.C.E. - to permit new redirections of expenditure, where appropriate, without increasing the total amount of resources devoted to this level of education. The findings of all these investigations are presented in the next section.

Conclusions:

This study, as clearly, stated in Chapter One, is an endeavour to achieve general understanding of the teaching /learning process and accumulate knowledge on educational costs at the school level as a guide for effective educational planning and better utilization of financial and real resources in academic secondary schools. Similarly to other studies of this nature it has raised more questions in this fertile field than it has answered, not only in the wide domain of educational costs analysis in general but even in the specific area under investigation, secondary education. However, if this overall objective is achieved then the study has fulfilled its purpose and hopefully contributed towards filling the wide gap in this literature in developing countries. That can be judged from the

conclusions derived from the analysis of the various chapters, summarised as follows:

The study used two complementary approaches to delineate the major aspects of costs that can be controlled to improve the utilisation of resources, both real and financial, at the school level. Analysis of unit costs is employed to compare institutions within and between regions according to four exogenous factors: size, location, type and kind of school in an attempt to identify the main cost indicators which contributed to these disparities. Correlations are used to identify the type of associations between the relevant variables and linear and multiple regressions are applied to test for economies of size, to identify the determinants of the unit costs and find out the crucial factors influencing the level of student performance.

Chapter Two describes the specific context within which the education system develops to put the study into its perspective. It highlights the vastness of the country and the primitive system of communication and transport, the heterogeneous, scattered young population - the proportion of children under fifteen is 47% - and the grave financial squeeze as the real challenges for further expansion in education. All these indicate the need for more effective planning of education for national integration and economic development in a period of economic stagnation affected by natural disasters, instability of government and worsened by mounting debts. The adopted socio-economic development plans, based on deficient data have not been able to make the best use of the scarce available resources.

In Chapter Three, the evolution of the educational system from earlier times is traced. The present system, inherited from the Colonial rule, is academically oriented - lacking basic practical skills - and as such is irrelevant to the majority of the population who are peasants and nomads. The education authorities, increasingly working under pressure of thinly stretched resources, can hardly fulfil their commitment to the policy of access and success

in education; self-help efforts in well endowed regions even widen the gap between the haves and the have not. The financial stringency and inflation have led to stagnation of enrolment at all levels, eroded the teachers and non-teacher salaries, damaged morale and lowered non-salary expenses. Lack of reliable cost statistics and data to guide decision-making has led to deficient formulation and implementation of educational plans that have perpetuated the marked disparities in the society and disadvantaged regions.

The discussion in Chapter Four attempts to justify the application of the economic theory of production and cost concept beside other economic notions to the education process as long as there are limited resources and competing aims and hence alternative uses for these resources. Despite the debatable areas between earlier economists on which costs to include and which not, it is now quite acceptable to refer to the education as an industry.

The review of related literature on educational costs, Chapter Five, reveals that cost analysis in the education industry lags behind other industries and has been constrained by the relevant usable data and statistics even in advanced countries. The limited interest and paucity of research still haunts this field in most developing countries. In these countries, data on educational expenditures are collected for administrative purposes and in most cases are of limited utility in educational planning. Information on educational expenditures, which rely on the budget estimates, has not reflected actual spending. Self-help or non-budgetary resources are not included and it is almost impossible to find detailed statistics on spending classified by level and type of education and heading of expenditure. Despite the limitation of the data - aggregated at the state or the school districts levels - education economists in developed countries have generated an extensive body of literature; investigating determinants of educational costs, relating costs to different proxies of educational outputs, and assessing various cost-saving measures for guiding better

allocation of resources. The Sudan's limited studies indicate a persistent lack of interest in this field by both economists and educational planners despite the grave need for it.

In Chapter Six, the difficulties of obtaining the relevant costs statistics from administrative files are highlighted and the need to conduct a special survey to collect reliable data is emphasised. Accurate costs data are difficult to come by easily even at the school level. Due to the financial stringency school administrators are very secretive about the funds they obtain from official sources let alone those from other sources. Depending on the personality of the director and his personal contacts, some schools have access to more resources in cash and kind, even from official sources, than others. The absence of school records for financial expenditure renders the tying of different items of expenditure to its source of finance a problem.

The analysis on the global unit costs and its six major components (Chapter Seven), reveals that the overall national unit expenditure is relatively lower, in real terms, than other countries in the region due to inflation and the successive devaluation of the Sudanese currency. Similar to the pattern discerned in other studies, personnel salaries dominate the unit expenditure (74%). Although teachers salaries are the largest component, a ratio of 52% on a per pupil basis is lower for this level of education - usually around 70%. This is attributable to the inflated ratio of non-salary expenses and the slow adjustment of the administrative salaries. Similar to other findings in developing countries (Tibi, 1987) and in advanced countries (Hough, 1981) disparities between regions in expenditure on non-salary are more marked than in non-teacher salaries and on the latter than in teachers salaries. Contrary to Tibi's findings, the discrepancies in non-salary items from budgetary sources are even more acute than those from non-budgetary. Private sources and foreign aid support only the

non-salary component, mainly the school building and furniture maintenance.

Discussions in Chapter Eight emphasise the critical role of the pupil teacher ratio and other indicators of teachers resource use - class size, average teacher load and average curriculum load - in explaining the disparities in the unit expenditure on teachers salaries, the major component of unit expenditure, in the various settings. Similar to other research findings in developing countries it indicates that the variations in per pupil costs are attributable to the organisation of the teaching learning process, diversity of curriculum options and the intensity of teaching staff utilisation.

The analysis carried out in Chapter Nine has revealed that the type of qualification and training alone have limited influence on the level of average teacher salary. The variations in years of experience emerged as the powerful factor in determining the average teacher pay, in line with a large number of countries surveyed by Unesco (1988). Average teacher salary has a highly significant, strong positive correlation, with all the higher range of years of experience but the strongest negative association with the ratios of newly recruited inexperienced staff.

All these three chapters indicate that, despite the supposedly centralised norms and regulations, there are considerable variations in the distribution and utilisation of real and financial resources.

As in Chapter Ten, the high unit costs of boarding facilities, 1.7 times that of a day student, justifies the policy of abolishing this facility to achieve further expansion of this level of education. Contrary to Tibi's (1987) findings, there is no significant relationship between the unit expenditure on boarding and each of its components and the size of the boarding house or the school alone. The number of boarders per boarding-worker is the outstanding variable that explained, alone, 70%, 67% and 59% of the variations in unit expenditure on boarding and its components.

In Chapter Eleven, regression analysis demonstrated clear evidence of economies of size in the operation of the sample schools, gained through the total unit expenditure and unit expenditure on administration salaries. The size of the school as represented by the number of pupils enrolled emerged as the most powerful determinant of unit expenditure followed by the pupil teacher ratio and the pupil worker ratio. Although the latter influence on cost saving is relatively small, it is the type of expenditure that can be controlled without the least effect on the quality of education. It is important to recall that increasing school size and pupil teacher ratio might influence the quality of education in developing countries. Nevertheless, this gives planners an option to look for if economic difficulties necessitate. Out of all the school, policy controlled variables and the other exogenous factors only the ratio of teachers with post-graduate diplomas and those with masters degrees emerged as the sole determinant of the percentage of successful students in the S.S.C.E. It emphasizes the critical importance of recentness of training and upgrading of teachers to gain insights into new developments in theory and practice of the learning and teaching conditions.

All these findings have important policy implications for decision makers and planners. This study has identified three major determinants of unit costs and the single factor that influences boarding costs which could be manipulated and controlled at the school level. Most important is that increasing the first two factors: school size and pupil teacher ratio not only can reduce unit costs but also achieve the objective of further expanding this level of education. Secondary education is much more expensive than primary and intermediate levels and even modest expansion may have profound cost consequences. Otherwise, these cost-saving factors would permit new directions of expenditure, where appropriate, without greatly increasing the total amount of resources devoted to education. On the other hand, raising the level of pupil worker ratio and

number of boarders per worker would lower the respective costs with no adverse effect on the quality of the service offered. However, the study revealed the critical importance of teacher training for student success; decision makers have to choose an alternative that is pedagogically sound and economically affordable. On the basis of this study, the planners may consider ways and means to effect more equitable distribution of real and financial resources between regions and among institutions in their attempts to achieve better use of the available scarce resources.

Recommendations:

It is difficult to make recommendations because much is needed to be done on individual regions and at a national scale on all aspects of costs of education and for each level and type. However, there are a few major suggestions that need to be emphasized:

1 - Systematic collection of cost statistics and expenditure data - budgetary and non-budgetary. Since individual effort is time-consuming and very expensive, the flow of cost statistics should be established from the local district level with feedback to the central level. Without detailed, relevant and timely data all efforts to study the cost of education would be severely handicapped. Educational planning requires a wide range of data especially statistics on costs of the different resources that contribute to the teaching learning process which may seem very expensive to collect. However, Tsang (1988) assured that "the obvious cost of managing a database of educational costs is likely to be more than compensated for by the gain of better informed decisions". It would be helpful if policy makers became aware of the fact that their decrees and mandates would not automatically result in instantaneous better collection of data and feedback; following through at the highest administrative level is essential. The regional office of planning and statistics should form part of the office of the Minister of Education at the regional level or

the director of education office if this effort would be successful and durable.

2 - It is necessary to motivate and retain educational planning staff at all levels by establishing a separate cadre for the "non-professional" educational planners within the existing one. Those public school teachers selected on the basis of competence, commitment, interest and merit to work as planners will automatically fall under this specified category. During their affiliation with this cadre allowances and other benefits should be sought to encourage their long stay in the job.

3 - Unit expenditure is relatively lower than that in other countries in the region and it reaches levels in some cases that constrained the quality of education. It is essential to set a foundation level of unit costs in real terms below which it should not be reduced. Better still if it could be related to that amount necessary to bring learners to predetermined levels of knowledge and skills or the set curriculum goals. An average standard unit costs has to be estimated for all regions and levels of general education.

Implications for Further Research:

In the course of this study the author has found a number of areas in the literature that need to be urgently investigated by further research. The following are a few suggestions that are considered necessary in the wider context pertaining to this topic; they are not exhaustive.

1 - A replication of this study should be carried out into each region, taking into consideration the local settings, for the primary and intermediate levels.

2 - Further studies could investigate temporal relationships to examine whether these variables change or retain these characteristics over time.

3 - The relationships between teacher attributes and student performance as well as other school inputs have to be investigated to direct resource allocation.

4 - Research should be conducted on debatable areas, such as the effect of class and school size on pupil performance.

5 - There should be considerable research into the costs of educational wastage to compare per graduate expenditure and per pupil enrolled costs.
6. There should be research on the influence of part-time teacher on student achievement.
7. There should be research into the variables of family background and their impact on pupils' attainment.
8. Empirical and other expository research in developing countries has been almost exclusively confined to individual countries. Cross-sectional studies are greatly needed to be conducted among neighbouring Arab and African countries.

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APPENDICES

APPENDICES 1 AND 2

COVERING LETTERS FOR QUESTIONNAIRE

APPENDIX 3

THE QUESTIONNAIRE

APPENDIX 4

PUBLIC SECTOR SALARY SCALE

بسم الله الرحمن الرحيم

جمهورية السـودان
وزارة التربية والتعليم
مكتب وكيل اول الوزارة
ص . ب ٢٨٤ تلفون ٧٢٨٠٨
الخرطوم في ١٥/ ١ /١٩٨٩
رقم : و ك ت / ٨١

The Republic of the Sudan
MINISTRY OF EDUCATION
Office of the Under Secretary
P. O. Box 284 Tel. No. 72808
Khartoum / / 198

السيد/ مدير عام التعليم / العاصمة القومية ...

السلام عليكم ورحمة الله تعالى وبركاته ...

* الموضوع/ دراسة ميدانيه في مجال اقتصاديات التعليم *

الاستاذة/ ليلى طه صالح - مبعوثة وزارة التربية والتعليم للملكة المتحدة للتحضير لدرجة الدكتوراة في مجال اقتصاديات التعليم وموضوعها " تكلفة مقارنة للتعليم الثانوي الاكاديمي والفني " ، وقد اعدت استبيانا شاملا لكل من الملحقين الاكاديمي والمهني يوزع على مديري المدارس في المحافظات التي وقع عليها الاختيار باقاليم السودان المختلفة ...

وبما ان الغرض من جمع المعلومات تربوي بحت وبغرض البحث العلمي نرجو من سيادتكم التعاون معها وتقديم كل مساعدة ممكنة لانجاح هذه الدراسة ...

ولكم التقدير كلـــه ... ...

احمد محمد أحمد كبوش
وكيل اول وزارة التربيه والتعليم

.../ سامية /...

(× بسم الله الرحمن الرحيم ×)

الاقليم الشرقي

وزارة التربية والتعليم

التعليم الثانوي

التاريخ :- /فبراير/ ١٩٩٩م

النمرة :- م ت / ٥٠ / ح / ٣ /

السيد / مدير مدرسة : كفر الثانوية بنات

تحية طيبة وبعد :

الاستاذة / ليلى حامد سالم ستتوجه لجمع معلومات واحصائيات للتحضير " للدكتوراه "

أرجو تقديم كل عون لها وتسهيل مهتها .

وتفضلوا بقبول فائق الشكر والتقدير

مدير عام / ادارة التعليم الثانوي بالاقليم الشرقي

(×) بكر السيد رضوان (×)

Laughborough University
of Technology,
Department of Education,

Ministry of Education
Under-Secretariat of
Educational Planning
Economics of Education
Division

Cost and Finance of Education

Questionaire for Secondary Education

Government Secondary Schools

Questionaire

A) Academic Secondary Schools.

B) Technical Secondary Schools.

Date of Administration: _____

School Scale ☐

Director Scale ☐

Assist. Dir, Scale ☐

Assist. Dir. Scale ☐

School Location. Urban ☐

Semi-U ☐

Rural ☐

Government Secondary Schools
Questionaire

A. Information about the School

Region :

Province :

Town :

Name of School :

Kind of Sec. Education :

Acc. ☐
Tech. ☐

Kind of School

Boys ☐
Girls ☐
Co-ed. ☐

School Size :

Small)LT 200) ☐
Medium(200-500) ☐
Large (500 +) ☐

No. of Streams by grade :

Grade (1) ☐☐
Grade (2) ☐☐
Grade (3) ☐☐
Grade (4) ☐☐

No. of shifts :

One ☐
Two ☐

Type of School :

Day ☐
Boarding ☐
Day & Boarding ☐

No. of Teachers :

Sudanese

Egyptians

British

No. of Pupils of Grade :

Grade (1)

Grade (2)

Grade (3)

Grade (4)

No. of Repeaters by grade :

Grade (1)

Grade (2)

Grade (3)

Grade (4)

No. of Drop-outs by grade :

Grade (1)

Grade (2)

Grade (3)

Grade (4)

No. of Boarders by grade :

Grade (1)

Grade (2)

Grade (3)

Grade (4)

Total No. of Pupils :

Total No. of Repeater

Total No. of Drop-outs

Total No. of Boarders

Total No. of Dismissed

(1) Information about Sudanese Teachers. 88/89

Name	sex	Date App.	Basic Qualif.	In-Service T.				Not T.	Special		Subject & Class	No. of period per mon.
				B.A	M.A	Short Course	Dip.		Maj.	Min.		

(2) Information About Sudanese
Teachers 88/89

N A M E	Grade	No.of Inc.	Basic Sal.	Allowances Ed.	Trans.	Rep.	Qualif	Gross Sal.	Deductions Tax.	Zakat	Unions	H.Ins	Net Sal	Add. period Sal.

C.

Information about the School Administration

Name	Post	Grade	Sex	Qualif.	Training	Basic Sal.	Allbs.	Gross	Deds	Net Tot. Sal.

C.

(2) Information about Non-teaching Staff.

Name	Post	Grade	Sex	Qualif.	Training	Basic	Allos.	Gross Total Sal.	Deds.	Net Total Salary

C.

(3) Information about School-Workers Boarding - House Workers.

N a m e	Grade	Post	Qualif.	Training	Basic Sal.	Allow.	Gross Total Sal.	Deds	Net Total Sal.

D. (1) Information about Expenditure on and Sources of Finance of Chapter One (Salaries & Wages)

ITEM	Amount of Expenditure and Sources of Finance						
	Central Govt.	Reg. Govt.	Foreign Donations	Foreign Loans	Students Familes	Self Help	
1.Admin.Sal.							
2.Teachers Sal.							
3.Part T. Sal.							
4.Non.Teaching Sal.							
5.Sch.Workers							
5.Boarding W.							

D.

(2) Information about Expenditure in and Sources of Finance of Chapter Two (Services)

ITEM	Amount of Exp. & Sources of Finance						
	Central Govt.	Reg. Gov..	Foreign Don.	Foreign Loans	Students Families	Fees	Self Help
1.Maintenance							
2.Text-Books							
3.Exercise books							
4.Raw Mat.&Chem.							
5.Petti-Cash							
6.Extra Curr.Act.							
7.Stationary							
8.Home-Sc.							
9.Sports							
10.Boarding House Exp.							
11 Library							
12 Transport							
13 Electricity, W & Tel.							
14 Post & Telg.							
15 Boarding Furniture							
16 Kitchen utensils							

School Exercise Books.

Exercise Books	Price per Unit.	No. In	No. Req.	Price per pupil	Total for School
Plain - 32 pages	1.60	—	6	9.60	
Lined - 64 pages	2.90	—	20	58.00	
Lined - 32 pages	1.25	—	28	35.00	
Pl. & Lined 64 pages	2.90	—	3	—	
Graph	1.25	—	3	3.75	
Science	1.50	—	6	9.00	
+ 15%	—	—	—	17.30	
Total pupil				132.65	

Text Books for Secondary Education.

Subject	Name of Books	Class	Price / Unit	No. In	No. Req.	Total Price
English Language	Nile Course 4	1	1.90			
	Nile Course 5	2	1.90			
	Nile Course 6	3	1.90			
	Rebecca		3.00			
	Atale of 2 cities		3.00			
	Oliver Twist		6.00			
	Cry the beloved country		6.50			
	Arms & the man		5.00			
	World Atlas		—			
	Flowers for the Harris		6.50			
Religion						
Religion	التربية الاسلامية الاول	1	6.90			
	" " الثانى	1	6.55			
	" " الثالث	1	7.50			
	تفسير سورتى الحجرات والنور	2	4.27			
	كتاب الجهاد فى الاسلام	1	3.54			
	انجيل لوقا بالعربية	1	—			
	انجيل لوقا بالانجليزية	1	—			
Arabic Language	الادب والنصوص الاول	1	5.15			
	" والنصوص الثانى	1	4.66			
	" والنصوص الثالث	1	—			
	القراءة العربية الاول	1	4.29			
	القراءة العربية الثانى	1	2.63			

SUBJECT	Name of Book	Class	Price Unit	No. In	No. Req.	Total Price	
Arabic Language	معلقة عمرو بن كلثوم	١	1.46				
	الشاعر الطموح	١	5.00				
	النحو الواضح الجزء الاول	١	—				
	النحو الواضح الجزء الثانى	١	1.75				
	" " الجزء الثالث	١	—				
	البلاغة الواضحة	٢	4.00				
	شوقى شاعر العصر الحديث	١	—				
French Language	اللغة الفرنسية الجزء الاول	١	—				
	" " " الثانى	١	2.56				
	" " " الثالث	١	—				
Mathematics	الرياضيات الاول	١	8.77				
	الجبر	١	7.30				
	حساب المثلثات	٢	3.26				
	الهندسة التحليلية	٢	4.90				
	مذكرة الاحصاء	٢	—				
	مبادئ التفاضل والتكامل	١	3.09				
	الرياضيات الاضافية	١	—				
	الميكانيكا	١	4.05				
	مذكرة الاحتمالات	١	—				
	" البرمجه الخطيه	١	—				
	الجداول الرياضيه	٣	—				

SUBJECT	NAME OF BOOK	Class	Price/ Unit	No. In	No. Req	Total Price
Geography	جغرافية افريقيا	١				
	" حوض النيل	٢				
	الجغرافية البشرية	٣				
History	معالم التاريخ الاوربى	١				
	" " " الافريقى	١				
	تاريخ السودان الحديث	١				
	" العالم العربى الحديث	١				
Science	الكيمياء الاول	١				
	" الثانى	١				
	" الثالث	١				
	الاحياء الاول	١				
	" الثانى	١				
	" الثالث	١				
	الطبيعة الاول	١				
	" الثانى	١				
	الثالث (كهرباء ضوء)	١				
	مبادئ الجغرافية الطبيعية	١				
	قراءة الخرائط	٢				
Commercial school	محاسبة مالية	١				
	اقتصاد تجاره	١				
	سكرتارية اعمال مكاتب	١				
	رياضة مالية	١				
	كتابة الطباعة الاول	١				
	محاسبة مالية	٣				
	اقتصاد وتجارة	٣				
	رياضه ماليه	٣				
	محاسبة تكاليف	٣				
	كتاب الطباعه الثانى	٣				
	محاسبة العاليه	٢				
	اقتصاد وتجاره	٢				
	سكرتاريه واعمال مكاتب	٢				
	رياضة ماليه	٢				
	كتاب الطباعه	٢				

APPENDIX 4

Salary Scale for Government Employees
(Central and Regional)

GROUP	SALARY						YEARS							ANNUAL
	RANGE(P.A.)	1	2	3	4	5	6	7	8	9	10	11	12	INCREMENT
1	8400													
2	7600													
3	6204-6804	6204	6354	6504	6654	6804								150
4	5682-6282	5682	5832	5982	6132	6282								150
5	4980-5460	4980	5100	5220	5340	5460								120
6	4332-4932	4332	4452	4572	4692	4812	4932							120
7	3708-4428	3708	3828	3948	4068	4188	4308	4428						120
8	2838-3594	2838	2946	3054	3162	3270	3378	3486	3594					108
9	1824-2616	1824	1896	1968	2040	2112	2184	2256	2328	2400	2472	2544	2616	72
10	2664-3252	2664	2748	2832	2916	3000	3084	3168	3252					84
10A	2418-2943	2418	2493	2568	2643	2718	2793	2868	2943					75
11	2052-2577	2052	2127	2202	2277	2352	2427	2502	2577					75
12	1740-2265	1740	1815	1890	1965	2040	2115	2190	2265					75
13	1338-1779	1338	1401	1464	1527	1590	1653	1716	1779					63
14	1200-1632	1200	1254	1308	1362	1416	1470	1524	1578	1632				54
15	0924-1281	924	975	1026	1077	1128	1179	1230	1281					51
16	0801-1053	801	837	873	909	945	981	1017	1053					36
17	0750-0960	750	780	810	840	870	900	930	960					30
18	0720-0900	720	750	780	810	840	870	900						30