RURAL PLURIACTIVITY IN JORDAN:

ISSUES AND POLICY IMPLICATIONS

by

AHMAD SHUKRI LUTFI ALRIMAWI

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DEPARTMENT OF AGRICULTURAL ECONOMICS
WYE COLLEGE
UNIVERSITY OF LONDON

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ABSTRACT

Rural Pluriactivity (RP), broadly defined as combining farming with other activities, is a worldwide, pervasive and persistent phenomenon. Its growth in the developed countries (DCs) has been largely associated with (a) "pull" factors related to the expansion of off-farm employment (OFE) in the rural areas through decentralization of industries and services, and (b) developments in agriculture which increased output and in turn depressed the terms of trade between the farm and non-farm sectors. In the developing countries (LDCs), its growth is largely attributed to "push" factors related to the increasing man/land ratio.

Jordan is an intermediate case between the DCs and the LDCs. Farm households (FHHs) have been exposed to a combination of push and pull factors of varying strength over the last four decades. RP is also influenced by social factors related to high levels of education, large sizes of FHHs and the low mobility of land.

Rural pluriactivity has not been a subject of analytical research in Jordan in the past. The main objectives of the current research, using primary data from a field survey in the main agricultural areas and secondary data, were to explore RP and to assess its extent among FHHs and regional distribution, and to test the validity of hypotheses related to its nature. The research focuses on: labour allocation between economic activities, motivations, the relative importance of farm and off-farm income and socio-economic implications for rural development. A final step was to investigate whether the effects of RP conform with government policies.

The findings indicate a high incidence of RP among FHHs (81% for the overall surveyed sample in 1989). Across the agro-climatic conditions, it is associated with small farms, rain-fed farming and hilly areas. 60% of FHHs derived more than 50% of their total income from OFE. Off-farm employment was largely regular and outside agriculture mainly in the tertiary industries. Public administration was the major employer and self-employment ranked second. Pluriactive operators were found to be younger, more educated, to have more regular contacts with extension agents, more positive attitudes to modern farming methods and appears to be more progressive than full time farmers. They occupy a significant share of the agricultural area, but they tend to have less intensive production pattern and fewer enterprises.

It is apparent that RP provides rural employment and improves the income of FHHs, and it bridges the inter-sectoral income gap, thereby helping to maintain rural population. It has positive effects on increasing production (leading to higher rates of self-sufficiency), on preserving agricultural resources and protecting the environment. It might be also concluded that it provides a logical and viable adaptation to the economic realities as it forms a workable alternative to the policy of improving farm structure by enlargement and the displacement of operators which is not feasible for socio-political reasons.

DEDICATION

To the memory of my late sister *Bothaina*

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ABBREVIATIONS

AOAD	Arab Organization for Agricultural Development
CBOJ	Central Bank of Jordan
CEAS	Centre for European Agricultural Studies
COMMISSION	Commission of European Communities
DCs	Developing Countries
DOS	Department of Statistics in Jordan
DJHing	Dual Job Holding
DJHer	Dual Job Holder
FE	Farm Employment
FHH	Farm Household
FI	Farm Income
FT	Full Time
FTF	Full Time Farm
FTFer	Full Time Farmer
FTFing	Full Time Farming
GTZ	German Technical Assistance
JD	Jordanian Dinar
JVA	Jordan Valley Authority in Jordan
MJHing	Multiple Job Holding
MJHer	Multiple Job Holder
MLF	Main Living Farm
MOA	Ministry of Agriculture in Jordan
MOL	Ministry of Labour in Jordan
MOP	Ministry of Planning in Jordan
MN(mn)	Million
MT(mt)	Metric Ton
OECD	Organization For Economic Cooperation and Development
OFE	Off-Farm Employment
OFI	Off-Farm Income
PT	Part Time
PTF	Part Time Farm
PTFer	Part Time Farmer
PTFing	Part Time Farming
RP	Rural Pluriactivity
RPA	Rural Pluriactive (farm household/operator)
SLF	Supplementary Living Farm
USAID	United States Agency for International Development

PART I

BACKGROUND AND RESEARCH OBJECTIVES

CHAPTER 1

INTRODUCTION

INTRODUCTION

1.1 THE SIGNIFICANCE OF RURAL PLURIACTIVITY

Rural Pluriactivity (RP), that is combining farming with other activities by members of farm households (FHHs), is a worldwide phenomenon and increasingly becoming a permanent structural feature of agricultural sectors. Some 40-60% per cent of farmers, FHHs or couples in 14 of the world's highly industrialized countries (with market economies) derived more than 50% of their income from non-farm sources in 1975 (OECD 1978) and evidence suggests that the incidence has increased since then or at least stayed about the same (Arkleton Trust 1985). Recent studies have indicated that pluriactivity was a feature of 62% of FHHs in 24 selected areas in Western Europe in 1987 (MacKinnon 1990), 85% of FHHs in Japan in 1986 (BAE 1988) and 81% of FHHs in Jordan in 1989 (this study).

Until the 1960s, RP was seen as a transitory phase into or out of farming or a temporary phenomenon in times of recession and hardship. However, its persistence and capacity for adaptation has demonstrated its permanent nature. Its recent growth in the developed (and some developing) countries has been largely associated with the expansion of non-farm employment within a commuting distance of the farm population. Job opportunities have become more accessible to rural dwellers in some of the developed countries through decentralization of industries and services. In Japan and Germany, it was initiated by positive rural development policies. Changes in agriculture have also promoted RP, actively through mechanization which releases labour for OFE and passively through improved inputs and methods of production; this substantially increased output which in turn depressed the terms of trade between the farm and non-farm sector due to the low elasticity of demand for agricultural products. Other factors have also promoted RP, such as rising aspirations by the more educated rural societies, disenchantment with

living in congested urban centres, and developing new attitudes towards land ownership beyond the conventional perception of land as solely a factor of production. A new dimension is added to the function of land as a social base and valuable asset which provides a sense of security especially for the future. With these developments, a more broad outlook for land use is introduced which will have to be integrated in future policies. However, in land scarce and densely populated countries, its growth is largely attributed to pressure on agricultural land reflecting the rising rural population, the deteriorating man/land ratio and decreasing the average operational areas per farm family. Subsequently, off-farm employment, though it is limited, helps to avoid extreme poverty.

Rural pluriactivity is viewed generally positively, but its negative effects have been also reported. On the positive side, there is considerable evidence which acknowledges its contribution in improving the FHHs' levels of income and its distribution, thus providing an alternative to structural reform. The evidence also suggests that it reduces unemployment problems, especially in the less developed and marginal areas. Enabling more people to make a living in the (disadvantaged) rural areas helps in maintaining population and contributes in some countries, where social services were adequate and off-farm employment (OFE) opportunities were available in the decentralized industries and to reversing the population movement. Increasing the purchasing power in rural areas has a multiplier effect which further promotes local employment. Evidence suggests that pluriactive FHHs, including those with members with low or effectively zero opportunity costs, achieve more flexible use of their labour resources in relation to all available employment opportunities. RP can also make positive contributions to production when this is deemed to be desirable and to the environment by preserving marginal land under cultivation which otherwise would be abandoned. Thus the significance of RP is largely related to its contribution to regional developments.

Where surpluses of agricultural products raise marketing or price support problems, the widely held view is that RPAs have lower productivity (though the evidence is inconclusive) and have a smaller share of marketable output; thus they contribute less to such problem. Reported negative implications are largely related to low economic efficiency, namely land and capital productivity. Empirical studies

in many countries have indicated that RPAs tend to use their land less intensively. This practice carries harmful effects on the macro level where irrigated areas are limited and were increasing production and land mobility to promote viable farming are desirable (e.g., Gasson 1977; OECD 1978; Arkleton Trust 1985; Shand 1986a)[1].

1.2 A CASE FOR RURAL PLURIACTIVITY IN JORDAN

Rural Pluriactivity *per se* was not a subject of research in the past in Jordan, though the Agricultural Censuses of 1975 and 1983 showed that 35% and 43% of operators respectively had a main occupation other than farming. Some socio-economic studies have put the figure in some areas at about 60%. Definitional problems make it difficult to assess the past significance of RP.

Despite the lack of detailed information about RP in Jordan, it appears to constitute an important element in the agrarian structure. It is influenced largely by a combination of push (supply) factors and pull (demand) factors but social factors play an important role.

Push factors which promote RP are largely related to the limited resource base. The cultivable and irrigable area is less than 10% and 1% respectively of the total area. The agrarian structure is dominated by small and fragmented holdings. Farm operators cultivating holdings of less than 3 ha were in a majority (> 2/3) in 1983 and increasing while the area under dry farming is decreasing. Most of the cultivable land (about 2/3) is in mountainous areas under rain-fed farming with consequent low income generating potential. With a static technology, crop yields are low and agricultural production is unstable. These conditions have led to unstable farm incomes and highly precarious living conditions and have prevented the majority of farmers from establishing full time viable farming. With the large size of farm households and seasonal fluctuations in labour demand, over supply of labour on the farms is inevitable.

The remarkable technological developments in the progressive irrigated sub-

[1] The special issues of *Geo Journal*, 6(4) in 1982 and *Sociologia Ruralis* xxiii(1) in 1983 on Rural Pluriactivity were also consulted.

sector of Jordanian agriculture have led to substantial increases in the production ahead of the local and external demand. Farming has become increasingly a capital intensive business. This was accentuated by high rates of inflation during the 1970s and the depreciation of the Jordanian currency in the late 1980s with almost stagnant output prices in the last decade while marketing outlets were becoming increasingly limited. Thus, the agricultural terms of trade have worsened over time, decreasing and destabilizing farm incomes and widening income disparities. The threshold of economic viability has risen while expansion of farming activities was halted by prohibitive land prices.

Pull factors have also played a major role in promoting RP. Jordan witnessed high real annual rates of economic growth from the early 1950s up to the mid 1980s, rates which were almost double that of population growth. For example, the average real annual growth of per capita income was 4.4% in the period 1952-1966 (MOP 1986). Off-farm employment (OFE) opportunities have expanded dramatically. Locally, this expansion has been largely in the public administration and the service sector and abroad it has been in the neighbouring oil-producing countries. Hence, in the late 1970s and early 1980s, full employment was achieved, with shortages of labour (most notably in the service sector and the irrigated farm sub-sector) largely being overcome by foreign labour.

Recent developments in Jordan and in the Middle East in general in the last decade and early 1990s have drastically altered the above mentioned favourable economic environment. As a result of the first Gulf War (1980-1988), economic recession affected the country around the middle of the 1980s. The second Gulf War may have had more far reaching and disastrous effects on the Jordanian economy. It is very early to judge how the political environment in the area will develop, but it is clear that unemployment is rising rapidly. The most conservative official estimates put the rate of unemployment at around 15% in mid 1990 (before the beginning of the 2nd Gulf War). Estimates of unemployment in the early 1991 are much higher than the previous levels according to the local media.

Social factors have also contributed to the promotion of RP. Social values and status, changes in types of families and obligations, high mobility of young educated people with new attitudes to work, leisure and high income expectations and

aspirations, increasing female participation and commitment to maintain farms after the fathers' death while having regular OFE must all be taken into account. There is also widespread interest in having a piece of land as the safest way to save and gain wealth, as substantial capital gains were realized in the last two decades. Interest in farming by a minority of migrants and urban dwellers is largely for hobby and personal consumption. Having a place of residence in the rural areas for the enjoyment of the way of life is a dream for the basically agrarian society.

Considering the totality of these aspects, farm household (FHH) members were exposed to push and pull factors of varying strength over the last four decades. Economic necessity was dominant in the 1950s and 1960s. Pull factors in the 1970s were largely related to the expansion of OFE opportunities, which was to a very large extent outside the farm sector and influenced by high levels of education. A good transportation network and ownership of cars has brought cities closer to the rural areas, which reduced the need to migrate by daily commuting to OFE. Virtually all regions including rural areas are well served by a wide range of basic services such as electricity, education, health and (tele) communications services.

The incidence of RP has a broad social role beyond the farm sector. Attempts will be made in this study to investigate whether the incidence of RP conforms with stated governmental policies such as raising the income and standards of living of farmers, reducing open and disguised unemployment, maintaining rural population, preserving agricultural resources, promoting environmental activities, improving farm structure and increasing agricultural production to achieve higher rates of self-sufficiency.

1.3 RESEARCH OBJECTIVES

By means of the analytical framework outlined in Chapter 4 and making use of a field survey carried out in 1989, the broad objectives of the research were the following:

(a) to explore RP and its nature in Jordan with respect to
    (i) assessing its extent among FHHs and their motivations.
    (ii) analyzing labour allocation between economic activities.

(iii) exploring its socio-economic implications for rural development.

(b) to use primary data collected in the survey to examine the validity of hypotheses[2] relating to the nature of RP in Jordan which might have useful implications for general application.

1.4 THE STRUCTURE OF THE THESIS

Part 1 of the study includes this introductory chapter which has set out in broad terms the significance of RP, factors which are assumed to be conducive to promoting RP in Jordan and the objectives of the research. Chapter 2 reviews the state of the agricultural sector and the agricultural policies in Jordan. Chapter 3 reviews the salient issues of RP, its evolution, concepts, motivations, typologies and the significance and policy implications of RP in the developed and some developing countries. Chapter 4 outlines the main hypothesis and the basic analytical framework and Chapter 5 addresses methods of data collection.

In Part 2 (Chapters 6 to 13) the main findings from the 1989 survey will be presented, analyzed and used to test hypotheses. These cover the extent of RP, characteristics of the FHHs, on- and off-farm employment and incomes, characteristics of farms, socio-economic environments, motivations and future outlook and types of farm households.

Part 3 synthesizes the salient research findings; draws conclusions and points to policy implications and suggests future areas for research.

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[2] The main hypotheses are outlined in Chapter four.

CHAPTER 2

JORDAN: THE STATE OF AGRICULTURE AND THE AGRICULTURAL POLICIES

THE STATE OF AGRICULTURE AND THE AGRICULTURAL POLICY[1]

2.1 THE STATE OF AGRICULTURE

2.1.1 AGRICULTURE IN THE ECONOMY

Agriculture sector has an important role in the Jordanian economy. In 1983 it was a source of income to about 20% of the population (DOS 1985). About 8% of the Jordanian labour force are engaged in the sector (MOL 1985). It contributes to improving the balance of trade and food security and has financed about 20% of the value of food imports during the 1980s (CBOJ 1990).

The agricultural sector has played a vital role in economic development by supplying food commodities at relatively low prices to the rapidly growing population[2]. This has helped by reducing the pressure for higher wages and increasing the demand for manufactured goods.

The relative importance of the agricultural sector however, has steadily declined due to the slow rate of growth[3] of the sector relative to the industrial sector. While the annual rates of growth (at factor cost and constant prices) in the agricultural sector were 3.6% and 2.1% in the periods 1952-1966 (1953 prices) and 1973-1980, (1972 prices), the annual rate for the industrial sector was 14.2% in the first period with rates in the industrial sub-sectors ranging between 13 and 19.3% in the second period. The annual rates for the service sector in the same periods ranged between 4.1% and 8.3% (MOP 1986).

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[1] This is an introductory chapter to put the research findings into context. Those who are familiar with the state of the agricultural sector in Jordan may proceed to Chapter 3.

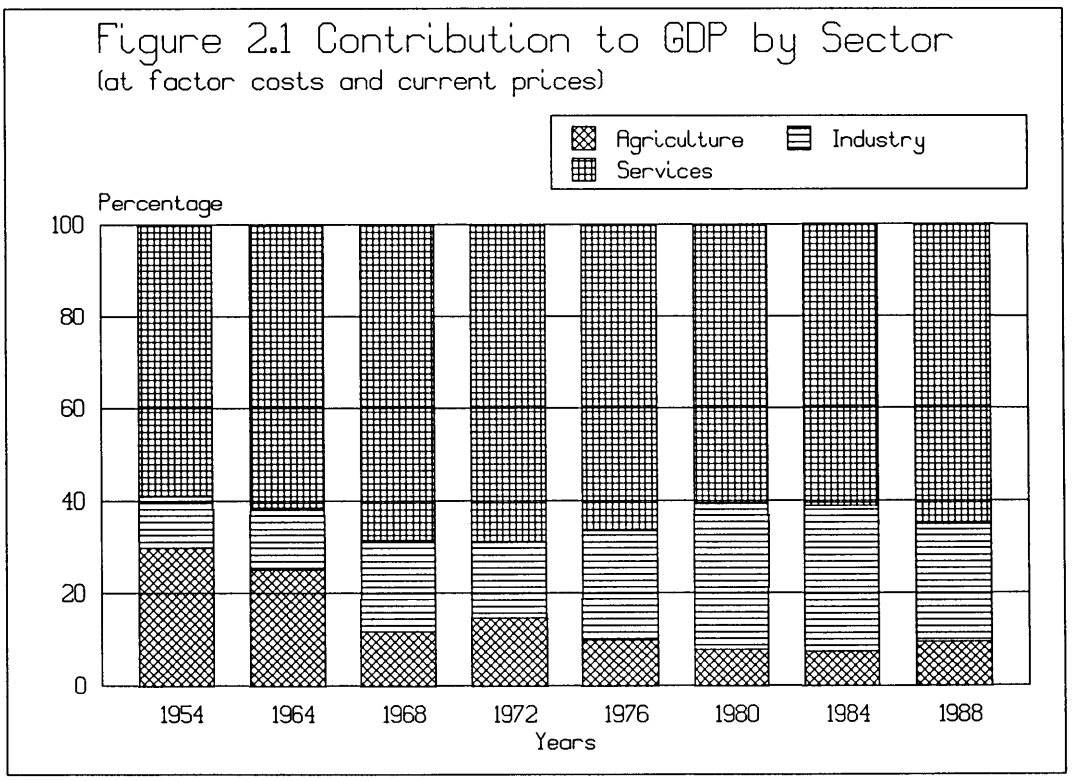
[2] The price index for all vegetables increased by 8.5% only during the period 1979-1988 compared with a rise in the cost of living index for all items by 54% (1986=100) and a rise in GNP at market prices by 102% (CBOJ 1990).

[3] The real rates of growth in GDP in the periods 1952-1966, 1967-1972, 1973-1975, 1976-1980 and 1981-1985 were 6.5%, 4.6%, 5.9%, 12.1% and 5.3% respectively (Anani 1987).

Figure 2.1 presents the relative share of the economic sectors. The share of the agricultural sector in GDP declined from 30% in 1954 (Aresvik 1976) to 15% in 1972 and to 8% in 1980. However, rates of growth in most of the years since 1985 in the productive sub sectors (especially in 1988) were negative except in agriculture. The rates of growth in the service sector were decreasing. As a result, the share of the agricultural sector increased in 1988 to 9.7% (CBOJ 1984, 1988 & 1990) (see Table B.1 in Appendix B).

In spite of its diminishing role over most of the period as a whole, the agricultural output in constant prices (1975 prices) increased from JD 34 mn in 1976 to JD 68 mn in 1980 and to JD 83 mn in 1986 (CBOJ 1990).

Although the low share of the agricultural sector in the GDP reflects the limited agricultural resource base (as evidenced in the low shares during the 1950s),



Sources: Data from Aresvik 1976 and CBOJ 1984, 1990.

they underestimate the real importance of the sector for two reasons. First, the value of the agricultural products was estimated on the basis of farm gate prices which, even without considering the rate of inflation, remained unchanged or decreased especially for vegetables. For example the price of tomatoes, which occupied 20% of the irrigated area and accounted for about one third of total production in 1987, decreased from JD 124 in 1979 to JD 90 per ton in 1987, while the cost of living index increased by 44% for the same period. The corresponding increase in the price index for all vegetables was 3.8% only (CBOJ 1984, 1989).

Second, the agro-business industries (e.g., food, plastics and fertilizers), and services (e.g., transport, storage, trading and retailing) associated with the sector generate a sizable share of the national income and employment. For example the food and agricultural materials retailing services employed an average of 30% of the total labour employed by wholesale and retailing activities during the period 1985-1987 (DOS 1989a).

2.1.2 LAND RESOURCES

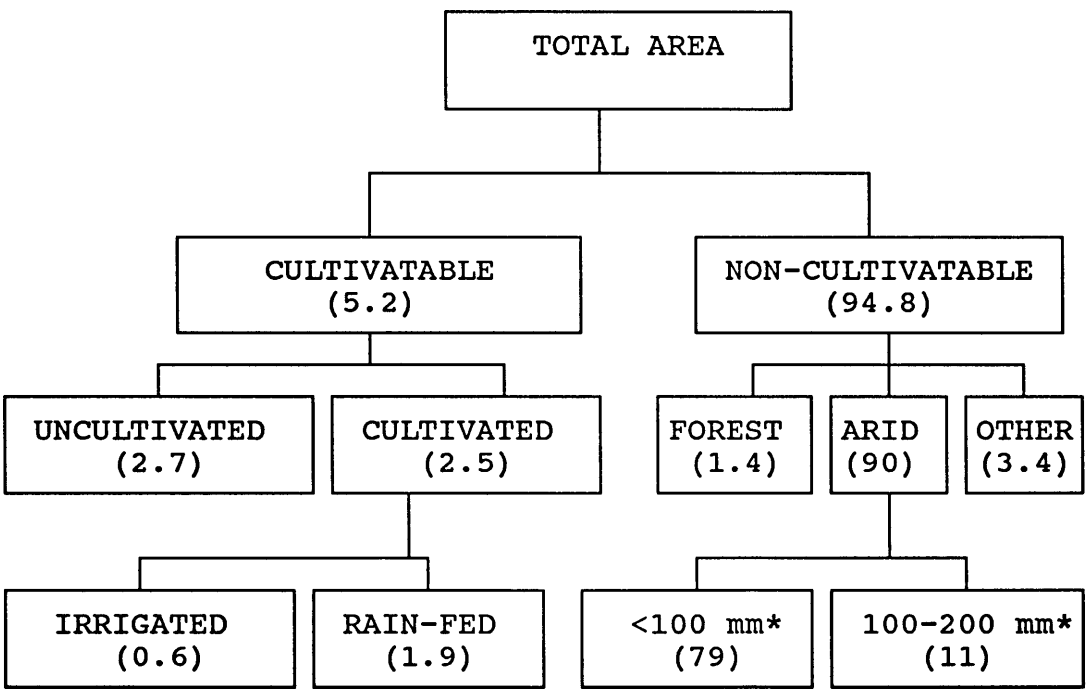
Agriculture development in Jordan has always been hindered by the limited arable land and water resources. Out of the total area of Jordan (9.2 mn ha), the cultivable lands were 480 thousand ha (Figure 2.2). The average irrigated area in the period 1982-1984 was about 52 thousand ha, representing about 0.6% of the total area or about 9% of the cultivable land. The rest is under rain-fed farming (Haddadein, Belbeisy & Nahar 1985).

Water resources in Jordan are limited. More than 90% of the country has less than 200 mm of annual rainfall with considerable variation from year to year in amount, distribution and timing (MOA 1974a). Rain starts in October and ends in May, but most of the rain falls in December through to March. The rest of the year is hot and dry with consequent high rates of evaporation.

Jordan has limited surface water with high rates of evaporation and infiltration resulting in relatively small annual stream flow, but good potential for under ground

water. Thus, developing water resources[4] was a primary objective for the Government. Water resources developed up to 1985 were 520 mn cubic meters, in addition to 110 mn developed in the period 1987-1990. The storage capacity of constructed dams is about 120 mn cubic meters of which 90 mn is in King Talal Dam alone. Total consumption of water in 1988 was about 670 mn cubic meters, divided equally between surface and ground water. About three quarters (500 mn cubic meters) was available for irrigation of which 60% were in the Jordan valley (MOP 1981, 1986).

Figure 2.2 Land Use in Jordan in 1985 (percent of total in brackets)



Source: Adapted from Haddadein et al., 1985.

* Amount of rainfall.

[4] The construction of the King Abdulla Canal to divert water from Yarmouk River, King Talal Dam and developing underground water were the main developments.

2.1.3 REGIONAL ASPECTS

Jordan is characterized by the diversity of agro-climatic conditions which permits diversification of crops and seasonal distribution of production. It can be divided into almost three distinct zones (see the Map in Appendix A):

2.1.3.1 The Jordan Valley

The highest rainfall in the valley is less than 300 mm and the temperature is normally about 10 degrees C in winter and 38 degrees C in summer. The valley is said to be the lowest area in the world with 200-400 meter below sea level. Because of the peculiar climate conditions, it is considered to be a natural greenhouse. This permits the growing of vegetables and fruits during the winter season, to be harvested 2-3 months earlier than similar crops grown in the highlands and neighbouring countries.

Because of the good agricultural potential of the valley, the Government launched an extensive irrigation project in 1958 to divert water from the Yarmouk River in the north through King Abdulla Canal. Of the irrigated lands in the valley, 92% of the area depends on the canal and the rest depends on underground water (Mu'asher, Tarazi & Bani Hani 1989).

The irrigable area in the valley in 1988 was about 32 thousand ha (57% of total), of which 30 thousand ha were cultivated (MOA 1989). The main crops produced in the valley were tomatoes, cucumber, eggplant, green pepper, citrus and banana. Vegetables and citrus accounted for 77% and 18% of the irrigated area. The valley produces 40% of the total agricultural production and generates 70% of the total agricultural gross value (USAID 1988). 98% of citrus and 65% of vegetables was produced in the valley in 1988 (Mu'asher et al., 1989).

More than 65% of the irrigated area (including the valley) was characterized by the use of modern irrigation technologies, mainly drip irrigation (AMO 1987). The percentage of area under drip irrigation was 27% in 1983 (DOS 1985). Of the

number of greenhouses[5], 58% were in the valley in 1988 (MOA 1989). The use of high yielding seed varieties, fertilizers, and pesticides is a common practice throughout the irrigated areas.

2.1.3.2 The Highlands

The Highlands are the most populated area in Jordan. Although they represent only 10% of the country's total area, more than 90% of the population lives there. Agricultural activities are basically under rain-fed conditions. The rainfall ranges between 200 mm and 650 mm. A large part (70%) of the area receives 200-350 mm. The size of the holdings is generally small and well below the national average (MOA 1974a).

The agricultural land in this area is largely mountainous with more than two thirds of it with slope over than 9% (MOA 1974a). Thus it is subject to heavy soil erosion, which consequently decreases its fertility and capacity to hold moisture which are important limiting factors to agricultural development. As fruit trees are the best possible use for the hilly lands, the Government has implemented a series of soil conservation projects since 1964. Therefore, the main agricultural activity in this area is tree fruit, mainly olives, grapes and stone fruits. The area under these fruits is rapidly expanding. It increased by 38% between 1982 and 1988 (DOS 1982, 1989a)[6]. Grains are mainly produced in the semi flat areas. The cropped area and production are steadily decreasing especially in the hilly lands.

In 1988 there were about 5 thousand[7] ha under irrigation depending on underground water and springs. The use of improved farming methods is common and similar to the farming practices in the Jordan Valley.

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[5] The area of a typical greenhouse is 500 square meters. The number of greenhouse in 1988 was 18056.

[6] The Ministry of Agriculture put higher figures for these increases.

[7] According to the records of the Agricultural Economics and Planning, Research Division, MOA.

2.1.3.3 The Arid Land Zone

Rangeland is largely located in the eastern and southern regions which constitutes 90% of the total area of the country. The rainfall in the large part of this area is less than 100 mm. The size of holdings is generally large and above the national average (MOA 1974a).

Some 14% of this area (about 13% of the total area) where the annual rainfall ranges between 100-200 mm has a good potential for grazing. With the introduction of tractors in the early 1950s, a large part of the range land with high potential for grazing, was tilled up and hence, the grazing area was reduced, an unfortunate result of indiscriminate use of improved technology.

Sheep raising is largely practised in this area for the production of milk products (e.g., white cheese, butter) and wool. Meat production is largely confined to the replacement of old animals and extra males.

Forty two percent of the irrigated lands were located in this area in 1988. Underground water is the main source of irrigation. Melons, tomatoes, cucumber, apples and peaches are the main crops grown in the area under irrigation. Improved farming methods including drip irrigation are almost normal practice.

Grains are also produced in this area. The production under rain-fed conditions is negligible, but the production of grains and fodder under irrigation is promoted by the Government and by leasing state land on easy terms.

2.1.4 THE AGRICULTURAL PRODUCTION

The agricultural sector is characterized by the existence of almost two distinct sub-sectors, a developed irrigated sector and a backward rain-fed system. The modern sector also comprises poultry production and a growing share of fruits production under rain-fed conditions. This dualism also applied to the type of problems associated with agricultural development. While the problems of the modern sector are basically those of marketing, soil and water management and disease control, the problems of the rain-fed sector are largely related to the low productivity and production.

As mentioned earlier, improved methods of production are common practice in the irrigated sub-sector. These developments were largely based on chemical and biological innovations, the application of fertilizers, pesticides and high yielding seed varieties, drip irrigation and greenhouses. Imported quantities of fertilizers and pesticides (including herbicides)[8] almost quadrupled during the period 1967-1988 (Aresvik 1976; DOS 1989a).

Mechanization in each sub-sector is limited to land preparation and spraying pesticides. In addition, the rain-fed area applies mechanization to harvesting wheat and barley, though there is a tendency to harvest manually in order to keep the straw, a valuable product in the dry areas. The number of tractors increased by almost 50% during 1970-1979 (from 2790 to 4150) (AOAD 1983).

2.1.4.1 Crop Production

The potentially cultivable area in Jordan is 480 thousand ha, of which an average of 213 thousand ha were cultivated during the period 1986-1988 (DOS 1987, 1988a, 1989a). The rest was either left fallow or was hilly land needing to be reclaimed. In 1988, 51 thousand ha were cultivated under irrigation out of 57 thousand ha of irrigable land (MOA 1989).

(a) Vegetable Production

During the period 1986-1988, vegetables were produced in about 29 thousand ha (Table 2.1), representing 16% of the cultivated land. The average total production was 629 thousand mt. The main vegetables produced were tomatoes, melon, cucumber, eggplant and potatoes; together they accounted for 72% of the average total production in the same period.

The average production increased from 264 to 376 thousand mt between the two periods 1973-1975 and 1976-1980 (MOP 1981). The wide use of improved farming methods, especially drip irrigation, the use of plastic-culture and expansion

[8] Imported quantities of fertilizers and pesticides increased from 15211 mt and 391 mt in 1967 (Aresvik 1976) to 59494 mt and 1297 mt in 1988 respectively (DOS 1989a).

of the area under irrigation in the Jordan Valley more than doubled between 1966 and 1987 (from 12 to 29 thousand ha) (Mu'asher et al., 1989), led to an increase of the average production to more than a million[9] in the period 1982-1984 (Haddadein et al., 1985).

Exports increased to an average of about 352 thousand mt during 1982-1984 (Haddadein et al., 1985). This high level of production, however, has proved to difficult to maintain as exports started to decline in 1983 and a large surplus was

Table 2.1 Average Area and Production During 1986-1988 Under Main Vegetables, Fruits and Grains

Crops	Area ('000 ha)	Per cent	Production ('000 mt)	Per cent
Vegetables	29.4	100.0	629.0	100.0
Tomatoes	6.9	23.5	225.4	40.2
Cucumber	1.5	5.1	65.5	11.7
Eggplant	2.5	8.5	59.5	10.6
Potatoes	2.0	6.8	44.0	7.0
Melons	2.6	8.8	60.3	10.8
Total	15.5	52.7	454.7	72.3
Fruits	53.0	100.0	196.0	100.0
Citrus	5.5	10.2	102.2	52.1
Olives	36.3	68.5	40.9	20.9
Grapes	5.5	10.4	21.2	10.8
Total	47.3	89.3	164.3	83.8
Grains	130.6	100.0	103.0	100.0
Wheat	71.2	54.5	63.1	61.3
Barley	46.9	35.9	29.0	28.0
Total	118.1	90.4	92.1	89.3

Source: Calculated from DOS 1987, 1988a, 1989a.

[9] The MOP estimated the average production in the period 1981-1985 to be 628 thousand mt (MOP 1986).

witnessed. Export in 1987 were 30% below their level in 1984 (CBOJ 1988).

To encounter the surplus production problem, the Government introduced a cropping pattern in 1984 to reduce the production of crops in excess supply such as tomato, eggplant and cucumber, and to increase the production of crops in short supply such as potato, onion, wheat and fodder. The production of vegetables decreased to 664 thousand mt in 1987 (DOS 1988a). This will be discussed in more details later in this chapter.

The crop production index for the years 1977-1987 (Table 2.2), indicates that vegetable production increased by 169%. It is to be noticed that this level was much less than the potential. The Government enforced a cropping pattern to reduce production which was about 36% less in the period 1986-1988 than the level achieved in 1984. Had this intervention not taken place, vegetable production would have been much greater.

(b) Fruit Production

Citrus, olives and grapes are the main fruits, they accounted for an average of 84% of total fruit production in the period 1986-1988 and they occupied 89% of the area under fruit production in the same period.

Table 2.2 Agricultural Production Index: Crop Production
(1975 = 100)

	1977	1981	1984	1987
Vegetables	88.3	168.5	179.0	237.5
Fruit trees	186.4	380.6	284.3	628.5
Olives	175.1	402.9	1062.8	435.6
Grains	116.0	140.6	110.6	179.5
Overall	122.1	235.0	294.2	329.6

Source : CBOJ 1989.

Citrus under irrigation is the largest in terms of production. Its production increased from an average of 30 thousand mt during the period 1976-1980 to an average of about 102 thousand mt in the period 1986-1988 representing 52% of total fruit production (Table 2.1).

Olives under rain-fed farming are the largest in terms of the area. They occupied 68% of the area (Table 2.1). The production of olives is highly variable, with a good crop every other year. The average production increased from 19 to 24 thousand mt between 1973 and 1980 (MOP 1981) and to 41 thousand mt in the period 1986-1988. Grapes represented about 10% of the area, but about 20% of fruit production.

The production of pome, stone and other fruits is increasing rapidly. As Table 3 shows, the production index indicates an increase of 237% in the period 1977-1987. Significant increase was also witnessed in olives production due to successful Governmental programme to promote fruit trees in the hilly areas.

(c) Field Crops

Wheat, barley and lentils are the main grains. Together with onion and tobacco they represented the main field crops. Wheat and barley are the largest in terms of area. As Table 2.1 shows, they occupied 54% and 36% respectively of the area under grains in the period 1986-1988, but they represented 61% and 28% respectively of the total grain production; that is together, they accounted for more than 90% of the total area and production.

According to 1983 Census, grain production was 99% under rain-fed farming. The production index for grains shows increases in production in the period 1977-1987 (Table 2.2), but in contrast to the remarkable increases in vegetables and fruits production, grain production and the area under grains have declined by more than 50% since the 1973. The area decreased from an average of 240 thousand ha during the period 1957-1973 (Aresvik 1976) to an average of about 90 thousand ha during the period 1981-1988 (MOA 1989). Consequently, the average annual production of about 139 thousand mt in the period 1957-1973 (Aresvik 1976) fell to about 64 thousand mt in the period 1978-1988 (MOA 1989). This decrease might be attributed

to first, active encouragement by the Government to replace the grains by fruit trees in the hilly areas within a soil conservation scheme for economic as well as ecological considerations. Second, continuous division of land and pooled ownership which are commonly cited as deterrent to grain development (e.g., MOA 1974b; Duwayri 1985).

2.1.4.2 Animal Production

Animal production, which accounted for 35% of the agricultural gross value in 1965 (Clawson, Landsberg & Alexander 1971) increased to 40% during the period 1983-1987 (DOS 1989a). With the sharp increases in the demand for animal products during the 1970s and 1980s due to significant improvement in per capita income and high income elasticity of demand, poultry meat output increased from 13 thousand in 1970 to 33 thousand in 1980 and to 84 thousand mt in 1987. Similarly, eggs production increased from about 40 to 500 mn egg between 1973 and 1986 (DOS 1983, 1988a). Jordan is virtually self-sufficient in poultry meat and eggs production. As the animal production index shows in Table 2.3 poultry meat increased by 133% and eggs production by 150% between 1977 and 1987.

The production of milk rose slowly from 45 to 55 thousand mt between 1973 and

Table 2.3 Agricultural Production Index: Animal Production
(1975 = 100)

Produce	1977	1980	1984	1987
Poultry meat	141.4	294.8	200.0	329.8
Eggs	247.7	405.1	451.4	619.2
Milk	96.8	102.7	108.6	150.5
Meat	98.7	107.6	41.6	100.8
Overall	140.7	238.1	188.0	293.4

Source : CBOJ 1989.

1984; in this later year production covered 40% of the local consumption. The milk production however, has rapidly expanded since 1984, therefore, the Government has decided to ban importing dry milk for dairy factories by the end of 1987. Table 2.3 shows that milk production increased by 55% between 1977 and 1987.

Red meat production according to the 1987 annual agricultural statistics and the animal production index has almost remained constant since 1978 in the range of 7.6-8 thousand mt (DOS 1989a, CBOJ 1989). This level is even lower than the average production achieved in the period 1967-1971 (about 10 thousand mt) (Aresvik 1976). This indicates that raising animals such as cows, sheep and goats is largely for milk and dairy products. The limited rangelands, over grazing and lack of integration between animal and plant production were the main obstacles to the development of livestock production (AOAD 1983, Haddadein et al., 1985, USAID 1988).

2.1.5 FOOD CONSUMPTION

Primarily for welfare reasons, the Government controls the prices of the basic food items. Food commodities represent a large share (41% in 1986) of the consumer's expenditures (DOS 1989b). The price control policy covers wheat flour, rice, sugar, imported meat, milk and partial control over the prices of vegetables and fruits.

The average per capita food intake during the 1970s was about 2250 calorie, of which more than 90% were derived from plant sources and 50% from wheat alone. The diet is poor in animal protein despite the notable improvement during the 1980s. (AOAD 1983).

The rise in per capita income in constant prices from JD 300 in 1976 to JD 684 in 1986 (CBOJ 1987) has led to considerable increases in food consumption particularly poultry meat, red meat and dairy products, which rose respectively by 22%, 8% and 8% annually during the period 1970-1979. Consumption of cooking oils and potato, wheat and sugar increased beyond the rate of population growth (AOAD 1983).

The annual per capita consumption of red meat and poultry meat increased from 8, 16 kg in 1980 to 16, 23 kg respectively in 1986. The per capita consumption

of eggs increased from 90 egg in 1977 to 141 egg in 1987 (MOA 1988). This is to be expected as animal products share was (and still is) low in the diet and due to its high income elasticity of demand. The high rate of population growth (3.4-3.8% during the 1970s and 1980s), increased female participation in the labour force, social values and urbanization were significant factors too.

Jordan is virtually self sufficient in vegetables, fruits, poultry meat, eggs, but it is a net importer of wheat, red meat, and dairy products. The total consumption of rice, sugar and cooking oil (apart from olive oil) is imported (AOAD 1983, CBOJ 1987, MOA 1988).

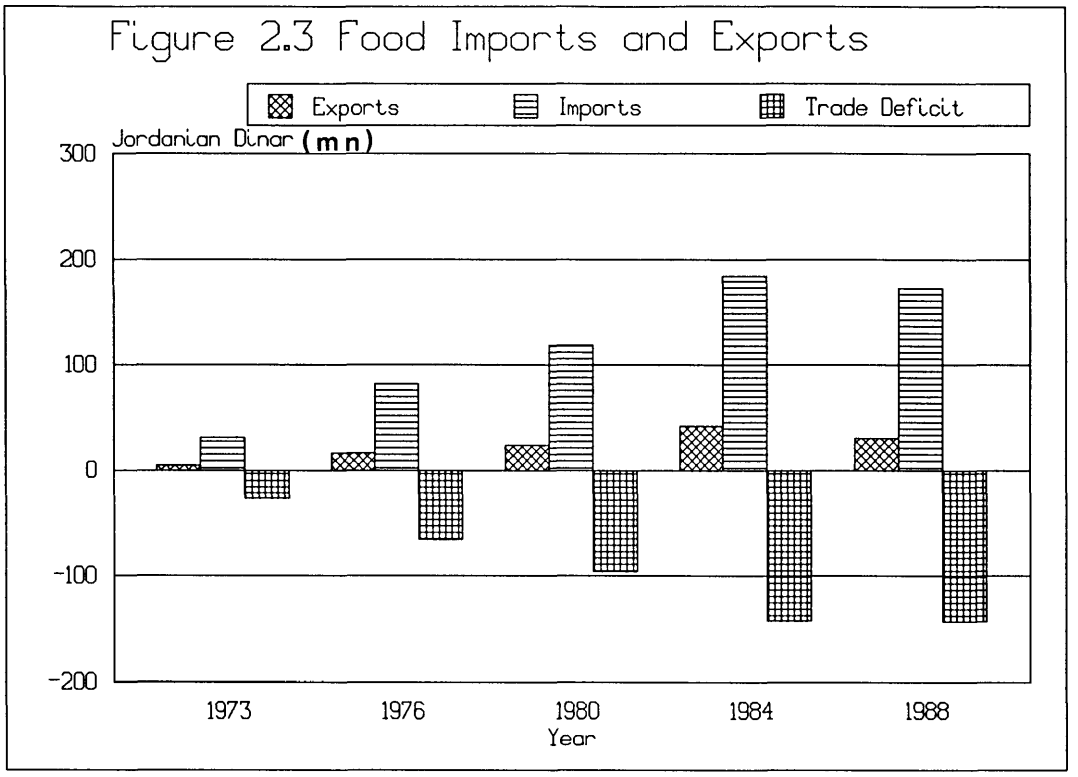
2.1.6 FOREIGN TRADE

Agricultural products have played an important role in Jordan's foreign trade, even though their proportion is gradually declining. As Figure 2.3 shows, the agricultural trade balance has been in increasing deficit, in line with the trade deficit of the economy as a whole throughout its various stages of development. The food trade deficit (at current prices) increased by about six time from JD 27 mn in 1973 to JD 143 mn in 1984 and 1988 (CBOJ 1984, 1990).

Although, the agricultural exports increased from less than JD 5 mn in 1973 to JD 42 mn in 1984 (before it declined by 30% products in total exports in 1988), the share of the agricultural exports declined progressively throughout the period from 70% in 1954 (Aresvik 1976) to 47% in 1966 (MOP 1981) to 18% in 1980 and to 9% in 1988 (CBOJ 1984, 1990). Vegetables and fruits (mainly citrus) were the main exports.

Decreases in exports were due to strong price (subsidised) and quality competition by Turkey, Greece and Cyprus, increased local production in the export markets, shortage of foreign currency in Syria and Iraq and market inefficiency in Jordan (AMO 1987).

The percentage share of the agricultural imports, however, declined from 28% in 1975 to about 17% in the 1980s. Red meat, wheat, sugar and rice were the main imported products, in 1985-1986 they represented about two thirds of the total agricultural imports (CBOJ 1987).



Sources : Data from CBOJ 1984, 1990*

The ratio of food exports to imports was about 15% in 1973 but it has improved since then and averaged about 20% up to 1988 (Table B.2 in Appendix B). The ratio of the value of agricultural imports to the gross value of agricultural production were 219%, 171%, 187%, 123% in the years 1976, 1980, 1984 and 1988 which suggest that there is a downward trend in the reliance on food imports for Jordanian's food supply.

2.1.7 FARM STRUCTURE

The farm structure is characterized by the dominance of small farms. Land fragmentation is the product of the growing population pressure, the inheritance system, the high social values attached to the possession of land, development activities and land speculation.

As Table 2.4 shows, several changes can be observed between the 1975 and 1983

Agricultural Censuses. First, the total area of holdings[10] decreased by about 7%, while the number of holdings increased by 13%. Thus the average size of holding decreased from 7.7 to 6.3 ha. Second, the change was more notable in the 1-4.9 ha sizes where the number of holdings increased by 28% and the area increased by 26% mainly at the expense of the larger group sizes over 20 ha in which the number decreased by 22% and the area decreased by 17%.

In contrast to the trend in developed countries where the percentages of smaller farms are declining, the percentage of the area under 5 ha increased from about 13% in 1975 to 18% in 1983. As a general rule, the small farms are located in the high annual rainfall areas and the more fertile lands or under irrigation in the Jordan Valley, whereas the large farms tend to be found in the marginal lands, in the arid areas or where underground water is available.

Fragmentation adds to the problem of the small sizes of holdings. In 1975

Table 2.4 Distribution of Holdings by Area Size Groups (ha)

Area Size	1975		1983		1975		1983	
Groups	No	%	No	%	Area	%	Area	%
< 1	12347	24.3	14501	25.3	4172	1.1	6042	1.6
1- 2.9	12263	24.2	16264	28.3	21414	5.5	27997	7.7
3- 4.9	7634	15.0	9290	16.2	27674	7.1	33623	9.2
5-19.9	14113	27.8	13928	24.2	127262	32.6	122410	33.6
20-49.9	3359	6.6	2610	4.5	93376	23.9	72705	20.0
Over 50	1075	2.1	845	1.5	116505	29.8	101486	27.9
Total	50791	100.0	57438	100.0	390403	100.0	364263	100.0

Source : Adapted from DOS 1977, 1985.

[10] A holding is defined by DOS as an independent agricultural unit which might be composed of one plot or more regardless of the legal ownership, area, type of enterprise or location within an administration area.

Census, there were 2.2 plots[11] on average per holding whereas in 1983 census, there were 2 plots on average per holding. This suggests that holdings were slightly less fragmented. Although land fragmentation might be largely attributed to the inheritance system, division of land for land speculation might not be less important as it almost certainly lead to land fragmentation. Whereas, land inheritance takes much longer time to be put into effect, thus the operated holding might remain unchanged.

2.1.8 THE RURAL AND FARM POPULATION

The population of Jordan was growing at the rate of 3.1% during the 1960s and at 3.4% during the 1970s in addition to migration from the West Bank (MOP 1986). Total population in 1989 is estimated to be 3.1 mn. The estimated population for 1975 and 1983 were 1.81 and 2.49 mn respectively. The farm population was 0.404 mn according to 1975 Agricultural Census (DOS 1977) and 0.499 mn according to 1983 Agricultural Census (DOS 1985). These figures suggest that first, the percentage of the farm population decreased from 22.3% to 20%. Second, the rate of growth was 2.6% which is about 1% less than the national rate whereas the rate is expected to be higher in the rural areas. This suggests that rural areas were still net losers of population during the period 1975-1983.

The percentage of the population which was rural[12] fell from 56% in 1961 to 41% in 1979 and to 30% in 1989 (Table 2.5). The internal migration has led to the depopulation of the rural areas. The population in Amman Governorate (including Zarqa) accounted for 48% in 1961 and rose to 55% in 1979 and to 57% in 1985. There was a general decline in the population of governorates other than Amman. For example, the population of Irbid decreased from 30.4% in 1961 to 27.2% in 1985. Balqa and Karak population fell from 8.8% and 7.5% to 6.8% and 5.6% respectively

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[11] A plot is defined as a specific area in a separate deed. A holding might be composed of one plot (or part of it) or more, that is, it is a legal entity.

[12] A locality of 5000 population was designated in 1979 as un urban area. This criterion is still valid (DOS 1989b).

in the same period (MOP 1986). The Department of Statistics estimated the percentage of the rural population from 1985 onwards at about 30%[13]. The revival of the agricultural activities in the rural areas by pluriactive holders might have a positive impact in this regard, but this is yet to be proved.

Table 2.5 Distribution of Rural Population by Governorate
('000 people)

Governorate	1979			1989		
	Total	Rural	Percent	Total	Rural	Percent
Amman	1185	219	18	1747	235	13
Irbid	609	416	68	862	420	49
Balqa	152	115	76	215	96	44
Karak	126	89	70	179	134	75
Ma'an	75	30	40	108	50	46
Total	2147	869	40	3111	935	30

Source : DOS 1985, 1990a.

There was a reduction of the percentage of young holders below the age of 35 years from 18% in 1975 Agricultural Census to 13% in the 1983 census. Similar reduction was observed among the category of over 65 years age from 18% to 16%. Consequently, holders in the age groups 35-64 increased from 63% to 71%. The rate

[13] There was a general opinion between the mayors and heads of village councils surveyed in this study that the migration from the rural areas is reversed due to the economic recession and the high cost of living in urban centres and remarkable improvements in the social and physical infrastructure. All villages were found to be served by paved roads, provided with electricity and water supplies and schools. Good transportation facilities has made cities closer to the rural areas, which altered the need to migrate by daily commuting to OFE. Thus taking OFE has ceased to be competitive with FE as combining both has become feasible. This will be dealt with in later sections in more details. However, the head of the demographic section of the Department of statistics (DOS) was not in favour of this opinion. The figures of the rural population produced by DOS were merely estimates based on the 1979 delineation of the urban areas and the rates of population growth derived in the 1970s. Thus they might not reflect the real and present situation. Consequently, it is premature to judge the population mobility due to the lack of evidence.

of illiteracy among holders decreased from 52% in 1975 to 45% in 1983, and the percentage of the holders with secondary education or more increased from 12% in 1975 to 20% in 1983 (DOS 1977, 1985). These figures suggest that first, the younger generations are increasingly looking for occupations other than farming but at the same time ageing holders are giving up farming. Thus farming is more likely to be an occupation for the well established and active middle-to-late age holders with other means of income. Second, the education levels were improving. Hence, the more educated farm household members were becoming more competitive in the labour market which might explain the tendency towards rural pluriactivity and the adoption of improved agricultural practices.

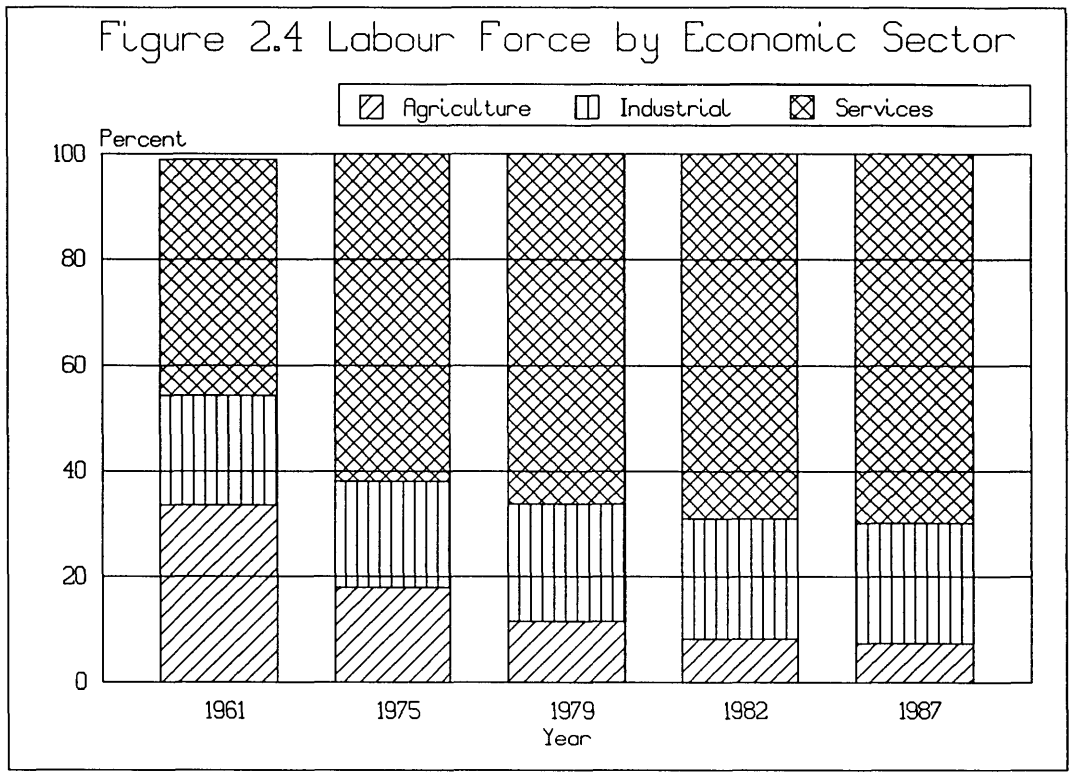
2.1.9 LABOUR FORCE

The relative share of the Jordanian labour force engaged in agriculture has steadily declined since the 1960s (Figure 2.4). The number decreased from 73 to 39 thousand between 1961 and 1985, and the percentage declined from 34% in 1961 to 18% in 1975 and to about 8% from 1982 onwards (Table B.3 in the Appendix B).

The decrease in the Jordanian labour force engaged in agriculture was partly compensated by foreign labour. Of the total hired labour, 58% were foreigners (90% of occasional). As Table 2.6 shows, there was drastic change in the composition of hired labour between the Censuses 1975 and 1983 in favour of occasional labour (DOS 1977, 1985).

The participation rate in the labour force according to the population Census in 1979 was 20% (MOP 1981). This low rate might be attributed to the high percentage of population under fifteen (50.7%), low participation rate (7.7%) by women (MOP 1986) in addition to high rate of school and university enrolment of person over 6 years (87% for males and 72% for females in 1982-1983) (DOS 1984).

From the Agricultural Censuses 1975 and 1983, a number of significant changes can be inferred, first, the percentage of regular labour decreased from about



Sources: Data from MOP 1986, Momani 1987 and MOL 1985, 1987.

60% to 15% while the percentage of the temporary[14] labour increased from 28% to 71%. Second, there was also an increase of the percentage of farm households who did most of the farm work (from 64% to 80%) due to shortage and /or high costs of labour. Third, the number of unpaid family labour members increased by 55% (from about 79 to 122 thousand), i.e an average of 2.1 per holding. Fourth, there was a tendency by holders to hire foreign and cheap labour to perform occasional work while themselves assuming managerial or off-farm employment. Fifth, the percentage of paid and unpaid females involved in farm work decreased by 8% and 6% respectively. Women participation in the labour force increased from 7.7% in 1979 to 12.5% in 1985 (MOP 1986). Taken together, these changes suggest that there is a strong tendency by the farm household members to shift from monoactivity on

[14] Regular labour is defined by DOS as those who are employed for more than 2/3 of a year. Temporary labour is defined as those who is employed for more than 1/3 a year but less than 2/3 of a year and an occasional labour is employed for less than 1/3 of a year.

Table 2.6 Type of Hired Labour According to the Agricultural Censuses

Type of Labour	1975 Census	Percent	1983 Census	Percent
Regular	77456	59.8	11494	15.2
Temporary	15519	12.0	10496	13.9
Occasional	36443	28.2	53471	70.9
Total hired	129418	100.0	75461	100.0

Source : Adapted from DOS 1977, 1985.

their farms to pluriactivity in order to diversify their sources of income (to be discussed in later sections).

The steady increase in the agricultural output and the decrease in the size of labour force suggests that the productivity of labour has notably improved.

2.1.10 RURAL PLURIACTIVITY

According to the 1975 Agricultural Census, 35% of total holders declared that their main occupation is not farming whereas the percentage in 1983 census increased to 43% (Table 2.7). The correspondent percentages of areas were 18% and 28%. This suggests the areas of holdings cultivated by pluriactive holders were slightly increasing. The increase in number were 41% against an increase in area by 45%.

The worsening terms of trade between the farm sector and other sectors as mentioned earlier in Chapter 1; the changes in the structure of farms and the agricultural labour force as mentioned above; the high percentage of holders who did not market any part of their production (39%); and low dependence on institutional credit (6%) (DOS 1985) together suggest a process of marginalization of farming activities to a significant percentage of land holders which indicates the existence of alternative sources of OFI and off farm activities.

The incidence of pluriactivity was found to be widespread throughout Jordan

Table 2.7 Distribution of Holdings Operated by Pluriactive Holders by Size Groups (ha)

Area Size Groups	Number of Holding	Percent	% of All Holding	Area (ha)	Percent	% of Total Area
0.1-0.9	9683	40.0	16.9	3782	4.0	1.1
1.0-1.9	4316	17.8	7.6	5704	5.9	1.7
2.0-2.9	2656	10.9	4.7	6109	6.4	1.8
3.0-4.9	3061	12.7	5.4	11129	11.6	3.3
5.0-9.9	2627	10.8	4.6	17398	18.1	5.2
10-19.9	1215	5.0	2.1	15588	16.2	4.7
> 20	679	2.8	1.2	36314	37.8	10.9
Total for 1983 Agricultural Census	24237	100.0	42.5	96024	100.0	28.7
Total for 1975 Agricultural Census	17163	100.0	34.9	66205	100.0	18.1

Source: Adapted from DOS 1977, 1985.

(Table 2.8). There were some variations between governorates, the highest percentages of pluriactive holders and their cultivated areas were found to be 48% and 32% respectively in Irbid and the lowest percentages were found to be 37% and 20% in Balqa. The availability of water for irrigation in much larger percentage of land and better annual rainfall in Balqa might partly explain these differences.

Even if the number of holdings under the size of one hectare is disregarded (where the greater part of which can be assumed not to be able to provide full time employment) 25 % of the other holders (except in Balqa Governorate) were pluriactive. It is to be noted that the percentage of holders who spent some time in OFE activities but less than 50% of their working time is not available.

Table 2.8 Distribution of Pluriactive Operators by Governorate

Area Size	Total		Amman		Irbid		Balqa		Karak		Ma'an	
			Percentage of									
ha	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
.1-	17	1.1	14	0.6	19	1.4	21	2.4	15	0.8	12	0.6
1-	12	3.5	11	1.8	15	4.8	10	4.7	12	2.9	8	2.0
3-	5	3.3	5	1.8	6	4.0	3	3.4	7	3.9	6	3.1
5-	5	5.2	5	3.0	5	5.9	2	3.9	7	7.2	7	5.9
10-	3	9.1	4	8.7	3	8.1	1	4.3	5	13.2	6	13.3
50-	1	6.5	.7	8.7	.2	7.5	.1	1.8	.2	1.8	.4	4.0
Total	43	28.7	40	24.6	48	31.7	37	20.1	46	29.8	40	28.9

Source: DOS 1985.

2.2 AGRICULTURAL POLICY

2.2.1 POLICY OBJECTIVES

2.2.1.1 General Objectives

The broad policy objectives for the development of the agricultural sector can be summarized as follows:

(a) to conserve the basic agricultural resources and to protect the national environment.

(b) to improve the incomes of farmers, promote their investment in farming and to generate employment opportunities to encourage farmers and labourers to remain in their farms and villages.

(c) to increase agricultural production to meet the domestic demand of the rapidly growing population, to achieve improved food security, and to minimize the deficit in the agricultural balance of trade (Haddadein et al., 1985; MOP 1981, 1986).

2.2.1.2 The Agricultural Development Plans

The economic system in Jordan is based on free enterprise and private initiative. Socio-economic development is carried out basically by the private sector. The Government, however have the responsibility for providing the necessary infrastructure facilities, adopting fiscal and monetary policies[15] conducive to creating an appropriate investment environment and entrepreneurship and to achieve balanced regional economic development. Investment is encouraged by selective incentives. The Government has also taken the lead in implementing large projects

[15] Fiscal policies includes taxation, subsidies and customs tariffs in favour of domestic production and ensuring regional equity and fair distribution of income. Monetary policy includes curbing inflation through controlling money supply and rates of interests, promoting domestic savings, credit preference to commodity producing sectors and exports.

in participation with the private sector such as cement and fertilizer manufacturing, marketing centres, tomatoes processing and oil refinery.

The past development efforts in the agricultural sector can be summarized as follows:

(a) The Seven Year Plan 1964-1970

The plan was the first and it was originally initiated in 1963 as a five year plan. Due to THE 1967 war, the plan was rescheduled as a seven year plan. It aimed at increasing agricultural production by 4.7% annually, promoting agricultural exports to reduce the deficit of food trade and to create employment opportunities in the rural areas. These objectives were targeted through implementing several projects to increase the production of the main crops such as tomatoes, wheat, citrus, olives and grapes by expanding the irrigated area after the construction of the King Abdulla Canal in the Jordan Valley, adopting improved methods of farming and by reclaiming the hilly lands for planting olives and grapes.

However, the rate of growth in the agricultural sector was minimal due to the economic recession which resulted from the 1967 war and the disruption of the agricultural activities in the Jordan Valley. Only the objective of land reclamation has been partly achieved (MOP 1986).

(b) The 1973-1980 Development Plans

Two plans were implemented during this period. The Three Year Plan 1973-1975 was a project-oriented plan which aimed mainly at reactivating the economy after a long recession period and to create job opportunities. The Five Year Plan 1976-1980 was formulated with a comprehensive framework of development strategy. Its period has witnessed a large increases in the Arab assistance and the value of remittances, a growing demand for Jordanian manpower by the growing industrial and services sectors locally and in the oil producing countries.

The main developments in the agricultural sector were in vegetables and citrus production, poultry meat and eggs. The rate of growth was 2.1% which was much

lower than the rates of growth observed in the industrial sub sectors which were 13-19%. As a result, as Figure 2.1 shows, the share of the agricultural sector in GDP continued to decline.

(c) The Five Year Plan 1981-1985

The favourable economic conditions which prevailed during the previous plan were reversed. The Arab assistance, remittances and the demand for Jordanian manpower rapidly declined. However, the agricultural sector was the least affected. The annual rate of growth increased to 7 percent while the rate of growth of the industrial sector fell to 4.9 percent.

The main agricultural developments were the rapid use of the drip irrigation and the use of plastic houses. The number of greenhouses in 1979 in the Jordan Valley alone was 1482 (equivalent to 74 ha) and the area under drip irrigation was 851 ha (Steitieh & Musa 1980). The number of greenhouses increased to 9934 in 1985 (DOS 1986) and the area under drip and sprinkler irrigation increased to 6000 ha in 1984 (JVA 1988). The use of chemical fertilizers increased by 22% (DOS 1983,1986). The agricultural production index of vegetables increased by 35%, the production of fruits increased by 65%, poultry meat increased by 14% and eggs production has increased by 62% (CBOJ 1989).

(d) The Five Year Plan 1986-1990

The plan was formulated with long term objectives to transform the economy from service orientation to a more balanced economy. More emphasis was placed on local production of import substitutes and export oriented products, especially the industries with high local added value, to create employment opportunities and to increase the share of commodity producing sectors from 36% in 1985 to 39% in 1990 and to 43% in year 2000 .

As agriculture can be expected to make large contribution to the added value and employment, priority was given to the development of the sector. The expected rate of growth was 7.8% and the value of agricultural products was expected to

increase from JD 112 mn in 1985 to JD 163 mn in 1990. The share of the sector is expected to rise from 8.3% to 9.4% in 1990. These objectives were partly realized in 1988 as the added value increased to JD 140 mn and the share of the agricultural sector in the GDP increased to 9.6% (CBOJ 1988).

2.2.1.3 Regional Development

The plans of the 1980s aimed to achieve a balanced overall development of all economic and social sectors in all regions and more balanced distribution of population in light of resource availability.

The 1986-1990 plan was formulated on the basis of regional and local plans to ensure public participation and sustained overall regional planning. The aims of the integrated rural development approach adopted by the plan were to provide the basic social and physical infrastructure such as education, health, housing, domestic water and agricultural roads, to create income generating opportunities for the small farmers and landless workers through implementing agricultural projects, the encouragement of cottage industries, integrating animal and crop production and promoting internal tourism by establishing tourist villages.

2.2.2 FINANCIAL RESOURCES

The public investment in the agricultural sector in the previous development efforts was targeted towards the implementation of infrastructure projects such as the irrigation system in the Jordan Valley, marketing centres, research and extension services, food storage, tomato processing and land development projects.

Private investment was mainly concentrated in poultry production, plastic houses and drip irrigation. Private sector investment amounted to JD 34 mn during the period 1976-1980 (Table 2.9) representing 61% of agricultural investment. In the period 1981-1985 it sharply increased to JD 140 mn representing 72% of agricultural investment.

However, the actual investment by the public sector has stopped far short of the planned amounts, in contrast to the

Table 2.9 Sectoral Investment of the Development Plans (million JD)
(planned investment in brackets)

Sector	1976-80	1981-85	1986-90
All sectors	1222.0 (765)	2636.1 (3300)	(3115.5)
of which:			
Agriculture	51.7 (40)	182.1 (234)	(294.0)
of which:			
private	47.0 (22)	140.0 (134)	(211.0)
public	4.7 (18)	42.1 (100)	(83.0)
Agricultural Investment (%)	4.2 (5.24)	6.9 (6.5)	(9.4)

Source: MOP 1981, 1986.

* The figures for actual investment for 1986-90 were not available.

private sector whose actual investment exceeded the planned amounts. As Table 2.12 shows, the public sector invested about 20% and 42% of the planned investment in the 1976-1980 and 1981-1985 plans, while the proportions for the private sector were 214% and 104% respectively.

The 1986-1990 plan gave higher priority to the development of the agricultural sector. The planned investment was expected to rise (to JD 294 mn), of which 72% was expected to be invested by the private sector.

In contrast to the previous plans, and to enhance the regional development, the biggest share of the agricultural investment was targeted to the rain-fed sub-sector, especially for the promotion of grain production, rangelands development, soil conservation works and fruit trees planting.

It is to be noted that the above mentioned investment did not include the allocations (of JD 97, 522, 280 mn in the 1976-1990 plans) for domestic water and irrigation development. Substantial amounts of these investments were targeted to develop new sources of water for irrigation such as constructing dams, treatment of waste water, and increasing the efficiency of water use especially by converting the surface irrigation into pressurized system.

2.2.3 IMPLEMENTATION MEASURES

2.2.3.1 The Price Policy

The main objectives of the price policy of the Government are the following:

(a) to increase the farmers' income.
(b) to secure the food commodities to the consumers at reasonable and relatively stable prices.
(c) to bring about a pattern of production which satisfies the domestic requirements, improves food security and to increase exports and reduce food imports (AOAD 1983; MOP 1986).

These objectives, however, have been always a subject of heated debates (e.g., Haddadein et al., 1985; AMO 1987; USAID 1988) as they were neither consistent nor workable and farmers were cited as the main losers. Distorting the forces of free market and imposing a production pattern have not led to increases in farmers income nor to a proper product mix to avoid surplus production or better quality.

At the time of the survey, Government intervention covers the following aspects:

(a) Price Control

(i) Regulation of Vegetables and Fruit Prices

The daily retail prices are determined according to the mode price prevailing in the previous auction day in the main wholesale market in Amman[16]. A margin of 20-30% is added as a mark-up to arrive at a minimum and maximum retail price. In effect, the high price is the normal market price regardless of the quality. This regulation has several negative effects, first, it is based on the mode price regardless of the quantities, hence they do not reflect the representative price of the quantities

[16] 80% of the total production of vegetables and fruits pass through Amman Wholesale market (AMO 1988).

sold, second, as the retail price is determined in the previous day, it will be less likely that the retailers will pay higher prices even if the quantities were smaller. Third, the high price normally prevails regardless of quality; hence, it gives little or no incentive to farmers to produce high quality products.

(ii) Animal Products

The retail prices for poultry meat and eggs are fixed from time to time by the Government in agreement with the representatives of the producers. Jordan is almost self sufficient in the production of poultry meat while egg production is above the local requirements.

To promote sheep and goats meat production, there is no intervention prices for the locally produced meat. The price of the imported fresh meat however, is fixed. The prices of local meat are almost double the prices of imported meat, due to strong taste preference.

The price of cow's milk is fixed for farmers and consumers including the prices of manufactured dairy products. The production is increasing and by the end of 1990, importing dry milk for industrial purposes will be banned. The prices of sheep and goats milk and their dairy products are determined by market forces.

(b) Price support

(i) Grain Production

Various measures have been taken to promote grain production through promoting improved agricultural practices. During the 1980s, a system of guaranteed prices which is well above the world market prices (about 250% in 1988) was adopted. Despite increases in procurement prices, no measure including the price support has proved to be effective. This might be explained by the low returns to grains in comparison to fruit products in the rain-fed areas and vegetables in the irrigated areas (Shebly 1988). In addition, prices have much less effect for the large number of small holders who have no or little grain to sell. Hence, the objective of

increasing grain production will have to be addressed by an alternative policy.

(ii) Vegetable Production

The Government also intervenes by absorbing the excess production of tomatoes to be processed at prices higher than the prices prevailing in the wholesale markets. This applies to farmers who comply with the cropping pattern adopted by the Government. Three tomato processing factories were established in the period 1975-1985 in the main producing areas. With over production of tomatoes, the price support gives a wrong signal for the producers to produce more. It is not a coincidence that tomato production was found to be one of the most profitable crop in the Jordan Valley (AOAD 1985) despite the over-production problems.

2.2.3.2 Inputs Subsidies

The main subsidies are the following:

(a) subsidies for the use of the factors of production which cover mainly water for irrigation in the Jordan Valley, feeds such as wheat bran and barley and grain seeds.

(b) subsidies for land reclamation works such as soil conservation measures, fencing and seedlings through MOA.

(c) exemption of taxes on imported agricultural inputs and equipment. This exemption applies to local agricultural production (JVA 1988).

2.2.3.3 Land Use

(a) Land Use Policies

The broad land use policy in Jordan can be summarized as follows :

(i) in rain-fed areas with an average annual rainfall below 250 mm, the policy is to use areas below 200 mm for grazing. Two projects are under implementation in this area for range development to promote meat and dairy production. For areas with

200-250 mm rainfall, the only feasible enterprise is barley production.
(ii) for areas with average annual rainfall over 250 mm or under irrigation, first, land with less than 9% slope, the policy is to use them for field crops and summer vegetables production. Second, land with slope between 9-25% which represent more than 60% of the cultivable lands is best suited for planting fruit trees. The Government has implemented several projects to promote fruit production and to control soil erosion. So far, about 50 thousand ha has been reclaimed and a greater part of it is planted with fruit trees mainly olives and grapes[17]. Third, for land with slope over than 25%, the proper land use is for afforestation. Several afforestation projects have been implemented and at present, the afforested area is equivalent to the natural forest, together they occupy 50-60 thousand ha.

(b) Land Use Objectives

The main objectives of land use policy is to use it according to its capability which in turn will increase agricultural production, protect the soil from erosion and maintain an ecological balance of the areas. For example, the use of the marginal lands (with annual rainfall below 250 mm) for wheat production may produce a good crop once in every 3-5 years, but it destroys the life cycle of weeds. Hence, regeneration capacity of grass would be substantially reduced, and the most needed animal production will be hampered. Besides, the soil will be subjected to water and wind erosion which reduce its fertility, and adds to the desertification problems.

Similarly, growing grains on hilly lands increase soil erosion substantially through frequent disturbance of soil. The practice of tilling the hilly lands against the contour lines accelerates erosion. Hilly lands are most suitable to fruit trees which needs less soil movement, the roots hold the soil, the green foliage reduce the intensity of rain, and hence soil capacity to hold moisture will be enhanced. With the limited land resource base, protecting soil from erosion is of utmost importance in addition to the highly positive effects on the environment.

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[17] Figures are provided by the Highlands Development Project for the year 1988.

2.2.3.4 The Cropping Pattern

Vegetable production has more than doubled during the period 1977-1984 as Table 2.3 indicates. Exports and domestic consumption however, have not kept pace with increases in production. Surpluses of production have been observed since 1984 which have substantially reduced the farmers' income and created intractable debt problems which are yet to be solved. Low rates of repayment of loans have seriously affected the viability of the institutional agricultural organizations (Hankel, Mittenorf & Starke 1989). At the same time, cereals and red meat production have declined or remained unchanged, covering less than 25% of the local consumption. Potatoes, onion and garlic were in short supply.

Against this background, the Government introduced a cropping system in 1984 to restrict[18] the area that can be planted with surplus crops, namely tomatoes, eggplant and cucumber and to encourage the production of crops in short supply such as potatoes, onion, garlic, wheat and fodder (AOAD 1984).

The cropping system was successful in the following, first, sharp increase in the production of potatoes (from about 5 to 48 thousand mt between 1982 and 1988) and onions (from negligible production to 29 thousand mt in the same period) (DOS 1983, 1989a). Hence, Jordan has become a net exporter of potatoes and almost self sufficient in onions and garlic production (MOA 1989). Second, curtailing vegetable production as mentioned earlier from an average of more than one million mt in the period 1982-1984 to an average of 629 thousand mt in the period 1986-1988.

However, a number of shortcomings have resulted from the enforcement of the system. First, the reduction in vegetable production cannot be considered a positive achievement for agriculture development in Jordan. Subsidising the surplus products, lack of proper policy to promote food processing and inefficient marketing system (notably the lack of a market information system) have misguided farm operators resulting in improper product mix and to loss of traditional markets instead of promoting exports and food industries. Second, the extension agents who were

[18] The restriction was applied on the micro level by a system of (proportional) licensing by which farmers were permitted to plant a specific area of their land with surplus crops. Of the major shortfalls of the system were the disregard of land use capabilities and geographical variations.

supposed to be agents for transferring improved farming practices to the farmers have been held responsible for enforcing the system which was disliked by most farmers, thus relegating their functions into the follow up of purely administrative work. This has undermined their image and hence their most important role was forgone as they lost their credibility. Third, the system was applied through limiting the cultivated lands regardless of their capability or location.

Fourth, the production of wheat and fodder has not increased. Wheat, fodder and meat imports in 1986 represented 42% of the value of total imports (CBOJ 1987).

Against these inconsistencies with most of the policy objectives of the agricultural sector, the underlying justification for the cropping system ceased to exist. Consequently the system was relaxed in 1990. This, however, was not accompanied by a proper information system to provide farmers with the necessary signals as to what to produce and for what markets which might solve the expected over production problems, thus leaving FHHs in a highly precarious condition .

2.2.3.5 Farm Structural Policy

Since 1964, the small sizes of farms and fragmentation have been recognized by the development plans as major problems for the agricultural development. Therefore, structural reform has been a common organizational measure for the implementation of the agricultural development plans through enacting legislation to consolidate the ownership of small farms into workable and economically viable holdings.

In the Jordan Valley, a partial land reform was carried out in 1959[19] to improve the farm structure either by consolidating

small farms or dividing large holdings into economically viable sizes of farms. Eventually, 30 dunums were considered to be minimum size of holding and 200 dunums as maximum. Table 2.10 presents the contrast between the situation in 1955 before the reform and in 1978. For example in 1955, the farm size group 2.1-5 ha represented 22% of the number of holdings and occupied 8% of the area. In 1978,

[19] Law 14 in 1959 and its subsequent amendments between 1960 and 1966. Table 2.10 presents the situation in 1978 which does not reflect the actual situation after the reform in 1966.

this group represented 41% and 32% of the number and area of holdings respectively. The significance of land reform was more evident in the changes of land ownership structure; land owned in holdings of less than 30 dunum accounted for 65% in 1960 but after the reform, 75% was in the 30-50 dunum size group (Clawson et al., 1971). By law, land cannot be sold or divided below the minimum of 30 dunum, although de-facto subdivision cannot be avoided if heirs of a late holder have decided to work in their sub-units (Hezelton 1974, DOS 1981).

Table 2.10 Distribution of Holdings in the Jordan Valley by Size Groups (before and after the land reform)

Size Group (dunums)	As in 1955*		As in 1978**	
	% of Number	% of Area	% of Number	% of Area
Under 5	21.8	0.5	5.9	0.4
5 - 20	27.4	3.4	31.8	8.8
21 - 50	22.1	7.6	41.4	32.0
51 -100	12.4	9.2	14.5	24.9
101 -200	7.8	11.8	4.5	14.8
Over 200	8.5	67.5	1.9	19.1
Total	100.0	100.0	100.0	100.0

Sources: * Hezelton 1974, ** DOS 1981.

The remarkable development in the adoption of improved technology and the significant increases in production indicated that the restructuring reform was effective in bringing about the changes deemed to be necessary for agricultural development in the Jordan Valley.

In the highlands, the restructuring measures were not put into effect. Instead, in 1966 the Government limited the minimum size of holding to 4 dunum. In 1982, the minimum size increased to 10 dunum (Qasem 1986). These measures were not sufficient to improve the situation as these minimums are far lower than the minimum economical sizes under the rain-fed conditions.

The small sizes of farms and fragmentation remain a major obstacle to agricultural development. Due to critical socio-political considerations, the prospects for a major structural reform in the foreseeable future are very low if they exist at all. Therefore, the options which are open to the farmers are as follows:

(a) to abandon their farms, this is actually the case in many of the hilly areas where numerous plots were abandoned and are subject to heavy soil erosion.

(b) forming farming groups or cooperatives which might contribute to increasing the productivity of land, but the problem of absentee landlords and pooled land ownership which means that the lack of interest by some of the owners of the fragmented plots make this option of little practical value.

(c) renting the land to other farmers, this would contribute to improving the productivity of land and its economic viability and is actually happening though in a limited scale.

(d) pluriactivity as full time farming cannot be expected to generate reasonable income to satisfy their needs from farming their land alone, many farmers have to supplement their incomes by off-farm work.

Therefore, pluriactivity would be the most viable alternative open to the holders under the rain-fed conditions and the present socio-economical, political and environmental considerations. However, holding size may not be the only factor that determines the viability of farms under irrigation, especially in the Jordan Valley. With intensive fruit or vegetable production, the problems of small area are less acute. Indeed, some holders do rent part of their irrigated land to avoid hiring regular labour, hence the farm size is tailored to the family labour potential.

2.2.3.6 Agricultural Marketing

(a) Marketing and Foreign Trade

Jordan has a limited local market. Hence, expansion of production will have to be geared for exports. It is in strong position to compete with the neighbouring countries for producing out of season vegetables and fruits.

The trade balance deficit has been increasing throughout the various stages of development in Jordan. Remittances and Arab assistance have largely contributed to the financing of deficit. Reducing the trade deficit, therefore, has been a target for all development plans. Promoting agricultural exports and reducing agricultural imports were considered as a main vehicle in achieving this policy (MOP 1981, 1986).

In 1988, a project[20] for improving marketing efficiency was established to improve handling, grading, packaging, especially to upgrade the quality of the exported products, to promote exports and to counter the strong competition of the subsidised exports from countries in the region such as Turkey, to promote diversification of production in order to reduce food imports through the production of crops in short supply and to establish a marketing information and export prospects system to guide farmers in their production decisions and to provide market information to the export markets (AMO 1988).

The Government has adopted a new policy of permitting exporting of agricultural products and restricting imports to promote local production of crops in limited supply regardless of the local demand in either case (MOP 1986).

Banning imports of out of season fruits has resulted in rapid expansion of the area under peaches and apples, especially during the period 1980-1985. According to MOA sources, about 1000 ha were developed for this purpose in this period using highly progressive farming practices such as high yielding dwarf trees and drip irrigation.

Although the Government efforts to rectify the marketing constraints have to

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[20] The main activities in the project schedule for the period 1988-1993 include, *inter alia*, training, agricultural policy and export demand research, local studies and establishing market intelligence system.

be recognized, marketing at present is still the main obstacle to agricultural development in Jordan. A coherent, clear and long term marketing policy with strong Government commitment within an effective institutional framework is yet to be developed.

(b) Food Processing

With the rising marketing problems, food processing is a major marketing outlet for the seasonal surplus production. The 1986-1990 plan (MOP 1986), placed special emphasis on medium and small industries with high local value added and which promote integration with other sectors through backward and forward linkages. Food processing manufacturing, whether oriented for exports or to substitute for imports, was well placed in this plan. This move towards capital saving and labour intensive establishments was motivated by the growing shortage of capital and growing rate of unemployment[21]. Small industries have a special role to play in creation of a technological and entrepreneurial base for modern industries and as a nucleus for regional industries.

The agricultural industries represented 11% and 15% of the number of establishments and labour respectively. Food manufacturing was basically flour milling, chocolate and sugar confectionery, oil extracting especially from olives, canning and preserving food products, juices, tomato pastes and dairy products.

2.2.3.7 Credit Policy

Under the 1980-1985 plan (MOP 1986), policy measures were taken to expand the scope of the commercial banks' credit to cover rural areas and small farmers, to develop the specialized credit institutions (namely the Agricultural Credit Corporation (ACC) and Jordan cooperatives organization (JCO)) by increasing their resources and updating their activities.

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[21] The rate of unemployment was 6% in 1985 (MOL 1985), and according to the statement of the secretary of labour to the House of Deputies on June 27, 1990, the rate of unemployment have reached 15.6% (Al-Ra'ei Newspaper, June 28,1990, vol:20, Amman, Jordan).

Interest rates and terms of loans were adjusted to vary according to the types of loans, farming systems and enterprises. For example, the rate of interest is lower and the grace period is longer for growing olives under rain-fed conditions relative to other fruits such as peaches or to the fruit trees grown under irrigation. These variations are due to the differences in bearing periods[22] and to the Government policy to develop the rain-fed areas. Gross rates for long term and seasonal loans are 6%, 7-8% respectively while the rates in the commercial banks are about 11% without grace periods. Besides, credits extended by commercial banks have compound rates of interests, shorter and strict repayment periods. Hence very few farmers resort to commercial banks due to the risk of land confiscation. Thus, the commercial banks are utilized by agri-businessmen such as input dealers, commission agents and exporters (Haddadein et al., 1985).

The annual credits extended by the commercial banks to the agricultural sector increased from JD 13 mn in 1978 to JD 26 mn in 1983 and to 42 mn in 1988. On average, credits extended to the agricultural activities by the commercial banks represent 3% of the total outstanding credits. The loans extended by the ACC, JCO in the period 1978-1988 amounted to JD 60, JD 50 mn (an average of JD 5.4, JD 4.6 mn) respectively (CBOJ 1990).

According to 1983 agricultural census, only 5.9% of total holders utilized the institutional credit sources. This suggests that more effective measures should be taken to make the institutional credit more accessible to the average farmers who are typically small by reducing the red tape to make the credits available when needed, and to adopt more practical measures for the required security and collateral of the credit to reduce the farmer's aversion to formal credit.

The Government is in the process of restructuring the agricultural credit system. The options are essentially based on integrating the agricultural credit into the capital market in conjunction with price, subsidy and income policies in favour of the producers of some farming products. Soft loans for high priority and social

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[22] Under rain-fed conditions in Jordan (and some other mediterranean countries) olive trees need some five years to start producing and 10-15 years to reach normal production period. For grapes and stone fruits, the corresponding periods are 3-5 years. Thus, the credit repayment period for olives growers were ten years including a grace period of five years against five years period for other fruits. These conditions were later on softened for which data is not available.

projects would not be excluded (Hankel et al., 1989). If we recall that fewer than 6% of farm operators in 1983 have resorted to formal credit, the new initiative might lead to mobilizing more funds and credits to the sector and to the creation of viable, independent credit institutions which will relieve the Government budget from a heavy commitments to be used more effectively for more critical productive purposes.

2.2.3.8 Research and Extension

With the limited agricultural resource base, further agricultural development will have to be based on more efficient use of resources and the adoption of improved practices to achieve higher productivity.

The weakness of the research and extension services is widely acknowledged as one of the major obstacles for agricultural development, especially in the rain-fed areas and for the livestock sub-sectors (e.g., Phocas 1982; Sudad 1980; USAID 1988).

In the rain-fed areas, some of the main research issues are water harvesting and improved tillage practices to conserve soil and moisture, fertilizer application, improved varieties (grains and seedlings), better range management and veterinary services were considered to be the basis for the development of grain, fruit trees and livestock sub-sectors. Several projects were directed to achieve these objectives but the results so far were modest at best (e.g., Arabiat et al., 1982; Duwayri 1985; Hurani 1988; USAID 1984).

Some of the critical issues in the irrigated areas are, land use capabilities, crop water requirement, plastic culture management, disease and pest control, higher cropping intensities, effective extension services and market intelligence (Dar Alhandasa 1987; AMO 1987; USAID 1988).

Therefore, promoting applied research and improving the extension services are given high priority in the development plans 1981-1985, 1986-1990. A specialised unit for research and extension was set in the Jordan Valley. A National Centre for Agricultural Research and Technology Transfer was established in 1986 within a comprehensive highland development project. Projects were also established for developing marketing of poultry, red meat production, soil survey and land classification , seed improvement and multiplication, range lands and fodder

production and selection of sheep and goats.

2.2.3.9 Environment

Jordan has witnessed rapid economic growth during the 1970s and early 1980s. As mentioned earlier in this chapter, the industrial sector grew rapidly during the 1960s and 1970s. Between 1976 and 1980, the real agricultural GDP increased 15% annually. These developments were accompanied by high rates of population growth (3.4%-3.8%).

These developments were bound to have negative environmental effects. Among the salient environment problems were urban expansion at the expense of the agricultural land, pollution of underground water and dams, improper handling and use of insecticides and chemicals, improper disposal of plastic wastes, soil erosion in the hilly areas, the desertification of the marginal land through the misuse of land, excessive grazing and cutting down the forests, (MOP 1981, 1986).

Under the development plan 1981-1985, efforts were made to accelerate soil conservation and afforestation activities. A project was initiated for range management and to counter desertification problems. Measures were taken to regulate the purification of waste water to prevent the pollution of underground water and dams. A new society sponsored by the Government was set up to manage the environmental affairs, and two wildlife reserves were established and endangered species were reintroduced.

Under the present plan 1986-1990, environmental protection and pollution prevention measures are taken to enhance the efforts that were already taken in the previous plans, to promote the creation of green protected areas and to monitor the importation of chemicals and pharmaceutical,and to ban the importation of products with adverse effects already banned in the developed countries.

CHAPTER 3

LITERATURE REVIEW

3.1 HISTORICAL BACKGROUND

3.1.1 INTRODUCTION

Rural Pluriactivity (RP), broadly defined as combining farming with other activities, has deep historical roots and was an integral component in the subsistence agricultural societies. Traditionally, e.g., in Germany, France, United Kingdom, Canada, Norway and Finland, off-farm employment (OFE) in local trade, blacksmith, carpentry, fishing and forestry works has been customary for farm people (e.g., Wietfeldt 1976; Hackman 1976; Brun 1977; OECD 1977; Bollman 1982a; Commission 1986).

Therefore, RP is neither geographically peculiar, nor a recent practice. Indeed, though in different forms, it is a universal phenomenon regardless of national ideologies. It can be found in a wide variety of natural and socio-political environments with different levels of economic development.

Different forms of RP have developed over time and under varied socio-economic conditions. Attempts were made to trace the evolution of various forms of RP in the various stages of capitalist development (Sivini 1976). Linkages were also sought with stages of economic development by conceptualizing the economy as passing through the stages of economic growth in the context of land scarce and densely populated countries (Shand 1986b). These stages however, are confined (by definition) to the economic dimension while the behaviour of societies is not solely determined by economic considerations. Social, cultural and political factors have always played a decisive role in shaping the performance of societies. For example, the agrarian reform, social development and the cultural values with respect to the ownership of land in Italy were no less important than the mere industrial growth in explaining the growing importance of RP in various forms (Saraceno 1988).

Against this background, RP has been a controversial issue among agricultural economists, geographers and social scientists during the greater part of this century and

there were always conflicting opinions concerning its origin, forms, definition, terminology, classification, motivations, significance, merits and dismerits, sustainability and policy implications.

3.1.2 RECOGNITION OF RURAL PLURIACTIVITY

The importance of RP has been recognized for more than a century. In the United Kingdom, two Royal Commissions were appointed to examine the hardships caused to large sections of British agriculture during the depression of the last few decades of the nineteenth century. It was found that a wide range of occupations were combined with farming such as manufacturing, retailing, banking, fishing and agricultural work on other farms (Hill 1984b).

Early in the present century, Jebb (1907), stressed the importance of integrating agricultural and industrial activities to solve the unemployment problems which arise from the seasonal fluctuations and the periods of slack trade. Thus, the casual would be able to derive part of his income from land which alone would not suffice to support him.

Garrat (1928), has indicated that there were nearly 0.2 mn small holdings rented or owned by operators in the UK with some other means of livelihood. Many of them worked very hard for small remunerations and they produce some of the best fruit. They also contributed to the creation of a very fine kind of village life. Some could be found on less fertile land. He also indicated that this kind of farming was common in Denmark and the man whose main income came from working for his neighbours or from some part-time job was called in Germany a *Nebenbeschaftigung* (Garrat 1928).

The 1930s were marked in the United States for the emergence of research and public interest in RP *per se* as a possible option to mitigate the hardships encountered during the great 1930s depression (Frauendorfer 1966). As noted by Fuller (1984), the 1930s era of research had a profound and lasting impact on the direction and nature of research on RP. The positive role of RP in rural development was recognized in Austria, Switzerland and Norway earlier than other countries. This was due to the limited income generating capacity of the of mountainous agricultural areas (Frauendorfer 1966).

In the 1950s, Germany has witnessed a growing research interest in RP (Frauendorfer 1966). This was followed in the late 1960s by an effective policy to

promote RP in the rural areas and to improving living conditions and standards through promoting regional development and rural industries. Similar positive policy was implemented in Japan (OECD 1977) and more selectively in France (OECD 1978).

The 1970s and 1980s witnessed an upsurge of interest in RP. This was initiated by the EEC 268 directive in 1975 to support farming and off-farm activities in the less favoured areas. Following this development, more interest was demonstrated in international workshops and seminars held in the University of Guelph (1975), CEAS (1976,1977), the Arkleton Trust (1983). A seminar on part time farming and adjustment to pluriactivity was held in Yugoslavia in 1982 (Krasovec 1982) and a conference on off-farm employment in the development of rural Asia was held in Thailand[1]. Following special surveys, reports exclusive to the subject were published by the OECD (1977,1978) and European Commission (1986). Special editions were published by the periodicals *Geo Journal* in 1982 and *Sociologia Ruralis* in 1983.

In general, it was generally recognized that RP is a world wide element in the agrarian structures and it has a number of positive socio-economic and ecological implications. This includes, reducing intra and inter income disparity within the farm sector and with other sectors, reducing rural un- and under-employment and maintaining the rural population, the agricultural resources and activities. RP however, was also associated with negative effects on allocation of land and capital resources (largely at the macro level) especially when land is a limiting factor in food deficit countries. These aspects will be discussed in later sections.

3.1.3 THE TERM: RURAL PLURIACTIVITY

Rural pluriactivity is a multi-dimensional subject and can be found under a wide variety of headings such as part time farming, peasant-worker, homesteads...etc (Frauendorfer 1966). The list of headings can be a long one indeed. Figure A.1 Appendix A presents a list of most of the terms found in the literature of this subject.

Lack of interest in studying RP might be attributed to the lack of market orientation of the RPAs and the stereotype image of inefficiency largely due to lack of

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[1] The conference was held under the auspices of the Development Studies Centre of the Australian National University, Canberra.

specialization (CEAS 1977). This narrow approach of economic analysis has changed, and is gradually replaced by more comprehensive analysis where socio-environmental aspects were becoming integral elements in any serious evaluation of socio-economic developments.

Against this background, the term part time farming (PTFing), which until recently was the most popular term in north America and West European countries, was felt to be directly contributing to that image and it was increasingly criticized as unsatisfactory (e.g., CEAS 1977; Arkleton Trust 1985; Gasson 1988; Fuller & Brun 1990). These unfortunate connotations have led to the gradual adoption of new terms with more broad connotations such as RP, multiple job holding (MJHing) which are gaining ground and more appealing in the EC states while off-farm employment (OFE) is more popular in the Asian countries.

Thus, the differences in the terms used should not be looked at as purely a matter of terminological exercise as they do reflect the relative importance of the perceived role of the phenomenon under varied socio-economic and environmental conditions. Therefore, the terms may not be used interchangeably.

If farming is seen as a sideline activity especially for operators with regular off farm occupation or inactive elderly operators who practice hobby and very marginal farming, PTFing would be a proper term.

If farming is less significant for farm based operators and non-farm employment is highly significant, then OFE is a more proper term. OFE are not necessarily used in the Asian context for farm operators, but also for landless agricultural labourers.

If both activities on the farm and off the farm are significant to the livelihood of the operator and his family, then, DJHing and RP would reflect better the reality of pluriactivity. Both terms implies the existence of dual activities which emphasize the gainful nature of the activities. MJHing although neutral to the implied significance of the dual activity, gives no hint of farming activities, whereas RP has the advantage in that it does pass this test by the use of the word 'rural'. Rural word implies agriculture as well as the broad rural development activities. If it is combined to the terms MJHing or DJHing, they would be equally satisfactory if deemed to be more convenient.

3.1.4 THE EXTENT OF RURAL PLURIACTIVITY

As discussed in earlier sections, RP in its traditional and contemporary forms is a world wide phenomenon, but there are difficulties in quantifying its extent. First, in some countries the statistics may not be available. Second, there are wide variations in its definition and the units of account used in statistics. However, the available information does give a clear indication of its wide existence and its growing importance. The OECD general report on RP (1978) concluded that the percentage of class II RPAs range between 40-60% in the OECD countries. The Arkleton Trust report (1985) estimated the percentage of total RPAs to be more than 50% around the 1970s. The EEC Farm Structure Survey in 1983, using a common definition across its member states, has revealed that the percentages of RPAs range between 20% and 43% (Commission 1986). A more recent study by the Arkleton Trust indicated that 62% of FHHs in 9 countries in the EEC were RPAs (MacKinnon et al., 1991). The following table summarises the known extent of RP and its growing importance in selected countries in the world.

The percentage of RPAs is generally on the increase in most countries or at least stable at the aggregate level and to a large extent at the individual level (Fuller 1976; Mage 1982). Mobility in RP is high, relatively large number of RPAs disappear and are replaced by others. Gasson (1983) has found that 50% of PTFs had changed hands within ten years. This suggests that the inflow of arrivals compensates or outnumbers the outflow of departures. Inter-class changes also take place between class I and class II.

In the DCs, labour saving technologies and continued development of computer-based technology and progress in industrialization in the LDCs would reduce employment opportunities (Arkleton Trust 1985). In the third world, although socio-economic development and industrialization is offering more OFE opportunities, it will not have the capacity to absorb the ever increasing force. Thus, in either case, it is unlikely that monoactivity would solve employment problems in the rural areas.

Table 3.1 The Extent of Rural Pluriactivity

Country	Year	% of RPAs	Country	Year	% of RPAs
USA	1974	45	Japan	1950	50
UK	1971	23		1986	85
	1979	27	Taiwan	1960	52
Norway	1959	61		1980	90
	1979	69	Jordan	1975	35
Italy	1979	38		1983	43
Germany	1975	55	Cyprus	1977	55
Austria	1973	54	Kenya	1977	51
Hungary	1980	40	Nigeria	1980	43

Sources: Arkleton Trust (1985), Hungary; Enyedi (1982), Jordan; DOS (1977, 1985), Japan; Kada (1982) and BAE (1988), Taiwan; Ho(1986), Cyprus; Upton et al., (1982), Kenya; Freaman& Norcliffe (1983), Nigeria; Okafor (1982).

3.2 CONCEPTS AND DEFINITIONS

3.2.1 DEFINITION

3.2.1.1 Definition; Controversial Issues

Since the 1930s, a part time farmer or pluriactive holder has been broadly defined as 'the farm operator who uses part of his time to farm his land' or 'the one who has some other sources of income'. Ever since, the definition has been debatable and so far there is no unanimity on a specific definition (e.g., Frauendorfer 1966, CEAS 1977, Fuller 1984). A number of issues are still controversial in the sense that either there are wide variations in the interpretations of the definition or adherence to them. The main controversial issues can be summarized as follows:

(a) Whether RP is related to the farm or to the farmer.

(b) Whether the time spent or income should be used as a criterion for RP.

(c) Whether the 'other sources' of income should be an earned income only, or unearned income should be taken into consideration as well.

(d) The minimum farming activities, number of percentage of man-days if the farm operator is to be considered a farmer. By the same token, the minimum off-farm activities if the farm operator is to be considered a monoactive or pluriactive holder.

(e) Whether the off farm work should be interpreted as off own farm, off all farms or alternatively off the agricultural sector altogether. Besides, whether non-farm work on own farms should be considered as off-farm work.

(f) Whether a landless worker who works on farms while assuming OFE is to be considered as pluriactive.

(g) Last but not least, whether the farm operator activities only should be considered or those of his or her spouse as well or more broadly, the activities of any member of the household.

The main arguments behind these controversial issues are the following (respectively);

(a) The distinction between part time farm (PTF) and part time farmer (PTFer) is important. All commonly accepted definition of a PTF is a farm with requirement less than annual work unit of labour. In this sense, 68% of farms in EEC (of Ten) were PTFs in 1985 (Commission 1989). In reality, this farm could be operated by a FTFer (Hill 1984b; Gasson 1988); he may be physically fully employed or he may be underemployed depending on, *inter alia*, the agro-climatic conditions of the farm, degree of mechanization, age and managerial skills. A minor alteration in cropping or number of animals could change a PTF into FTF (Jolliffe 1977). In some areas in Northern Ireland during the 1970s it was found that the supply of labour on farms were as high as three times the estimated requirements for the crops grown or number of animals (Furness 1978).

In considering PTFs, emphasis is laid on the farm's absorbtion and income generating capacities, the economic viability and land use. However, when considering PTFers, the emphasis is laid on their numbers and the occupations of the members of the farm household, their income needs and the necessity to absorb the surplus capacity in some other productive employments to support their income (CEAS 1977; Fuller 1976,1984; Christodoulou 1982; Gasson 1990).

(b) The debate on the use of the time and income criteria can be attributed to practical and policy considerations. Historically, It has been easier to collect data on the use of time (CEAS 1977). FHH members are less likely to be willing to reveal data on income; there is the additional problem of determining the degree of pooling of income. Unlike income, time is less amenable to fluctuations. Thus, it produces more reliable and stable classes which are more meaningful for international comparisons (Medland 1977).

From the social policy standpoint, it is more useful to highlight the percentage of farm and off-farm incomes and the number of RPAs who have other sources of earned income regardless of the hours of farming or OFE to assess the well-being of farmers and income distribution (Hill 1982; Commission 1986). However, given the difficulties and lack of confidence in income data collected via censuses, Cavazzani[2] has suggested that income measures might be more effectively collected, checked and employed in

[2] This suggestion was raised in the seminar on part time farming and their adjustment to pluriactivity in Yugoslavia in 1982 (Krasovec 1982).

special enquiries and studies.

(c) The argument for the earned income is that pluriactivity or MJHing by definition implies the existence of other activities in addition to farming. Besides, occupations other than farming, do not take unearned income into consideration. Few countries e.g., France and Italy and Norway consider unearned income such as pensions, rent and interest (Commission 1986; Symes 1982) but most countries consider the earned income only. Although in reality, the unearned income has a bearing on the well-being of farmers and their performance in farming (Hill 1982) and their capacity to invest (Bergmann & Laurent 1977). Although, the same argument can also be applied to other self-employed occupations, knowledge of all sources of income might be of importance to the policy makers.

(d) The number and the percentage of man days or the income derived from farming and non farming activities were adopted by Japan (and later by the OECD countries) basically to establish a dividing line among full time farming (FTFing), class I (which together represent the main living farms) and class II or the supplementary income farms (Krasovec 1982; OECD 1978) (This will be further clarified in a following section). Some countries such as the USA and Canada consider a minimum value for marketable output (OECD 1977,1978) while other countries rule out the farming activities in small farms which are considered to be statistically insignificant (Harrison & Gasson 1982).

(e) The specification of off own-farm work may be justified if most of the farms are owner-operated or if the non- agricultural employment and the inter-sectoral relationships are the main concerns. Off farm work therefore, would be interpreted as off all farms or off the farm sector respectively (Oshima 1986; Shand 1986a). Non-farm work on the farms, such as FHH's industries in south east Asia (Shand 1986a) and providing accommodation by FHHs in Europe, are widely considered as legitimate types of OFE. However, work such as retailing and some forms of food processing are easily overlooked.

(f) Regarding the question whether the employment off the farm sector by the

landless agricultural labourers is to be considered as a form of RP; the widely held view is that they are not RPAs. The issue of landless is very critical in the densely populated developing countries where OFE opportunities are limited (Shand 1986b). Although their work is vital to the farm population, and they face low income problems (e.g., their income in the UK was 72% of the average non-agricultural earnings in 1976 (Hill 1990)), its importance is comparable to the works of other labourers in any other para-agricultural activities. Thus, it is conventional for the universe of farm population for studying RP to be confined to holders of agricultural land or animals. The problems of the agricultural labourers should be addressed in the context of the general employment problems.

(g) The debate over the logic of taking the FHH as a unit of account is based on the theory of the farm household (FHH) which takes into account the consumption and production functions of the rural household. Drawing from the theory of the FHH, attempts were made to build econometric models which will be dealt with in more details in a latter section.

Using the FHH as a unit of account for welfare considerations was supported by a number of studies (e.g., Bryant, Bawand & Saup 1981; Buttel 1982; Cavazzani & Fuller 1982; Gasson 1983; Arkleton Trust 1985; Hill 1990). The adoption of this approach, however, even among those who advocate its use does not attract the same enthusiasm as noted by Fuguitt (1976). In most national statistics, only the farm operator is considered except in some countries such as in Japan (OECD 1977) and Taiwan (Ho 1986). However, the EEC will publish information of the total disposable income of FHH in member states in the near future (Hill 1990).

The main reservations for taking FHH as a unit of account were that considering all FHH members would inflate the extent of RP by considering all FHH members such as in the case of Japan and Taiwan (Krasovec 1982) but this could be the true reflection of reality (Arkleton Trust 1985). Others questioned the practical aspects such as the lack of stability of the farm household due to continuous changes in the family along the family cycle; the extent to which the incomes of FHH's members are pooled (CEAS 1977; Hill 1982 ; Shand 1986a); the difficulties in collecting data on FHH members' income or time spent on the farm (e.g., Bergman & Laurent 1977; Fuller 1983).

However, changes in the FHH composition might cancel each other on the macro level (Arkleton Trust 1985). FHH's members living with their families, specially in the non-western context, even if they refrain from pooling their income, are helping their families by not depending on their present or future income such as in Jordan.

A case was made to take the farm operator and his spouse in the survey of the Commission (1986) as they are more stable unit in the western context. This was supported by Gasson(1988), who found that considering the income contribution of members, other than the operator and his spouse, has made only a little difference. Only Austria considered the farming couple in 1970 as a unit of account, and partly by Germany for income criterion only (OECD 1978). The importance of considering the family as a unit of account however, cannot be ignored if the extended type of family is prevailing such as in Japan (Kada 1982). This is not only because it is the spending unit, but it is also the social unit as well within which smooth transitional movements can be achieved by its members.

3.2.1.2 Towards a General Definition

The statement "the lack of common definition makes it difficult to assess or to compare the extent of RP within and among countries" can be found in most RP studies (e.g., CEAS 1977; Frauendorfer 1966; OECD 1978; Fuller 1984; Commission 1986).

Gasson (1977) indicated that it might be argued that the problems raised by RP in different countries or in different regions of the same country are varied to the extent that there is little point in trying to collect comparable statistics. The task is to arrive to a few aspects which are internationally and generally applicable and acceptable. Avoiding unduly rigid definition and recognition of the difficulties of having a consensus on a single definition was supported by the conclusions of the seminar on RP held in Yugoslavia (Krasovec 1982).

The difficulties and lack of consensus in having a common definition are comparable to the controversies over having a common definitions for multi-dimensional socio-economic concepts such as small farmers and poverty. In this light, a number of multi-disciplinary researchers in a workshop held in the Centre for European Agricultural Studies, Wye College in 1977 have proposed a general definition which says

" RP is the practice of a farm based household in which one or more members are gainfully engaged in work other than or in addition to farming the family's holding "(CEAS 1977). The definition put no minimum levels of farm or off-farm works or incomes to be determined according to circumstances, as these may differ among countries .

Thus, in studies of RP, it is vital to have a clear statement of the adopted definition, so findings can be studied on comparable basis.

3.2.2 CLASSIFICATION SYSTEMS

Differences in the definition of RP have been echoed in differences in the classification of pluriactive holders, namely the use of time or income to measure RP, and the unit of account whether the farm operator is to be considered only or the farm household. However, the following classification which was initially adopted by Japan has been adopted partly by the OECD organization and is increasingly used by countries and by researchers. Together with the general definition proposed by the CEAS workshop (1977), the incidence and the extent of RP would be easier to assess and comparisons among countries would be more meaningful.

OECD has classified farm operators into the following: First, the FTFer is the operator who devotes less than 10% of his work time to OFE or derives up to 10% of his income from OFE. Second, the RPA class I /type I is the operator who devotes 10-50% of his time or derives 10-50% of his income from OFE. Third, for the RPA class II/type II, the proportions are 50-90%.

The main differences among countries with respect to classification other than the variations already mentioned in the previous section are the following:

First, most OECD countries rely on the work time. The World Census of Agriculture conducted by FAO in 1980 also classifies farmers according to their main occupation. Few countries such as Germany consider both time and income simultaneously, in a double yardstick to achieve more scrutiny. Norway considers both time and income but independently, thus they produce two figures for RP whereas Japan considers income criterion only (OECD 1978).

Second, the farm operator is the unit of account for most OECD countries except Japan,

which considers the farm household. Austria consider the farm labour force. Germany considers the farm income for the farming couples but work time of the operator only. New Zealand considers farms and classifies them into commercial and non-commercial (OECD 1978).

Third, in the USA and Canada a range value of sales (in USA $ 50-2499) and minimum man days are adopted to rule out the non-commercial operators. In some countries such as in Finland 150 man days which are more than 50% of the work time in a year is used as a dividing line between class I and class II due to the short growing season (OECD 1978; Arkleton Trust 1985).

Fourth, the retired farmers might be excluded or dealt with separately such as the OECD study (1977,1978).

3.3 MODELLING PLURIACTIVE FARM HOUSEHOLDS

Taking the FHH as a unit of account is based on the theory of the farm household (FHH). Kooten and Arthur (1985), Chalamwong (1986)[3] and Singh (1988) have reviewed some of the literature from Western and Asian countries regarding taking into account the consumption and production components of the rural household, drawing from the theory of the FHH, to build econometric models.

Nakajima (1986) made a step further by attempting to integrate the characteristics of the FHH as an economic entity into an economic theory of the decision-making behaviour of the FHH based on subjective motivation. The FHH is looked at as a "complex of the (1) farm firm, (2) the labourer's household and (3) the consumer's household ", and whose behavioral principal is utility maximization. He identified several differences between the FHH in one hand and the three economic entities respectively; (i) both carry out production activities but the FHH (must) utilize its own labour, (may) consume part of its production while the firm does not, it (FHH) maximizes its own utility while the firm is a profit maximizer, (ii) both utilize household labour but the FHH makes decisions about how and what to produce to obtain mixed income (FI and OFI), the labourer's household seek wage income, (iii) the FHH is engaged in production activities, thus its utility function contains household labour while the consumer's household does not.

However, since the FHH might not consume part of its production, hence it is essentially the "complex of the farm firm and the labourer's household". Accordingly, the decision-making process must simultaneously take into account the kinds of considerations applicable to each of these normally independent economic units. Multiple objectives, choices between leisure and on and off-farm income, present and future income, retained and marketed output and uncertainties regarding family illness, plant diseases and low market prices affect choices such as type of technology, investment and

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[3] In Kooten and Arthur model in Canada, OFE participation was found to decline by net worth, experience (age), livestock enterprise and geographical location. There was no significant relationship with wage rates suggesting that OFE is largely explained by necessity and OFE opportunities.

In Chalamwong model in Thailand, OFE also appeared to decline by land ownership, but FHHs appeared to respond positively to changes in OFE wage rates. Contradictory results were found in Thailand also by Reif and Cochrane (1990) regarding wages off the farm. Education and hence investment in human capital and transportation were found to be much more crucial.

purchased inputs add to the complexity of the responses of the FHH (Singh 1988).

Based on labour economic literature, Harrison (1984) and BAE (1988), (and similarly by Nakajima (1986)) suggested that the labour-leisure trade-off model and the concept of the margin can be employed as an analytical framework to analyze the decisions to undertake OFE, as Figures 3.1 and 3.2 show. OFE is assumed to be available at a fixed wage rate to the labour supplied by the FHH. Thus, as Figure 3.2 shows, the marginal return is horizontal while the upward (positive) slope of the OFI in Figure 3.1 indicates that OFI increases as FHH members allocate more time to the readily available OFE. As the utility curve (a single curve of the indifference map) shows combinations of (FE and OFE) work and leisure among which FHH members are indifferent, they will have to decide how much time is to be devoted to FE, OFE and leisure. Ideally, this will be based on the marginal net return from FE and OFE.

The farm return curve in Figure 3.1 is concave to the origin due to the diminishing marginal returns as Figure 3.2 shows. Up to L0, the marginal return from farming exceeds the rates of wages of OFE. Thus, FHH members work exclusively on the farm. Beyond the point A, OFE is more rewarding as the marginals in Figure 3.2 show. The amount of OFE depends on the capacity and preference towards income and leisure. At B, utility is maximized as the marginal substitution between work (FE and OFE) and leisure is equal to the marginal OFI. Thus at point A and B, the marginal returns from FE, OFE and the marginal evaluations of leisure in terms of income forgone are all equal. Therefore, FHH members devote 0-L0 time for farming, L0-L1 time for OFE and the time left beyond L1 to leisure for a total income of 0-Y1, of which Y0-Y1 from OFE.

This simplified model does not take into account the above mentioned factors which might influence decisions. For example should interest in farming be low, the marginal return curve would fall more rapidly to a lower level (Harrison 1984).

Figure 3.2 was also employed by Bollman (1982b) to explain the decision to allocate time between FE and OFE. Farm operators face a downward-sloping demand curve (D-D1) for FE in his farm. They also face an OFE demand for labour which he assumed to be readily available and hence perfectly elastic (ZZ1). Thus, operators face a kinked demand curve for labour. Those with a demand for FE that cut the vertical axis above ZZ1 are to be called exclusively farmers. If the opportunity for off-farm wage rate

Figure 3.1 On & Off Farm Total Returns & Labour-Leisure Tradeoff.

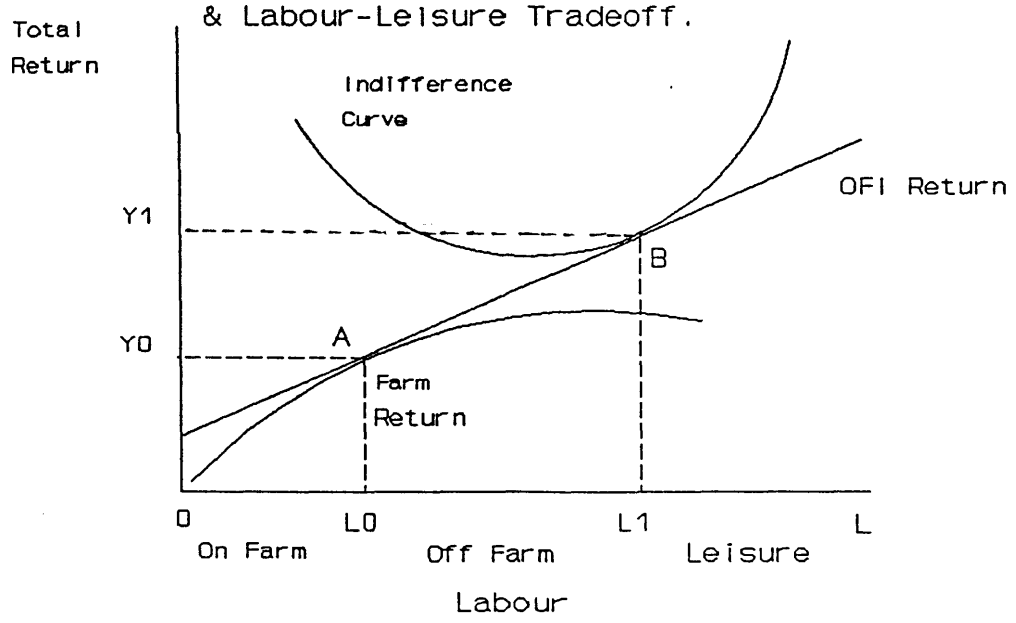
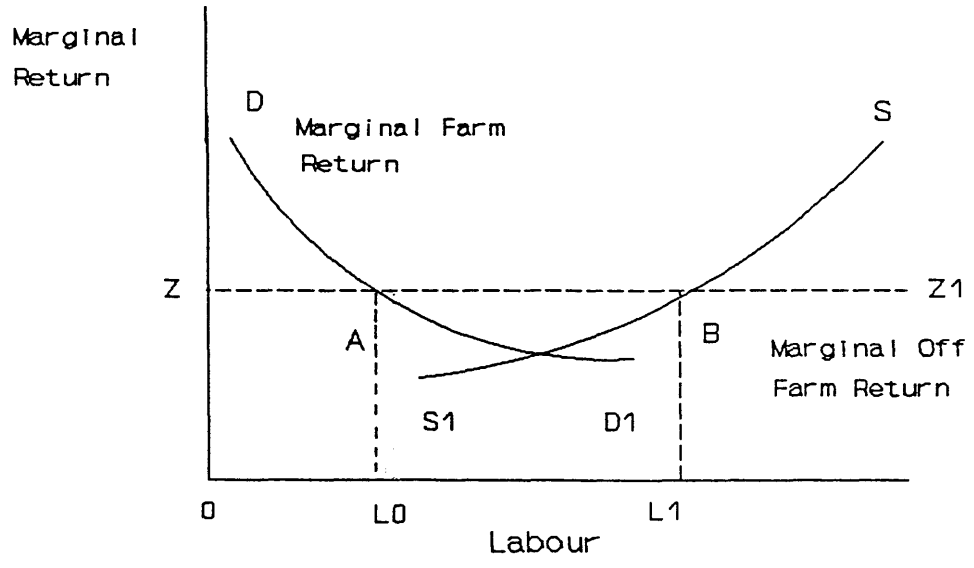


Figure 3.2 On & Off Farm Marginal Returns & Labour-Leisure Trade-off



Sources: Figures 3.1 and 3.2 (Harrison 1984), Figure 3.1 (BAE 1988 and Figure 3.2 (Bollman 1982b).

is everywhere higher than the return to FE, then the operator may not be solely involved in FE (assuming economic rationality) as OFE would be more remunerative between L0 and L1 where the kinked demand curve of labour (DAB)is in equilibrium with the supply of labour S-S1 (Bollman 1982b).

Reviewing the literature, many researchers questioned whether the decisions are taken exclusively by farm operators and whether profit maximization is the FHH objective or even the prime one in the short or long run. The objective for FHHs is suggested to be a composite of considerations such as capital gains, securities provided by the combined activities, traditions, leisure, rural life and other non-pecuniary objectives which vary historically and spatially (e.g., Gasson et al., 1988; Reinhardt & Barlett 1989).

Therefore, the FHH allocates labour, land and other resources between farm and non-farm activities to maximize its well-being or its utility. As possibilities or circumstances might dictate, adjustment can be facilitated for one or more member of the family to take OFE either temporally or permanently (CEAS 1977; Kada 1980).

3.4 MOTIVATIONS FOR RURAL PLURIACTIVITY

There are wide variations in the motives for rural pluriactivity between and within countries. This might be attributed to the heterogeneity of environments, e.g., low agricultural potential arising from small farms, short growing seasons, technological development, social values, stage of development and OFE opportunities. This also might explain the diversity of types of RPAs and types of OFE.

RP is born out of necessity (Gasson 1977). With the passage of socio-economic development stages, other factors are increasingly playing their part. Thus diverse, short and long term considerations enter on the decision-making of FHHs.

From the economic standpoint, motives can be described as 'push' and 'pull' factors, a hypothesis proposed by Fuguitt[4] (1959) cited by Frauendorfer (1966). Thus motives can be broadly classified into 'necessity' as they are related to marginal opportunities and 'choice' which are oriented to opportunity maximization (Fuller 1976). To these factors, social commitment should be added as it is strictly, neither necessity nor a choice. The existence of any of these motives does not rule out other motives, as RP is more likely to be the product of the compound effect of several motives.

3.4.1 NECESSITY FACTORS

Necessity oriented motives arising from marginal opportunities were (and still they are in the LDCs) the primary motive for RP. The economic imperatives push the holders to supplement their low income by taking OFE. This was supported by empirical data from different parts of the world. Low farm income was mentioned by two thirds of DJHers in France and Ireland (Commission 1986), 74% in Japan (Kada 1980), 55% in West Germany (OECD 1977).

These motives are more dominant at the early stages of economic development as it was the case in Japan during the 1950s and 1960s (Kada 1980; Oshima 1986) and at present in the developing countries specially the highly populated, land- scarce countries such as India, Thailand and Indonesia (Shand 1986a). They are also vital in

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[4] Fuguitt (1959) Part time farming and the push-pull hypothesis. *American Journal of sociology.* 64(winter): 375-379.

times of low farm income such as in the USA in the 1920s and 1950s and in times of economic recession and growing unemployment such as the case during the great depression in the 1930s in the USA (OECD 1977). They are also important at the early stages of the family cycle to enable the FHHs to cover the financial requirements for raising children and to cope with the high costs of education (Gasson 1983).

Under these conditions, OFE is 'supply' determined by the necessity factors which can be attributed to the small sizes of farms, limited opportunities and marginality of farming, the techno-economic considerations. Based on the subjective equilibrium theory of FHH mentioned above, the decision to allocate labour time depend on the marginal returns of OFE and FE. If the former is higher, then the operator may not be solely involved in FE (assuming economic rationality) as OFE would be more remunerative (Bollman 1982b; Harrison 1984).

3.4.1.1 The Small Sizes of Farms[5]

Farms of RPAs were found to be predominantly small by the standards of the particular country. Unless the agricultural conditions are highly favourable, farm incomes are typically low and are not sufficient to provide stable and an adequate standard of living specially for young farmers with children in schools (e.g., OECD 1978; Arkleton Trust 1985; Commission 1986). However, farm income might support FHHs if intensive, irrigated farming and improved technology are adopted. Specialization in the production of vegetables, or flowers under glass in the Netherlands (OECD 1978) and in Hungary where 50% or more of the vegetables, orchards produce, vineyard produce, pork, wine and eggs are produced in small farms (Enyedi 1982).

Thus as expected, in virtually all studies, an inverse relationship has been observed between the extent of RP and the size of farms. 85%, 84%, 75% and 32% of RPAs were found to operate a holding of less than 5 ha in Italy, Greece (Commission 1986) Spain (Arnalte 1982) and the UK (Gasson 1983). In 9 countries in the EEC, 57% of farms were less than 5 ha in 1983 (Commission 1989). In Hungary, the average private PTF was 0.7 ha (Enyedi 1982). 78% of all farms were less than one ha in Indonesia

[5] The inadequacy of farm size to measure farming activities or potential is discussed in details in a later section (Annex 3.1).

(Bandiyono & Conroy 1986). In Taiwan, 44% of all farms were less than 0.5 ha (Ho 1986). In Japan, two thirds of farms were less than one ha (Oshima 1986). In Jordan 70% were less than 5 ha in 1983 (DOS 1985).

This negative association does not imply that the phenomenon is strictly confined to small farms, but it simply shows that the extent decreases with the increase in farm size. In the USA, though the farm structure is quite favourable and the average size of farm is relatively large, more than 50% of farm operators were RPAs (OECD 1977: Arkleton Trust 1985). In the UK, a U shaped association has been observed, in the sense that the percentage of RP decreases with the increase in farm size to a point but starts to increase, though to a lesser extent, while approaching the largest sizes (Harrison 1975;Gasson 1983). The same shape of distribution was observed in Spain (Arnalte 1982) and in Germany, France and Denmark (OECD 1978; Commission 1986).

3.4.1.2 Marginal Opportunities

The motivation for RP is more evidenced where the agricultural resource base is marginal. An attempt was made to identify the areas of low economic opportunities by cross tabulating regional locations against the agricultural conditions. As expected, the remote areas with unfavourable agricultural conditions were the areas with the lowest economic conditions and where RP can play a positive role (CEAS 1977).

Limited production capacity and marginality of farming might be attributed to unfavourable climate, topography and soil conditions. In Northern Europe such as in Finland and Norway and in Canada, the growing season is short due to long and harsh winter season, thus a symbiotic relationship was developed between farming and some non-farm activities such as fishing and forestry work (Wietfeldt 1976; Hackman 1976; OECD 1977).

The reverse is also true in the mountainous areas in the Mediterranean countries where the winter season is short and the long and hot dry season does not allow growing more than one crop in addition to the slope and soil considerations. These conditions are conducive to monoculture RP such as the case in Spain, Italy and Cyprus. Fruit growing is predominant (e.g., olives, grapes, stone fruits and citrus) and livestock raising is potentially limited (Arnalte 1982; Peroni 1982; Commission 1986; Ansell et al., 1984).

Therefore, RP is a logical adaptation to the marginal opportunities in farming due to the economic and ecological conditions.

3.4.1.3 The Techno-economical Considerations

The continuous technological improvements and development in mechanization have led to steady increases in agricultural supply of output, whereas farm income, for farmers with limited farm resources, is decreasing in real terms (Commission 1986). The growth of output has outpaced the growth in demand due to low population growth, if any, in the developed countries and low income elasticity of demand for agricultural products. In the UK the real value of total output (that is after allowing for inflation) declined from the early 1970s and was little different in 1988 compared to 1951 (Hill 1990). The costs of production have kept increasing without concomitant increases in real output prices. Real (aggregate) farm income in the UK was little different in 1989 compared to 1938 (Nix 1990). Returns on farm resources, therefore, have tended to be lower than returns in other sectors of the economy even with a steady increase in labour productivity and continuous decline in labour force. As expected, disparity of reward between the farm and non-farm sectors is more salient in the small sizes of farms (Ruttan 1959; Schultz 1968).

In addition, the financing of modern technology and land ownership becomes increasingly beyond the capacity of the average farmer. Wide fluctuations in the ratio of input-output prices and the low mobility of agricultural resources to adjust to the changing conditions have contributed to the destabilisation of farm income (OECD 1975,1978). With these inter and intra-sectoral disparities of factor reward and the lack of stable source of income, OFE has become an important supplementary as well as reliable source of income. At the same time, keeping the land provides additional security for the pluriactive FHHs against inflation and unemployment.

3.4.2 THE CHOICE FACTORS

These factors are applied to holders who are privileged to have the choice to take an OFE or otherwise to be a RPA. Personal aspiration and long term concerns of the FHH are central in the decision-making units even if immediate and short term necessity is the driving force to RP. Thus, they are an expression of the desire of landowners for opportunity maximization (Fuller 1984) in the short as well as in the long term perspectives.

Choice factors are more applicable in countries in the later stages of economic development such as the OECD countries or among the better-off landowners in the developing countries. These factors are either pecuniary or non-pecuniary factors.

3.4.2.1 The Pecuniary Factors

(a) The Pull Factors

The rapid industrial development, the decentralization of industry and urbanization seen in many countries in the last few decades have demanded a continuous flow of labour from the agricultural sector. Therefore, the availability of OFE in the industrial sector and the expanding service sector within a commuting distance, in addition to the spread of transportation networks and cars, have played a major role as a catalyst in pulling farmers to quit farming altogether, or perhaps more wisely, to take an OFE while retaining the land to be farmed on part time basis. This was supported by the reports of OECD (1977,1978), the Arkleton Trust (1985) and the Commission (1986) and Shand (1986).

(b) Capital Gains

Due to the persistence of inflation and the high demand pressure (for farming, residential areas and urban development) on the generally limited supply of land, the prices of land are increasing ahead of the inflation rates (e.g., in the UK and in Jordan). Therefore, combining a supplementary and reliable OFI with the sense of security

provided by the land as an anti-inflationary asset, the potential financial gain through land speculation are strong motives for RP (Jolliffe 1977; Brun 1977; Ansell et al., 1984; Oshima 1986; Gasson 1988). Hill (1982, 1987b, 1990) has suggested that the capital gains on assets owned by farmers in addition to the current income should be considered in measuring the well-being of farmers, as farmers may be actually better off than is widely believed. Capital gain is argued to be a form of income; with high assets values, borrowing capital when needed is more accessible. However, the case for capital gain is less valid where attachment to the land is a strong tradition, though it may have a social implication in terms of higher status to the land owners over tenants or landless labourers.

In urban-fringe areas, the possibility of expanding the agricultural land area of individual holdings is limited due to the high land prices, therefore, the operators have to seek OFE to supplement their income while retaining the land for capital gains and last resort employment (OECD 1978; Commission 1986).

3.4.2.2 The Non-pecuniary Factors

> Keynes quoted by Rostow (1971) has said :
>
> "If human nature felt no temptation to take a chance, no satisfaction (profit apart) in constructing a factory, a rail-way or a farm, there might not be much investment merely as a result of cold calculation".

Recent studies have revealed that the push and pull factors are not the only factors behind RP. Indeed they may not be the primary explanatory factors especially in the affluent societies. Non financial factors are gaining ground and outbidding the supply and demand considerations. Although not necessarily, it is natural for a human being, should his needs be satisfied or taken for granted, to look further for recognition, status and satisfaction.

High expectations generated by the awareness of standards of living through mass media sources especially the TV have produced new outlooks. Life style, recreation and enjoying living in the countryside in a healthy environment away from the less secure life in the congested cities are more frequently cited or the first to be cited especially by the

entrant RPAs. In Cyprus, personal satisfaction was the first motive to be cited by 39% of RPAs (Ansell et al., 1984), this was supported by Arkleton Trust (1985) and more recently in the UK where living in the countryside and job satisfaction were given utmost importance and mentioned by 80% of the respondents (Gasson 1988).

The growing interdependence between the farm and non-farm sectors have brought farmers into closer contact with urban life, norms and values (Giorio 1974). The reverse is also true, rural areas are becoming closer to urban dwellers who are becoming increasingly aware of the problems attached to the life in the urban centres. The availability of services are increasingly making the rural areas more attractive for living as well as for decentralizing of industries.

The combined effects of these changes are manifested by the increasing occupational mobility by the more educated young FHH members, males and females with new attitudes towards work and leisure, shorter work time, more rewarding work and increased participation in labour force have led to diversified sources of OFE and OFI.

3.4.3 THE SOCIAL FACTORS

The **inheritance system** is the paramount factor among the social factors as RP is found to be associated with the generational shift (Commission 1986). Ansell (et al., 1984) found that 36% of RPAs in Cyprus inherited the land or received it as dowry while they were already regularly employed full time off the farm. The same trend was observed in Germany (OECD 1977). After the death of the of the FTFers, their young, educated sons with outward orientations, regularly employed off the farm do not take over. Their high expectations and aspiration can hardly be achieved merely in a farming occupation. However, with a long term perspective, knowing the socio-economic advantages of the farm, they quite rationally retain their OFE and become RPAs.

RP is necessitated by the growing population pressure on land and subdivision of holdings on inheritance which increase man /land ratios. Adult members of FHHs are bound to be unemployed or underemployed even in peak seasons. The surplus labour has to seek employment elsewhere in the economy. This is specially valid in the heavily populated countries in Asia (Shand 1986a).

Personal attachment to the land are strong traditional reasons for holding a piece of land such as the case in Japan (Kada 1980). In Germany, 58% of RPAs with holdings less than 5 ha have mentioned tradition as a basic reason for RP (OECD 1977), in Cyprus 19 % of RPAs stress the importance of traditional commitment (Ansell et al., 1984). In Northern Ireland, owners of small farms, though unable to farm it, were very reluctant to sell the family farm (Furness 1978).

Similarly, the old traditions of total commitment to farm work, when it was considered to be disgraceful for a farmer to work off the farm (Weitfeldt 1976; Hackman 1976) is giving way to more liberal orientation by the more educated, open-minded new generations.

It was noted that the lower social status in being a mere factory worker or otherwise a farmer plays a role in RP. In France, it was found that a RPA has a higher status than an industrial worker (Bergman & Laurent 1977; Brun 1977).

To conclude, RP is influenced by a combination of push and pull factors. Push factors are related to over supply of FHH labour arising from limited farm resource base and unfavourable agricultural conditions. Thus, economic necessity is the primary motive for RP in most of the (densely populated) LDCs and areas with less favourable conditions in the Dcs. It is increasingly less valid in the context of the DCs where the pull factors are essentially the main motives. However, technological development and worsening terms of trade in the DCs increased the threshold of economic viability which require lower labour/land ratios are pushing farm operators either to quit farming or to diversify their sources of income. Other socio-economic factors are gaining importance in playing a role in promoting RP, notably life style, inheritance, capital gains, attachment to the land and increasing occupational mobility of the younger and more educated generations.

3.5 CHARACTERISTICS OF RURAL PLURIACTIVITY

3.5.1 CHARACTERISTICS AND TYPES OF PLURIACTIVE FARMERS

3.5.1.1 Characteristics of Rural Pluriactive Households

As mentioned earlier, the farm household is an economic production unit (the farm and labour) as well as consumption unit. It can also be looked at as social unit (the farm family) and as psychological unit (members of the family). Action in one unit would have an impact on the other units of the system, which is in constantly changing environment (FAO 1986).

Profound changes are constantly taking place in the social, cultural and economical aspects of life. Higher levels of educations and skills have brought about fundamental changes in the social structure, norms of behaviour and values. The authoritarian-extended type of family is giving way to the independent-nuclear type of family in most countries. Japan is an exceptional case in the developed countries where the extended system of family and the social ties are still strong (Kada 1980) enough to withstand the otherwise overriding changes. These changes have resulted in a growing disassociation within the farm family as a social unit and as a production unit. Further changes have taken place in attitudes toward work and leisure, aspirations and the role of the family members (Giorio 1974; Arkleton Trust 1985). Under these conditions, better educated and young members of the farm households are becoming more mobile and more independent socially and economically (Gasson 1974; Arkleton Trust 1985).

The OECD general report (1978) has concluded that the average age of RPAs is lower than that of FTFers and they tend to have more children. This might be explained by their high financial requirements either to cope with the high costs of living for their families especially for education or although to a lesser extent, to finance their ever increasing farm investments. These conclusions have been further supported by the recent report of the Commission (1986) and Gasson (1988). Ansell (et al., 1984) has found that RPAs in Cyprus had the youngest age structure and the largest number of dependants with 60% having at least four dependants. Education and training were positively associated with pluriactivity. Similar findings were observed in Nigeria (Okafor

1982). In Canada, it was found that the incidence of pluriactivity had increased with increases of age up to 45 years but thereafter, started to decline (Bollman 1982a). The same can also be said about Italy ,but up to 55 years of age (Commission 1986). In Japan, RPAs were found to be younger, more educated, skilled and more likely to be the males (Oshima 1986). In France, the wives of the younger farmers were increasingly participating in OFE (Bel 1987). In Taiwan, RPAs were found to be younger and more educated. Females however, were the more likely to take OFE in low and semi-skilled jobs. It was suggested that RP among other factors, has contributed to the reduction of the population growth by 1% during the 1960s. The increased participation of the more educated females in OFE leaves less time for child rearing (Ho 1986; Chalamwong 1986), an observation which has a positive demographic implication in the developing countries.

3.5.1.2 Types of Pluriactive Farmers

The wide variations in FHHs' characteristics, socio-economic conditions, causes and motives of RP are mirrored in different types of RPAs. RP was generally seen as a marginal and transitional phenomenon as noted by Brun (1977) who indicated that over the generations, RP was a phasing out stage in the socio-economic development process which might support the transitional theories suggested in earlier research work. However, reviewing the vast and more recent literature from different parts of the world, has suggested that RP is a persistent phenomenon (CEAS 1977; Arkleton Trust 1985).

Different types of RPAs were proposed based on past, present and future status, background, motivations, objectives and commitment to farming (Fuller 1976; Mage 1976; Kada 1980; Gasson 1988). These types can be generally grouped as follows:

(a) The transitional pluriactive.
(b) The persistent pluriactive.
(c) The hobby Pluriactive.

(a) The Transitional Pluriactive

This group would comprise the entrants (including the aspiring) into farming with or without farming background and the leavers who are phasing out of farming. Jolliffe (1977) has indicated that the agricultural development and advisory services in the UK experience has shown that the small RPAs have rarely fulfilled their aspirations to move up the farming ladder. This might be explained by the trend of capitalization of farming, the rising costs of inputs and high prices of land (OECD 1975). Mage (1982) has found that less than 5% have used RP as a means for leaving agriculture but much more (20%) have used it as an entrance into FTFing between 1966-1976 in Ontario, Canada. Bollman (1982) has noted in Canada that, although RP might facilitate entry to FTFing, movement into and out of FTFing is largely direct rather than via RP. Gasson (1986) arrived to the same conclusion in Britain. Transitional leavers, however, are more likely to be found in the less favoured areas where the opportunities are limited in both farming and non farm activities (Brun 1977; Arkleton Trust 1985).

(b) The Persistent Pluriactive

The persistent RPAs are those who are stable in their decision to continue their rural pluriactivity because agricultural conditions are favourable and it is felt that pluriactivity is advantageous to their well being. A sideline business in farming would fall under this type as it expresses commitment to a profession rather than a hobby or amateur activity. Fuller (1976) has found that 44% of RPAs in Hastings County in Canada were persistent. Mage (1982) has found that 31% of all farms in Ontario, Canada who have continued farming between 1966-1976 were RPAs. Considering the rapid decrease of farm units, (over 80% east of Ontario since the 1950s according to Mage (1982)), these figures indicated the significance of persistence of RP.

However, the persistence of RP might take different forms according to e.g., location, resource endowment and stage of economic development (CEAS 1977; Fuller 1984). Due to the dynamic nature of the phenomenon, its stability is more evident on the macro level while the individuals involved are changing places (Medland 1977; Gasson 1977; Brun 1977). Thus at the micro level, RP would be taken as a transitional

phase for some RPAs as was suggested by the presence of entrants and leavers in the typology proposed by Fuller (1976), Kada (1980) and Gasson (1988).

(c) The Hobby Pluriactive

Hobby RPAs who take refuge from the congested and unhealthy urban centres and can afford the privilege of having a second residence in the more remote rural areas are a growing type of RPAs in the DCs and some areas in the LDCs. Farming is not an end and FI is negligible (at least in relative terms), as they farm merely for the pleasure, prestige and the satisfaction of living in a peaceful environment, open space for children and for spending time more constructively (Troughton 1976; Mage 1976; Gasson 1988). Yet, they are still close enough to have access to the facilities of the cities as they are more likely to be in the urban fringe areas.

While enjoying living in the countryside, land is looked at as a secure investment for the future and an object for land speculation (Troughton 1976, Jolliffe 1977)). Capital investment was considered to be very important by one third of respondents in the UK (Gasson 1988). Although they are not qualified to be considered farmers *per se*, they constitute a significant number in many DCs and among the better-off in the developing countries. Mage (1976) has found in a study in Canada that one third of his sample were hobby farmers, similar findings were also observed in Australia (Schwazweller 1982). Christodoulou (1976) has suggested that the hobby farmers should be excluded from benefiting of agricultural polices. Yet, their contribution to environmental objectives cannot be ignored. Indeed, their holdings in some cases, technically wise, may serve as a good demonstration for the neighbouring areas (Jolliffe 1977). The same positive effect was observed in Jordan by the researcher.

3.5.2 TYPES OF OFF-FARM EMPLOYMENT

The pluriactive farm operators have a wide range of occupations and they may assume every possible occupation. However, marked differences were observed between class I whose main income is from farming and class II whose FI is supplementary. The variations of OFE reflect the differences in their capabilities and qualifications such as age, education, training and skills which suggest that they constitute a valuable asset to the economies (e.g., Harrison 1975; OECD 1978; Arkleton Trust 1985; Commission 1986; Shand 1986a; Gasson 1988).

Dual and MJHing however, are not confined to RPAs. The phenomenon is also widespread in the secondary and tertiary sectors. However, farming was found to be the most likely second occupation to be taken by the DJHers, while having two occupations within the service sector ranks second (Alden & Spooner 1982).

RPAs can be dual or MJHers. Upton (et al., 1982) has indicated that many RPAs in Cyprus were MJHers. In Nigeria, it was found that 43% of RPAs had more than one job in addition to farming (Okafor 1982).

OFE is mostly undertaken by the farm operators and the young educated male members of the families. Wives and females in general are increasingly engaged in OFE. This has been observed in the USA (OECD 1977), France (Bel 1987), Denmark (Commission 1986) and in Taiwan (Ho 1986).

Socio-economic developments, rapid technical change and higher levels of education and skills, decentralization of industries, the availability of OFE within a commuting distance and the availability of efficient transportation network have brought about changes in the types of OFE. Thus, dynamism is a another salient feature of pluriactivity (Fuller 1976).

Different forms of RP have developed over time and under varied socio-economic conditions. Attempts were made to trace the evolution of various forms of RP in the various stages of capitalist development. The emergence of rural industries in the 17th century offered permanent and temporary employment to rural families which led to the division of labour within the rural families and new forms of RP emerged and coexisted with other forms typical of previous stages (Sivini 1976). Linkages were also sought with

stages of economic development[6]. OFE has developed from largely subsidiary activities on other farms and supply determined with low return in the early stages of economic (including agricultural) development into more regular types with the gradual expansion of the secondary and the tertiary sectors.

3.5.2.1 Classification of Types of Off-farm Employment

OFE can be classified according to a variety of considerations:

(a) according to nature of OFE whether traditional, symbiotic, agricultural or modern, contemporary types.

(b) according to location of OFE whether farm-based or off the farm and in either case whether agricultural or non- agricultural. Non agricultural work off the farm can be further subdivided into local and urban work.

(c) according to regularity or duration OFE whether it is casual and seasonal or permanent, regular either wage or salaried employment.

(d) according to type of employer whether self-employed or wage and salary work.

(e) according to degree of skill whether unskilled, semi-skilled or skilled.

according to productivity whether OFE is productive or non productive.

(a) the traditional symbiotic work of combining farming with forestry work and fishing was widespread in countries where the growing season is short such as in Finland, Norway and Canada (Hackman 1976; Symes 1982; Mage 1982; OECD 1978). In Norway traditional work in the local primary sector has changed to urban-industrial jobs (Symes 1982), similar changes have been observed in Canada (Bollman 1982a).

(b) agricultural work can be either own-farm-based such as grading and retailing or on other people's farms on wage or contract basis such as tillage, pruning, spraying, harvesting and fencing. This type of work was found to be prevalent in southern Italy (Cavazzani 1976; Peroni 1982), and in southern Spain (Arnalte 1982). It was particularly

[6] The stages employed in this scenario were similar to the stages of economic growth proposed by Rostow (1971). These being the traditional society, the preconditions for take-off, the take-off, the drive to maturity and the age of high mass consumption, are essentially based on the capacity of societies to absorb new technologies.

important to class I RPAs such as in Cyprus (Ansell et al., 1984).

Non-agricultural farm-based work is also more important for class I RPAs such as providing accommodation, sporting and recreation in the UK (Gasson 1988) and in Switzerland and Austria (OECD 1978). However, for Western Europe as a whole, a recent data suggest that farm-based diversification is not of major significance (Mackinnon et al., 1991). In Japan, put-out work was important in the early stages of industrial development (Kada 1986) and it is also important in Taiwan (Ho 1986) in addition to crafts work in Southeast Asia (Shand 1986a).

(c) casual and seasonal work is prevailing among class I RPAs in the DCs and in the LDCs in Asia and Africa. This type is more likely to be complementary to, rather than competitive with farming. In Japan OFE has gradually changed from casual to full-time regular work (Kada 1982).

(d) self-employed work is more flexible for adjusting work time especially for class I RPAs. It is often suitable for old farmers who are more likely to have the capital, possibly for vertical integration as an outlet for marketing farm products or agricultural services such as machines services, fertilizer distributors such as in Ireland (Commission 1986). Old farmers may also lack the necessary qualifications for salaried work (Gasson 1983). Self-employment is of major importance in some countries such as in the UK where two thirds or more of RPAs were in this category (Harrison 1975; Gasson 1988). In Indonesia, 50% of RPAs were self employed (Bandiyono & Conroy 1986). In Cyprus 33% of all RPAs were in this category (Upton et al., 1982) but 62% of class I (Ansell et al., 1984). In France, Belgium, and Ireland less than one third were in this category (Commission 1986), and in Japan 26% (Kada 1980).

(e) semi-skilled and unskilled occupations are common in the less DCs, but they are also significant in some DCs. In Germany 39% were in this category, 32% in Ireland, but 22% in the UK. In Italy one third were farm workers (Commission 1986).

(f) non-productive OFE, or the odd jobs were found in the populated developing countries where the opportunities are limited in both the farm and non-farm sectors such

as in Nigeria where 43% of OFE fall in this category, and in many heavily populated Asian countries (Islam 1986).

3.5.2.2 Commuting to Off-farm Employment

Decentralization of industries and the development of transportation facilities were primary factors for promoting RP. This was most evident in Japan and Germany (OECD 1977). In Austria, Finland and Germany 70-85% of RPAs are commuters (OECD 1978; Arkleton Trust 1985). In the UK, RPAs in the less favoured areas were found to be most likely to travel considerable distance (Maclean 1977). RPAs were found to be willing to commute greater distances to main jobs and to better paid jobs and 68% of RPAs commute up to 16 km (Gasson 1983). In Cyprus, RPAs commuted up to 34 km and they were more likely to commute the greatest distance in the mountainous area (Upton et al., 1982). In Germany, a radius of 20-60 km was observed (OECD 1977). Improvement in transportation facilities and the increase in car ownership have contributed to the expanding of commuting distances around the urban and industrial centres. Commuting however, is costly, time consuming and tiresome for the commuters and a waste of resources economically and environmentally at the macro level.

In brief, varied levels of socio-economic developments and changes in characteristics of RPAs are reflected on varied types of OFE historically and spatially. Extending services beyond main urban centres and efficient transportation networks had promoted decentralization of economic activities. Diverse types of employment were opened to rural population within a commuting distance. Consequently, OFE are gradually changing from casual, traditional and local to regular, modern and metropolitan employments depending on the pace of socio-economic developments in the concerned country.

3.5.3 TYPES OF ADJUSTMENTS

Taking an OFE or otherwise making a decision to be a RPA requires making adjustments by the FHHs on the pattern of labour allocation and/or on the cropping pattern. Some RPAs are capable of adapting themselves according to circumstances, but professional advisory services may be required to help others not only to a convenient adjustment but also to one which ensures that the use of their resources (labour, land and capital) is rational and technically sound (FAO 1986) especially where increases in agricultural production is a policy objective.

3.5.3.1 Adjustments on Labour Allocation

This type of adjustment depends on the size, structure and age distribution of the family and would include:

(a) working harder and longer during week ends, holidays, paid annual leaves during peak seasons such as in USA and Japan and resorting to irregular shifts (OECD 1977; Kada 1986). In most Mediterranean countries, adjustment can be made by using the plenty of time available daily due to the short working day such as in Italy (Cavazzani 1976) and Jordan.

(b) obtaining help from other family members largely the female members such as in dairy farms in Yugoslavia (Krasovec 1982) and in Italy where the females contribution helped to free males for OFE (Cavazzani 1976) or in large farms in Wisconsin in the USA (Kada 1980).

(c) using hired labour or seeking outside help from neighbours. In some countries such as Cyprus, it was found that RPAs resorted less to hired labour (Ansell et al., 1984).

(d) having a self-employed job is an ideal type of OFE to be combined with farming due to its flexibility in time allocation. This is an important type of adjustment in the UK where about two thirds of RPAs were self employed (Harrison 1975; Gasson 1988). In

Indonesia, 50% of RPAs were self-employed (Bandiyono& Conroy 1986).

(e) adopting labour saving technology which is an important type of adjustment in the DCs. In the USA where the farm structure is highly favourable, heavy machines permit the operators to perform their farm activities such as cereal production whilst having a regular OFE (OECD 1977). In Japan with the smallest sizes of farms in the DCs, the availability of relatively cheap machines capable of performing practically all farming activities in rice production allows the active members of the families to take OFE (Oshima 1986).

3.5.3.2 Adjustments on the Farm

Adjustment of the type of farming is basically shifting from labour intensive types such as dairying, growing vegetables into enterprises with low labour requirements which are concentrated in short periods. Enterprises preferred by RPAs included beef cattle and cereals in the USA (OECD 1977), fruit trees such as citrus in Spain (Arnalte 1982), vines and stone fruits in the highlands, citrus in the coastal areas in Cyprus (Ansell et al., 1984), rice production in Japan (OECD 1977) and vines in Italy (Saraceno 1988).

This tendency towards less labour intensive forms of production, however, does not rule out intensive types of farming on PTFs entirely, but sizes of farms or herds would be smaller. In the Netherlands, RPAs with small holdings grow vegetables and flowers in green houses or in open fields, and 28% of them have dairy farms (Commission 1986). In Yugoslavia, RPAs were found to be able to continue dairy farming by getting help from other family members specially from the wives (Krasovec 1982).

In summary, DJHing requires adjustments to be made by the farm household on the pattern of labour allocation and/or on the cropping pattern. The type of adjustment is influenced by *inter alia*, the farm size, type of enterprise, place of residence and types of OFE. The types most observed in the empirical studies are; working harder and longer, getting family help, resorting to custom work and /or mechanization and adopting less intensive types of farming with low labour requirements to be performed in shorter periods.

3.6 IMPACT AND POLICY IMPLICATIONS OF RURAL PLURIACTIVITY

Rural pluriactivity has important implications for agricultural and social policies. The awareness and thorough understanding of these implications are indispensable to the government authorities for comprehensive analysis, identifying alternatives, assigning priorities and for adopting sound and coherent policies and well-founded plans within overall socio-economic, environmentally sound development strategies.

The attitudes of the governments toward RP vary according to its perceived merits and dismerits compatible with the broad objectives of the country concerned. Policies therefore, are decidedly different according to circumstances. Indeed, RP in economically marginal areas or in time of economic recession has different implications and calls for different sets of policies than would otherwise be in different situations (CEAS 1977; OECD 1978).

Laurent (1982) has attempted to group the OECD countries according to their past and present (1982) attitudes towards RP. At one end of the continuum were the countries in which attitudes were always favourable such as Austria, Norway and Switzerland due to prevalence of the mountainous areas, short growing season and /or for the promotion of tourism. Japan has moved toward more favourable attitudes following the land reform, while Germany has moved in the same direction at the end of the 1960s to promote rural development. The USA have remained indifferent while the Netherlands at the other end of the continuum has persisted in its active discrimination policy against RP as it is mainly concerned with restructuring farms into viable farms in accordance with its interpretation of the EC common objectives (Laurent 1982).

In Southeast and East Asia, only Taiwan has been successful in following the Japanese example by adopting almost identical policies toward RP (Ho 1986). More recently, in the late 1970s Korea is heading in the same direction (Park 1986). However, data for the significance of OFE in rural Asia is limited and very recent (Shand 1986a).

In the East European countries, with the limited private land, the scope for RP was limited. However, production from private plots of collective farm members and of non-agricultural workers amounted to 34% of gross agricultural production in Hungary

in 1980, 31% in Rumania and 21% in USSR in 1975 (Enyedi 1982). In Poland, 54% of family farms were pluriactive in 1970 (Arkleton Trust 1985). Although RP was not encouraged in socialist countries, there were no active negative policies against it. However, the recent historical developments towards free market economies, private land ownership and the widespread socio-economic problems are more likely to promote RP.

3.6.1 IMPACT ON INCOME AND INCOME DISTRIBUTION

Off-farm income is significant to the livelihood of RPAs, though this does not rule out the importance of other considerations. Empirical data from different parts of the world in the last two decades give an indication of the major contribution that OFI makes to total income levels. While a search for more income in the developed countries may have been a cause of many FHHs to become pluriactive, income necessity is by no means to any cause.

Harrison (1975) has found that the OFI in the UK exceeded FI for 68% of RPAs and was equal to FI for additional 12%. After a decade, this was supported by Gasson (1988) who found that OFI was the main source of income for 64% of RPAs. On average, 78% of earned income for wage workers in Ireland was an OFI and their average income was 32% higher than the FTFers income. In Germany, RPAs class II had higher income than FTFers and class I and it was comparable to the income in the non-farm sectors (Commission 1986). In Canada, more than 50% of total net income of farm operators came from OFI (Bollman 1982a). In Italy, 60-70% of the RPAs income was derived from OFE (Commission 1986) and in Veneto area in Italy, RPAs income was found to be higher than the FTFers income (Boatto & Defrancesco 1984). The percentage of OFI of RPAs in Sweden increased from 37% in 1966 to 68% 1n 1980 (Arkleton Trust 1985). In Norway RPAs' income was found to be higher than FTFers (Symes 1982; Arkleton Trust 1985). In France, 40% of income per farm was derived from OFE (Arkleton Trust 1985). In a more recent study conducted by the Arkleton Trust in 1987, which covered 24 areas in 12 Western European countries, it was found that FI contribute less than 50% of income in 53% of farms and only 38% of farms were operated by full time FHHs with OFI contributing less than 10% of income (Mackinnon 1990).

In the UK Gasson (1988) has found that 38% of RPAs have made a loss or no income from farming largely among the smallest size groups. Contribution to the fixed costs, the compensation of the pecuniary factors and the capital gains might explain the ability of RPAs to withstand losses. RPAs might have different cost account system with respect to taking into account the opportunity costs of labour and own capital. They might accept lower return to farm labour to absorb economic downturns (Reinhardt & Barlett 1989). Furness (1982) pointed out that the requirement of net income to reward the operator for management or to provide a return on his capital in tenant-type assets has little relevance to small farmers, of which many were with OFI (Furness 1982).

OFI in Japan represented 45% of the annual FHH income in 1960 but 75% was derived from OFE in 1979 (Kada 1982). In 1972 the per capita disposable income of the farm population surpassed that of the non-farm families and this has continued in the 1970s largely due to OFI (OECD 1977; Kada 1980). In the USA in the 1970s, in a review of literature, it was found that about 50% of operators and spouses worked off the farm and the aggregate OFI exceeded FI in eight of ten years in the decade (Bryant et al., 1981). This was supported by recent literature review as it was noted that in 1978, over than 70% of farm units provide less than 50% of households income (Reinhardt & Barlett 1989). Small farms tended to be relatively free of debt; on average 85% of the FHH income was OFI and two thirds of them worked more than 200 days annually. In 1976, 15-20% of small farmers were below the poverty line, of which 90% were FTFers (Bryant et al., 1981). This was later supported by Buttel (1982) who indicated that 70% of the total income of the small farmers was derived from OFE in 1981.

In Nigeria, the average total income for RPAs was found to be more than three times the average income of FTFers while at the same time they operated less than half the average FTFs, being 1 ha against 2.1 ha (Okafor 1982).

These findings were further supported by a recent study on OFE in Southeast and East Asia. It was concluded that the extent of the reliance upon the OFE and OFI has been substantially underestimated and the gap between the income of FTFers and RPAs was bridged to a large extent by the OFI (Shand 1986a).

Relatively the total income of the medium-sized farms was found to be lower than the smallest and the largest farms, as the labour requirement of the farm is almost equivalent to one unit of labour. This gave little room for the operator to manoeuvre

his labour time between FE and OFE to improve his income (Hill 1987b; Gasson 1988). Buttel (1982) has found that the medium-sized family farmers tend to have the lowest levels of OFI.

These findings suggest that RP has an important policy implication and would be an effective element in anti-poverty strategy and in bridging the intra and inter-sectoral income disparity. Small farms might be synonymous with low farm incomes, but with the back-up of OFI, they cease to be necessarily low income farm households.

3.6.2 IMPACT ON AGRICULTURAL PRODUCTION

An efficient farmer is one who efficiently allocates his land, capital and human resources among all competing enterprises on and off the farm by equating the marginal value product of each input with its price (Bollman 1982b). In general, it has been concluded that land and capital productivity of RPAs is lower than the productivity of FTFers, while labour productivity is higher (e.g., OECD 1978; Arkleton Trust 1985; Commission 1986).

However, there is no consensus in the literature about the expected relationship between efficiency and RP. Harrison (1977) has warned of measuring the farming efficiency of RPAs too narrowly and too hastily without considering the length of occupation of farms, the time required for adaptation and the kinds of adjustment undertaken by the farmer. The evaluation should not be merely on the basis of economic analysis, the non-financial objectives and the long term capital gains should be considered especially if agricultural production is not the main concern. The size of farms, cropping pattern and the type of RPAs should be taken into consideration.

Differences exist between RPAs class I and class II, the former being more dependant on farm income have much in common with FTFers. Their OFE is irregular and generally complementary to farming, therefore, their land productivity is higher than the productivity of RPAs class II such as in Poland and Yugoslavia. In Japan, it was found that land, capital and labour productivity of class I (1973/74) was higher than the productivity of class II and FTFers as well (OECD 1977). This was further supported by Kada (1980) for the case of Japan, and in Italy (Boatto & Defrancesco 1984). Age

and education seem to be the main explanation in addition to financial capability and innovativeness.

Productivity may also differ according to the type of enterprise. In Germany it was found that land productivity of RPAs class II was higher than class I in cereals and potatoes production and vice versa with respect to milk production (OECD 1977) where the family members in the main living farms are more involved in dairying enterprises.

The lower land productivity is not necessarily due to lower efficiency, since RPAs especially class II tend to adopt less intensive type of production. It follows that the productivity of land per ha will be lower but the output per unit of labour will be higher as it was concluded by the reports of OECD (1978), Arkleton Trust (1985) and the Commission (1986). Thus the RPAs are able to derive a higher income per working day on the farm as well as the OFI.

Productivity and production would not be reduced if OFE is seasonal or if labour requirements are low enough so the farm can be run on FT basis and indeed, they may be higher if the OFI is invested in the farm and improved technology is adopted (OECD 1978; Arkleton Trust 1985).

Against this background, the numerical importance of RPAs is not mirrored in their share of production due to their small sizes of farms and adoption of less intensive types of production, the general lower land productivity and the high percentage of personal consumption. Variations exist across different countries and classes according to socio-economic settings. Data for different countries also varies widely over time.

In the UK (1982), 67% of holdings were less than 16 ESUs, of which almost half were <4 ESUs, but they represent only 19% of the farm business activities measured in aggregate SGMs while 11% of farms of 40 and over ESUs accounted for 54% of the SGMs (Furness 1983). Given the findings that more than two thirds of PT holdings were in the size groups less than 16 ESUs in 1983 (Gasson 1990), these figures suggest that the share of RPAs in farming activities in 1982 was about one sixth of their numerical importance. They also accounted for about one sixth of the agricultural area in 1983/84 (Gasson 1983). This was further supported by Hill (1990) who noted that the holdings of <4 ESUs accounted for 44% of holdings but 3% of the total SGMs in 1988, against 12% and 56% respectively for holdings of 40 ESUs and over.

In Germany, the percentage of RPAs was 55% in 1975, the area occupied

represented 27% of the total agricultural area, but the market share was 21% in 1973-74 (OECD 1977). In Norway, RPAs represented 67% of total farmers but they occupied 34% of the agricultural area (OECD 1978). In Canada, they produced about one third of all food (Bollman 1982a). In Spain, they represented 48% of farmers but 23% of the area in 1972 (Arnalte 1982). Japan as usual is an exceptional case; RPAs class I represented 20% of farm households, but 40% of the area and 50% of production, while the RPAs class II represented 66% of farmers, 45% of the area but 29% of production (Kada 1982). Hungary is another exception, RPAs in 1980 occupied 11.5% of the cultivated land but 34% of the gross production and about 50% or more of orchards, grapes, wine, egg, pork and 45% of all vegetables. These results were achieved by adopting very intensive types of production on private plots of collective farms and by selecting outputs which have a very limited land demand. The percentages of gross agricultural production of RPAs were 31%, 21% and 16% in Rumania, USSR and Bulgaria, and more than one third to two third of potato, eggs and poultry (Enyedi 1982).

Personal consumption represents a high percentage of production. In Austria, 80-99% of vegetables, fruits and eggs produced are consumed by RPAs (OECD 1978). In Jordan the proportions of operators who did not market any produce were 48% and 39% in 1975 and 1983 respectively (DOS 1977,1985)[7]. In Italy the proportion was 35-45% for farms less than 3 ha, in Yugoslavia, the percentage was 48% of livestock production in 1977 (Arkleton Trust 1985). In Nigeria, most farms were not commercial (Okafor 1982).

It follows that the significance of RP, however, lies in the numbers of people involved rather than their contribution to farm output (Gasson 1990). The findings that RPAs are not primarily production oriented can cause them to be viewed negatively in situations where policy requires higher levels of production.

Increased production may be either for the local market or for exports and is often a prime objective when agricultural conditions are favourable and intensive types of farming under irrigation are economically more feasible, such as in Cyprus (Ansell et al., 1984).

Land should be used according to its capability to satisfy the local demand for

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[7] These operators are assumed to be RPAs. The percentage of consumption for operators who marketed part of their production is not known.

agricultural products in the concerned country. RPAs are said to be less responsive to the agricultural policies. In Japan, the government policy is to increase the production of wheat, vegetables, fruits and animal products but most RPAs replace winter crops by rice production (Kada 1982). This tendency was due to the low dependence on FI which might accrue from intensive farming, low labour requirement for rice production and the availability of wide range of effective and relatively cheap machines, with which the available elderly members of the families can easily fit with, less risks involved and the heavily subsidised rice prices.

In the developing countries facing shortages of food, abandoning the land partly or entirely by absentee landowners such as in Nigeria (Okafor 1982), and in Jordan carries harmful implications. Off-farm activities that compete for the FHHs members time and interest was considered as one of the main reasons of poor results of projects financed by the World Bank (Blackwood 1988).

In contrast, in countries facing a surplus of food, the general tendency of RPAs toward extensive types of farming contributes to the reduction of unwanted surpluses such as from milk production, a labour intensive type of production which RPAs normally avoid. Thus, RP will be in line with the governments policy as RPAs market less of their production and hence their small share in price support reduces the burden on the government budgets (OECD 1978 ; Arkleton Trust 1985 ; Commission 1986; Craps 1977).

Rural pluriactivity should make adjustments in the price polices more feasible as the levels of prices are broadly related to the costs of production under the least favourable conditions; thereby ensuring larger margins for the large producers. Small RPAs produce and market less than large farmers and depend less on the farm income and could therefore remain viable on lower prices. Large farmers are more cost effective and too could survive on lower prices (Cavazzani 1977; OECD 1978; Arkleton Trust 1985). An example is provided by Japan, where part of the price support for rice has been capitalized into the value of land. Higher land prices resulted in higher costs, as income support was based on costs of production (and parity index), which then feed back into the support price, resulting in a cycle of price and costs increase (BAE 1988). Hill (1990) has come to a similar conclusion as increased levels of support for agriculture are translated into higher land prices. He also contended that the wealth of operators,

should be considered in assessing their eligibility for income support. He questioned the policy of income support through the farming process. Direct payments and incentives to promote environmental activities is suggested as an alternative policy (Hill 1990).

3.6.3 IMPACT ON LAND STRUCTURE AND LAND USE

Rural pluriactive farms have often been seen in the EC Countries as an obstacle to achieving economically efficient and technically sound farm structures which are conducive to specialized commercial farming (Arkleton 1985).

Historically, the adoption of a common agricultural policy (CAP) was among the steps listed in the Treaty of Rome (which laid the foundation of the EEC in 1958) to establish a common market. The main objectives of the CAP were to increase the efficiency of agriculture; to ensure a return on resources and living conditions comparable to that obtained in the non-farm sectors; to stabilize markets; to promote self sufficiency and to achieve reasonable prices for consumers (Hill & Ray 1987). To achieve these goals and following the Mansholt plan in 1968, the EC countries in 1972 adopted three directives namely, 159, 160 and 161 to improve the farm income through modernization and restructuring farms into technically efficient and economically viable units. The modernized farms were intended to emerge gradually to minimize the hardships of the transitional periods to the outgoing farm operators in the restructuring process. This was to be achieved through socio-economic advisory, vocational training and direct payments (e.g., OECD 1975; CEAS 1977).

The EEC policies were translated into the exclusion of RPAs (especially class II RPAs) from benefiting from financial assistance such as grants and soft credits. A precarious economic position would promote mobility of land and speed up the process of restructuring of agriculture. However, price subsidies were applicable to all farmers which was linked to the typically low marketed output of RPAs (OECD 1978; Arkleton Trust 1985). Restrictions on applications for investment aids by RPAs were relaxed in 1989 and aids were enhanced for farm diversification including tourism, crafts and farm-based manufacturing and retailing (Arkleton Trust 1990).

Germany has adopted less restrictive policies. In 1968, investments aids, direct payments and advisory services were applicable to RPAs under certain conditions. The

main aims were to improve the conditions of life in the countryside and to preserve and develop the natural environment (OECD 1977). Regional development programs have helped to create substantial job opportunities in the rural areas where RP was widespread (Commission 1986). From 1984, Germany has softened the conditions under which assistance and advice were made available to class II RPAs (Arkleton Trust 1985).

The ability of RPAs to maintain their control on land as they are less dependent on FI is clearly in contrast with farm restructuring policies. In Northern Ireland, alternative sources of income and OFE, though limited, enabled FHHs to operate farms below viability threshold (Furness 1978). By reducing the mobility of land, the supply of land would be lower and hence the price of land would be pushed up. Thus landowners would be tempted to use land for speculation rather than means of production, which makes the enlargement of farms financially prohibitive by the professional farmers (Gasson 1977; Bergmann & Laurent 1977; Craps 1977; Arkleton Trust 1985).

However, depopulation of the rural areas, urban unemployment and environmental considerations have contributed to the awakening of concerns over the consequences of the rapid restructuring of farms in the European countries (Arkleton Trust 1985). In the UK, it was felt that this rapid progress was greatest where it was least necessary (Furness 1982). The merits of structural reform in the areas where RP is common was questioned by the OECD report (1978). High unemployment, desertification or wholesale rural depopulation and high budgetary cost of agricultural support have made the promotion of further farm amalgamation no longer valid (MacKinnon 1990).

In 1985, the structural policies of the CAP were reviewed. The revised objectives were: restoring to market forces as a guide to the level of agricultural production, maintaining viable rural communities and protecting and conserving the environment. Thus employment and incomes in rural areas and ecological concerns were more pronounced (Commission 1989, 1990). The justification of protecting agriculture has changed due to; reduction in number of farmers; surpluses of production of some products, high levels of self-sufficiency; decline and diversification in rural economies; rising concerns and political powers of environmentalists and consumers. Measures to reduce surplus production include; set-aside arrangements, and conversion of production to non-surplus products and cessation of farming. More funds were allocated to regional

development programmes in rural areas and structural funds (Commission 1990; Arkleton Trust 1990).

The USA have left farm restructuring to the market forces due to their favourable farm structure. Thus, its policies were therefore, neutral towards RPAs (OECD 1977). In Japan, the drastic land reform in the post World War II period and the government policy to increase food production and to secure a farm income comparable to other sectors had left the government with no choice other than to heavily subsidise farm products without discrimination against RPAs. The government policies for the development of services including effective transportation networks and decentralization of industries have promoted RP (OECD 1977).

In the Asian context, it was concluded, in a workshop held in Thailand in 1986[8] that access to land and more egalitarian system in land structure are prerequisites for sound rural development programs. Agricultural development based on capital intensive technology is not sufficient as an anti-poverty strategy as it was evidenced in the case of the Indian Punjab (Chadha 1986) and in the Muda project area north of Malaysia (Shand 1986a). It was even felt that it has created negative effects not only by the displacement of the labourers but also through the reliance of small farmers on mechanization by custom work from the large land owners (Islam 1986).

Reynolds (1975) has noted that research findings from countries such as India and Colombia has indicated that the small farms apply more variable inputs including labour per ha of land and achieve higher land productivity, while large farms using capital intensive technology achieve lower land productivity but higher labour productivity. Similar findings were reported from Jordan were land productivity was found to be higher on small farms in an irrigated area (Abu Oaf & Georiades 1978).

In brief, where the objectives are to promote agricultural production, new cropping patterns and technical and economical efficiencies, the evidences suggest negative policy implications towards RP. On the other hand, where the objectives are to stabilize rural population, reduce unemployment and to preserve the environment, the evidences suggest positive policy implications towards RP.

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[8] The workshop was held under the auspices of the National Centre for Development Studies, Australian National University in Canberra.

3.6.4 ADOPTION OF INNOVATIONS AND CAPITAL INVESTMENT

As mentioned earlier, RPAs are heterogeneous in their background and objectives, and hence, simple pattern of behaviour regrading improved technology cannot be observed.

On one hand, it can be argued that RPAs are more exposed to urban contacts, rely more on mass media sources of information, have more access to credit facilities due to their secure income and the availability of the land as a collateral, therefore they are in a better position compared with the average farmer to finance the purchase of improved inputs and machines and to be less averse to the risk associated with the adoption of modern agricultural methods.

On the other hand, it is also possible to argue no less convincingly that RPAs; due to their typical small farms and hence the diseconomies of scale, the limited time available to them, the lack of keen interest in farming as they rely heavily or perhaps totally on OFI and for them, the farm is merely a place of residence and due to their propensity to cultivate marginal land with limited opportunities for farming, RPAs have no incentives to adopt improved methods of production and to be innovators.

In the USA, RPAs were in better position to obtain credit because of having several sources of income (Cavazzani 1977). With their viable farms, they use their higher income to buy more and newer machinery than similar FTFs. The excess in investments is justified because of the need of reliable machines to cope with the workload in the limited time available to them[9]. Some farmers, especially RPAs class I, use their machines for custom work (OECD 1978). Over-investment is also reported from Japan where a wide range of machines is available for practically the entire farming activities in rice production (OECD 1977) including PTFs (Oshima 1986). Some farmers, however, may over invest regardless of the economic considerations but simply to take a pride in their modern farms or equipment (Gasson 1974 ; OECD 1978). Some RPAs use less fertilizers and other improved inputs, not because they have less propensity to adopt improved methods but simply due to their inclination to farm their land less intensively (OECD 1978).

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[9] In Jordan, a RPA was asked to justify having a tractor when custom work is far more economical, he said that 'being your own master helps in carrying out the farm work in the most convenient time'.

RPAs in Italy were found to be more innovative because they have access to more developed cultural and technical socialization (Peroni 1982). The levels of mechanization and land improvement were found to be higher on PTFs (Cavazzani 1976; Boatto & Defrancesco 1984). In the Netherlands, 40% of RPAs adopted modern production methods and they specialised in intensive production of flowers and vegetables; their diversified income enabled them to assume the high level of risk associated with this type of production (Commission 1986). In Germany, RPAs class II over-invested in mechanization, the FTFers ranked second and RPAs class I were the lowest (OECD 1977).

In Canada, the development of superior quality of beef production was financed by RPAs which filtered down to commercial operators (Hutchison 1976). In France, RPAs were found to be more innovative for some forms of production such as raising horses or rabbits (Brun 1977). In Hungary, RPAs occupied 11% of the total cultivated land , but they produced 34% of the gross agricultural production (1980) because they cultivated their small farms with an average of 0.7 ha very intensively and they relied on cooperatives to secure the improved inputs. Therefore, they were clearly more developed than the state farms (Enyedi 1982). Poland, with less developed agriculture is looking to Hungary as an example to be followed by the RPAs; the lack of modern machinery is considered to be the main reason for the lower economic efficiency on small farms (Klodzinski 1987).

Lerner[10] has noted that some of the greatest advances in agriculture throughout European and North American economic history have been made by (hobby) RPAs. In Jordan, RPAs were the first to introduce modern technologies such as greenhouse and drip irrigation[11]. These two developments were a turning point in the development of agriculture in Jordan.

In contrast, in the UK RPAs do not seem to have a prominent role in technical advances. It was found that 59% of RPAs had not made significant capital investment

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[10] Professor Lerner A, was a participant in the Rural Geography Symposium held in the University of Guelph in Canada in 1976.

[11] Drip irrigation was first adopted by a member of the Royal Family in Jordan who was RPA and progressive farmer according to an ex president of the Agricultural Engineers Syndicate who was himself a RPA pioneer in adopting modern technologies.

over a five year period (Gasson 1983). RPAs were found to have little formal agricultural education, they did not take up as much credit and hence they were not able to make use of modern technology (Gasson 1977). In Norway, RPAs invested less in machines and farm building (Symes 1982). In Cyprus, Ansell (et al., 1984) found that investment in machinery, irrigation equipment and greenhouses were higher on FTFs but there was some evidence that RPAs invested more heavily on mechanised equipment per ha although their efficiency of resource use was found to be lower.

Extension services are important to provide guidance for RPAs to use their farm, scarce labour and capital resources to their best effect. Many writers have advocated that information on the possible adjustments, OFE opportunities, training facilities on and off farm works should be made available to RP families (Fuguitt 1976; OECD 1978; Arkleton Trust 1985; Commission 1986).

Gasson (1983) has found that less than 50% of RPAs interviewed in a study in England and Wales had ever consulted the advisory services. However, the reports of the OECD (1977,1978), the Arkleton Trust (1985) and the Commission (1986) have indicated that RPAs are generally ignored by the extension services, which are more oriented towards the FTFers. The same attitude was observed in Finland (Hackman 1976). Referring to the heterogeneity of RPAs an Austrian extension agent was quoted as saying 'each holding is a case on its own' (Krasovec 1982). The type of advice needed and the conflict in work time between the extension agents and clients RPAs were said to be the main reasons, as the RPAs are normally away from their farms during the working time (Commission 1986).

A seminar on the application of a global management approach to pluriactive farms was held in Germany in 1986 in cooperation with FAO. The approach was essentially a (a) thorough investigation of the farm household resources, problems and basic or strategic objectives. (b) identifying possible options and (c) to work out a solution jointly by the farm family and the extension agent either to reorganize the farm enterprises or to take OFE (FAO 1986). The advisory services in the USA have been more active in producing leaflets and in guiding the RPAs for better utilization of their resources (Krasovec 1982). Austria and Germany have also made more efforts in this respect (Arkleton Trust 1985).

In summary, the dependency on primary sources of information and the tendency to adopt (and invest in) modern farming methods, are associated with factors such as the type of RPAs, the importance attached to OFI, the agricultural conditions, the market situation, inputs and outputs and types of OFE, the age and the level of education. On the issue of wether RPAs are generally more innovative than FTFers, the evidence is contradictory, but there is some evidence that many breakthrough innovations in many countries were actually undertaken by individual RPAs.

3.6.5 IMPACT ON EMPLOYMENT

Continuous technical change and the rapid pace of mechanization in the DCs have increased farm productivity with a reduced labour requirement. Hence, the released labour will have to be put into productive use. Ruttan (1958) has indicated that the impact of economic development is transmitted to farm families through the markets of inputs, farm products and labour. The ability of farm families to respond to these markets depends on the quantity and quality of their resources land, capital and labour. Labour as expected is what the (small) rural farm families can afford to offer (Ruttan 1958,1984). The efficiency of the labour market is an important factor in explaining the differences in farm income, although OFE may be available in the urban areas, the holder may be unskilled or travel cost may be high (Jansma et al., 1981) or transportation network may not be available such as in South Korea pre the 1980s (Park 1986) and in many countries in Asia (Shand 1986a). Development of transportation services and training therefore is essential for RPAs if they are to be competitive in the labour market.

As mentioned earlier, the decision to allocate the farm operator's (or the FHH members') time, assuming economic rationality, depends on the marginal opportunities between FE and OFE. If off-farm wage rate is higher than the marginal return to FE, then the operator may not be solely involved in FE as OFE would be more remunerative (Bollman 1982b).

RP permits more flexible and efficient use of the family labour resources especially the use of the female and elderly people with very low or zero opportunity costs such as in Japan (Kada 1980) and in many parts of the world.

Farming activities on small farms can be carried out while at the same time assuming a regular OFE. This is specially true in the mountainous areas such as in Yugoslavia (where a typical fruit trees holding requires about 50 man days of labour (Krasovec 1983)), or in the Mediterranean Coast in Spain (where 90% of farms are PTFs averaging 1 ha under citrus farming and requiring about one month of working time in a year (Arnalte 1982)). Labour is required on such farms in certain peak seasons and the holders can easily cope with by using paid holidays, working harder in a short time, getting help from the family members or hiring a labour for a short period.

Adjustments can also be made in larger farms by adopting less intensive type of farming and reliance on labour saving technology, such as cereal production in the USA and rice production in Japan (OECD 1977). The released or surplus labour could be absorbed off the farm. This would improve the FHH income and the labour force would be used more productively.

OFE can be undertaken locally or in the urban centres. In Cyprus, 80% of OFE are found in the rural areas (Ansell et al., 1984). Local OFE is generally lower in income but it has the advantage of directly contributing to rural development, while the urban occupations have higher incomes and more potential of possible multiplier effects through spending part of the income for purchasing consumer goods and inputs of industrial origin, services and custom work. This will contribute in generating more employment opportunities in the local areas (Bunce 1976, Krasovec 1977).

Jansma (et al., 1981) has noted that the growth of OFE was faster in the rural areas in the USA during the 1960s with concomitant increases in per capita income and a decrease in outmigration of young adults. It was found that 78% of the new jobs were taken by the local residents and 11% by the returning migrants and the industrial centres attracted labour within 50 miles radius. The growth of RP was more closely related with the availability (demand) of OFE rather than the 'push 'factors related to the quality of the agricultural resources (Jansma et al., 1981). In the EEC of Ten, more jobs were created in the rural areas such as in Italy where 60% of the new jobs were created in the rural areas in the 1970s (Commission 1989). Therefore, the growth of RP was associated with the expansion of non-farm employment in the decentralized industries or services in or close to the rural areas.

Cavazzani (1976) has indicated that RPAs in the central areas in Italy were

exploited by the decentralized industries because they were not unionized. This was supported by Agostini (1977) and by the OECD (1988) for Italy, Japan and some other countries. Brun (1977) has suggested that the RPAs are manageable and accept low wages because they are not committed to the labour work. Agostini (1977) has suggested that industries depending on RPAs may suffer from absenteeism in Italy.

In contrast, in the USA, the OECD (1977) has indicated that they tend to be better workers and more mechanically-oriented. RPAs were regarded as reliable workers in USA, Austria, Ireland and Italy and absenteeism was not a significant problem (Gasson 1977). The same was observed in Yugoslavia, where RPAs introduced the traditional values of hard-working farmers to their OFE (Arkleton Trust 1985). In Spain (Arnalte 1982), France (Brun 1977) and Germany, some industrial enterprises encourage RP by renting land to their workers (Frauendorfer 1966).

These discrepancies might be related to the socio-economic environments. In one hand, after all, the lower wages in the rural areas is one of the main impetuses to the movement of the industry into the rural areas. The lower wages are compensated by the low costs of living in the rural areas. In the USA, in 1968 it was found that the cost of living in the rural areas is 85% of the cost in the urban centres (Bryant et al., 1981). It is to be noted also that part of rural industrialization was household enterprises such as craft work in Thailand (Charsombut 1986)) and in Japan 'put out' works (Kada 1986). On the other hand, the low wages might be warranted by the relatively old labourers with low levels of education and skills. Training therefore is essential for RPAs if they are to be competitive in the labour market. Labour would be cheaper if only available in slack seasons (Binswanger 1983). Social and cultural values towards work (dedication, hard work..) might be also a partial explanation.

In times of economic recession, such as during the great depression in the USA in the 1930s, RP contributed to reducing the hardships of FHHs by producing part of their food and diversifying their incomes (Frauendorfer 1966). The same implication can be said about the heavily populated and land scarce countries such as Japan in the post-second World War period and South East Asia (Kada 1986).

3.6.6 IMPACT ON SOCIO-POLITICAL ENVIRONMENTS

Brun (1977) indicated that the uneducated working class is the lowest social stratum in France. Being RPA (worker-peasant) was a means of preventing, rather than conducive to, economic and cultural proletarianization as suggested by Cavazzani (1976) i.e demoting them to propertyless wage earners who live merely by the sale of their labour. He also indicated that they act as landowners rather than farmers; RPAs oppose the control of land use and land consolidation. This alignment and a situation of landed peasantry provide a stable political entity and becomes an important element in the embourgeoisement process (i.e elevating workers to the middle class) which has socio-political consequences (Buttel 1982; Fuller 1983). By slowing the pace of centralization of capital in agriculture, the polarization of the agriculture class structure is weakened, which will have the effect of reducing the social base of agrarian discontent and radicalism (Buttel 1982).

Kada (1980) indicated that a further element in the success of the land reform is that absentee land ownership was not permitted, an important impediment to agricultural development in the LDCs. He also (Kada 1986) indicated that the most important political and economic impact of OFE is that a large proportion of the population has some direct tie to the land and hence shares a political interest in rural policy (Kada 1980). The influence of the Japanese farmers, the majority of which were RPAs (85% in 1986) and especially the rice growers lobby, was strong enough not only to secure price support for rice through commitments of the candidates to the parliament to oppose any reduction in price support, but also to secure more representation of the rural areas in the parliament. However, rice price policy in Japan was changed and only 9% of operators with farms of at least 1.5 ha would be eligible for price support from 1989 (BAE 1988). Gasson (1990) has indicated that the significance of the RPAs were in their numbers rather than their share in production. This was also observed by MacKinnon (1990) who suggested that the farm as a family unit has retained political legitimacy and in consequence is often reflected in policy measures. To some extent, its survival accounted for the present market conditions of European farming.

The greater attention in the new reform of structural policy of the CAP to the environment, employment and income aspects of rural development through regional

development programmes and aids for farm diversification is a signal of increasing political power of the groups with an interest in agricultural and rural policy which varied from the Farmer's Unions (Arkleton Trust 1990). Marsden (1990) noted that the shift in the dominant values and activities associated with rural areas as a source of environmental values and for living rather than production is increasingly reflected in state policy in the UK which will provide more varied opportunities for production previously dependent upon agricultural markets and policies (Marsden 1990).

3.6.7 IMPACT ON ENVIRONMENT

The new strategy adopted by the EC members is to promote farming activities which further environmental protection and the conservation of the countryside (Commission 1989).

With modern farming orientated to profit maximization and the increasing challenge to intensive farming by ecological concerns over issues such as nitrate pollution of water supplies, excessive use of pesticides, pollution from intensive livestock production and loss of amenity value of the landscape (Robinson 1990, Knickle 1990)), RPAs can be considered as more gentle and kind users of the land (Gasson 1990). RPAs, especially class II, largely adopt extensive types of farming, they may cultivate marginal land, grow fruit trees with some soil conservation measures on the hilly lands such as Mediterranean countries (OECD 1978), Cyprus (Ansell 1984) and Jordan. They also have less propensity to use chemicals such as fertilizers and pesticides partly as such and partly as they are more inclined to farm less intensively (OECD 1978). Thus, RP may play a constructive role by promoting more ecologically sound agricultural production and by less tendency to exploit natural resources for the future generations.

3.7 THE ROLE OF RURAL PLURIACTIVITY IN RURAL DEVELOPMENT[12]

Rural development is a valid policy objective in the LDCs and it is steadily given more emphasis in the DCs as well. The overriding issue in the rural development efforts of the LDCs especially in the highly populated land-scarce countries such as in South and Southeast Asia is OFE while the rural decline and concerns over environment were the main issues in many European countries of the DCs.

Rural development strategies and overall economic development in most LDCs are bound to be based on agriculture, the principal sector where the need for development is pressing and most feasible. However, the capacity of the agricultural sectors to absorb the abundant labour supply and to generate enough income to support the FHHs is (severely) limited (Shand 1986a). These limitations arise not only or necessarily from limited resource base, but also, *inter alia*, from deficiencies in human resources, institutional problems[13] and shortages of social and physical services. Thus, neither OFE within non-agricultural sectoral development approach nor purely agricultural production-led oriented strategy (the so-called Green Revolution technology) is capable of providing a proper solution to the low farm income FHHs; a more broad rural development with emphasis on social and welfare projects and rural industries is imperative. This social orientation was adopted by the World Bank in the early 1970s and later on was refined to address macro issues related to improvements in policy environments[14] (Blackwood 1988).

It follows that a balanced development of agriculture and industry within an integrated development approach and provision of services are the bases of sustained economic development in the LDCs. Agriculture is considered the cornerstone of future development and at the same time non-farm activities are undertaken to create OFE to supplement the income of the small and landless farmers who constitute the majority of

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[12] Rural development is generally defined as "an overall improvement in the economic and social well-being of rural residents and institutional and physical environments in which they live" (Jansma et al., 1981).

[13] Institutional problems are largely attributed to administration, research, extension and training, land tenure, marketing and credit.

[14] Policy environments are in particular the price and exchange rates policies in relation to production incentives and in determining agricultural terms of trade.

farmers, to improve rural living standards. The adoption of such approach has played a crucial role in the agricultural, social and economic development of Japan, and it is to the multiplier-accelerator effects of this comprehensive approach that the Japanese success can be attributed. Since the early 1960s, the decentralization of industries has been promoted in Japan to provide OFE to the surplus labour in the rural areas, services were made available including efficient transportation and communication network which facilitate the uptake of OFE by the unemployed and underemployed FHHs members (OECD 1977). Taiwan has learned from this experience and has achieved remarkable results (Ho 1986). Germany has adopted similar policies since the late 1960s and has achieved similar success (OECD 1977).

The pre-1980s South Korea and the Philippines provide examples of the negative consequences of adopting the sectoral development approach based on export oriented industries and the failure to recognize the importance of developing the agricultural sector within a rural development approach in generating local demand for products of industrial origin (Oshima 1986; Park 1986; Fabella 1986). The absence of such a strategy might explain the social and political unrest in these two countries during the 1980s, which supports the argument proposed by Buttel (1982) who suggested that OFE within a rural development strategy contributes to social and political stability. Korea, however, reversed its policy in the late 1970s (Park 1986).

3.7.1 RURAL DEVELOPMENT IN THE DEVELOPING COUNTRIES; THE PIVOTAL ROLE OF AGRICULTURAL DEVELOPMENT

The experience of the Far East of Asia, notably the Japanese experience, presents a further proof of the requirements of agricultural development and the significance of the interactions between the agriculture and non-agricultural sectors. Schultz (1968), among others, has warned against the imbalance between agriculture and industry in the LDCs. He emphasized the importance of an efficient system of prices for inputs and outputs, the supply of improved inputs, research and extension.

Reynolds (1975) has indicated that backward farming methods cannot absorb more labour. Japanese labour inputs per ha in rice cultivation were found to be four to five times the labour inputs in Bangladesh. Two conditions have to be met: First, as

mentioned earlier, research from countries such as India and Colombia has indicated that small farms apply more labour and other variable inputs per ha and achieve higher yields per ha (Reynolds 1975). This supports the significance of land reform in the highly populated land-scarce countries at least in the early stages of development. More egalitarian land structure is repeatedly advocated as a prerequisite for sound rural development (e.g., Ghuneimi 1980; Christodoulou 1982; Oshima 1986; Islam 1986). In the later stages of development, measures to promote farm modernization and land improvement to improve productivity release more labour to the growing industrial sector through farm mechanization (Oshima 1986). Labour-saving technology would be increasingly adopted, marginal productivity rises and the opportunity cost of labour rises as well. Labour starts to be in short supply, at that time a more liberal system of land structure may be required to allow for the transfer of labour (Shand 1986a) provided that this transfer is desirable economically, socially and ecologically. Second, biological-chemical innovations rather than mechanical innovations which are labour saving have to be adopted as they lead to a substantial increases in farm labour demand which creates employment for operators with undersized farms and for landless labour. For example, more labour will be required in intensive farming, double cropping, spraying. Physical and social services are essential including research and extension (Reynolds 1975).

This has been also evidenced by the experience of China in the 1960s as noted by Reynolds (1975) with marked similarities with the Japanese experience except the differences in the institutional framework. China, after an initial concentration on heavy industry, reverted in the 1960s to a balanced development of industry and agriculture. Farm prices were increased several times, while the prices of manufactures have somewhat declined, thus agriculture terms of trade have been improving and the supplies of fertilizers and other improved inputs have grown relatively rapidly. OFE has increased through marked expansion of small-scale, labour intensive industries including agro-chemical industries and infrastructure activities such as roads, water control and irrigation systems, land terracing, reforestation and social services. At seasonal peaks, most of the off-farm workers were allowed to go to the fields (Reynolds 1975).

The increases in farm production in China outpaced the population growth, thus they were slightly more than sufficient to feed the growing population. The early 1980s

reform in the institutional organization of the Chinese economy has brought about more positive results. Among 370 mn labour in China, 300 mn work in agriculture at least part of their time while 70 mn work in the non-farm sectors (Nan 1986). The local enterprises are owned by the community which is basically a farming community. The family income depends on both agricultural income and the enterprise wages. Servicing agriculture was the primary function of the rural industries and it was for the local decision-making unit to decide whether the profits are to be recycled to agriculture or not. The increased disposable income promotes the purchasing power of the rural people which stimulates further rural industrialization, thus creating further OFE (Gray 1983). Thus, the multiplier-accelerator effects were similar to the Japanese experience.

3.7.2 RURAL DEVELOPMENT IN THE DEVELOPED COUNTRIES

Well-balanced regional development has a new trend in recent years. The rural economy is increasingly integrated with the national economies in the OECD countries and the rural areas are not merely a broader physical and social context for agriculture, but instead a totality of interlinked social and economic activities. In most OECD countries only 10-30% of the rural population is employed in agriculture while the rest are involved in a diversified rural economies and urban economies.

During the 1970s and early 1980s, rural-to-urban migration was reversed in some countries such as the USA, France, Italy, the UK, Germany, the Netherlands and Belgium. This can be attributed to structural changes which took place in the rural economies, especially the availability of a wide range of services such as roads and communications, the emergence of small and medium scale industries and the rising interest in living in the countryside by urban dwellers, diminishing attractions of the urban and industrial centres and a growing concern with maintaining the environment. RP has become widespread and an alternative to migration, OFE has often become the main source of income (OECD 1988; Commission 1989) and there has been a gradual reversal in the tendency for people to leave the rural areas in the EC states (Commission 1989). In France, the decline of the rural population had ceased and construction of new houses was intense during the 1970s. This new movement was the result of improvements in communications and decentralization of industry (Commission 1986).

With these developments, RP is on the increase in many countries such as France, and it is the wives of younger farmers who are mainly participating in OFE (Bel 1987).

In the remote and mountainous areas of many Western European countries where agricultural conditions may not be favourable, and OFE is limited, migration would be inevitable especially for the young, educated and active members of FHHs. Population declines below the minimum density required to prevent the breakdown of the social facilities and services. Under such circumstances, maintaining services will be difficult and costly, landscape cannot be protected, the rural type of life cannot be preserved (OECD 1975; Arkleton Trust 1985; Commission 1986,1989).

These concerns over the rural decline and the degradation of the environment led the EC members to adopt a supplementary socio-economic directive (268) in 1975. This included (a) provision of direct payments to be made to farm operators regardless of their main occupation, provided that certain conditions were met and (b) the creation of OFE through rural development projects to stabilise the rural population through diversified sources of income (CEAS 1977; Craps 1977; Arkleton Trust 1985; Commission 1986; OECD 1978).

As agriculturally oriented interventions had proved to have little impact on alleviating rural problems (Arkleton Trust 1985), a new strategy emerged in the EC to encounter rural decline based on development and economic diversification. Thus, RP is to be promoted through diversifying rural employment opportunities via regional policies based on decentralized industries in development centres, encouraging small to medium firms on the basis of their indigenous potential and extending social services to contribute to the revival of the rural areas which should provide a catalyst for sustained development (Commission 1989). Measures to implement such a policy will be necessarily tailored to the prevailing conditions and stage of development in the country concerned. Concerted efforts and decentralized decision-making processes are required for the formulation of broad and workable policies and the implementation of such programs (OECD 1988).

Thus, RP would play an instrumental role in helping to maintain the rural population and infrastructure and promoting tourism. It helps in making use of the services already available such as housing which minimises the burden on the already congested urban centres, indirectly reducing unemployment in the urban areas,

contributes to a broader distribution of property, provides security to rural people especially in times of economic recession, provides relatively low wage labour which encourage rural industry and increases the effective demand in the rural areas which further promotes socio-economic development through the multiplier effects (Krasovec 1977; Wibberley 1977).

3.7.3 THE ROLE OF RURAL INDUSTRIALIZATION

The capacity of the agricultural sector in the LDCs and in the marginal areas in the DCs to provide employment and to generate reasonable income to improve the welfare of FHHs is limited. Thus, these realities will have to be recognized in planning rural development programs and the need to create OFE is crucial through promoting rural industries.

A basic issue in rural industrialization is deciding what industry or project to promote and where it should be promoted. Choosing a specific project in a specific area would be based on either needs or potential. This is an equity-efficiency trade-off decision. The need-oriented enterprise or area would lead to selecting one with less income generating capacity or less capability of attaining sustained growth (Jansma et al., 1981). This calls for a thorough economic and social analysis to assess the direct as well as the indirect benefits and costs and the impact on the national economy (the multiplier-accelerator effects). Possible alternatives should also be examined.

The experience of South Korea in the late 1970s of too thin distribution of rural industries without due consideration of the potential of the areas has proved to be a misguided policy, costly and less efficient (Park 1986) and it is perhaps more damaging as scarce resources may be misplaced or wasted. Similar failures were also recorded by the World Bank in other Asian countries (Binswanger 1983). Likewise, it has proved to be difficult to introduce small industries in some of the rural areas in the EEC due to problems such as small scale, lack of appropriate services, access to technological innovations, capital resources and weak links with other firms. There were, however, notable exception in France, southern Germany and central and northern Italy where small to medium industries was growing (Commission 1989). Korean policy was corrected in the early 1980s through concentration of industries in well-grounded

industrial centres (Park 1986). Therefore, the rural industries should be initiated by local leadership and located in sub-poles where they are a basis for further developments or alternatively serve as effective satellites to existing industrial centres (Commission 1989).

It follows that regional and industry characteristics have to be taken into consideration in selecting an area: (a) the cost factor for raw materials, labour (levels of skills, education and training), capital, site and transportation costs. (b) the market prospects (demand) including the size, structure and location of the market for farm and non-farm products. (c) the availability of social and physical services which are essential for the industries as well as the target population (Ruttan 1959; Wibberley 1974; OECD 1975; Gasson 1977; Jansma et al., 1981; Shand 1986a). (d) The type of technology and scale of the enterprise whether large or small to medium-scale, capital or labour intensive which depends on the availability of capital, labour, entrepreneurship and skilled labour (Binswanger 1983).

In this process, RP contributes in providing cheap labour to the infant industries, while at the same time the OFI so generated will enhance the local demand for farm and non-farm products. The multiplier effect will promote economic activities and create further OFE opportunities.

ANNEXES

3.1 FARM CLASSIFICATIONS

In examining the incidence of RP, one important related variable is the size of farm operated by the pluriactive FHH. The criterion for measuring the sizes of farms based on the cultivated area does not seem to reflect the realities of the wide variation in agricultural potential of activities or incomes under different environmental and technical conditions (Furness 1983). The two-ha farms under horticulture or fodder crops which are considered, from the production standpoint, to be statistically insignificant in the UK (Gasson 1983), are the largest sizes for more than 90% of farms in Japan, Taiwan and Indonesia (Oshima 1986; Ho 1986; Bandiyono & Conroy 1986). Therefore, a more objective criterion which reflect the labour requirement according to circumstances or income-generating capacity would provide more workable bases for comparing or assessing the economic viability and potential employment.

A number of criteria are used in Europe for classifying farms by labour requirements or by financial sizes such as the Standard Man Day (SMD) in the UK, the Standard Gross Margin (SGM), the European Size Unit (ESU) (closely related to SGM) and the Standard Farm Income (StBt)[15] in Germany. In the USA[16] and Canada, the amount of gross sales is used as a criterion. SMDs and SGMs[17] have more potential to be widely used.

European criteria are based on standards rather than actual, for which data are often difficult to collect. Labour data as compared with income data are easier to obtain, less variable and more meaningful for international comparison. Thus, SMDs can be

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[15] One ESU equal 1000 European Units of Account of Standard Gross Margin. StBE is an average income for a properly managed and suitably located farm (OECD 1978).

[16] The Federal Food and Agriculture Act of 1977 used gross sales of less than US $ 20000 annually as the criterion to define a small farm (Bryant, Bawden & Saupe 1981).

[17] The SMDs is defined as the theoretical labour requirements per area of a crop or number of animals. In the UK, a holding with a labour requirement of 250 SMDs would be expected to provide employment for an average labourer in a year. The SGM for an enterprise is defined as the difference between the gross value of output and variable costs for a particular or dominant enterprise and a time period.

more easily calculated and interpreted. In the context of this study, it was thought that the concepts of SMDs could have a particular applications in the study of RPA in Jordan. No such system currently exists there but the means by which one would be developed are available.

However, SMDs have their shortcomings such as variation over time with technological change, and the degree and intensity of mechanization. SMDs do not reflect actual labour usage on particular farms which will be affected by method of farming, topography, climatic conditions and seasonal variations and the age, sex and capabilities of the people involved. Therefore, they have to be updated and calculated by crop, season, degree of mechanization if using them is to be meaningful as indicators rather than a clear cut criteria (Medland 1977; Hill 1987; Krasovec 1982).

Two issues are pertinent to this criterion, First, in the UK, 250 SMDs are considered to be equivalent to the work of one labour unit in a year but the corresponding area or number of animal units is increasing over time with the advances in technology, increased labour and management efficiency through education and training. The reduction in labour requirements reduces SMDs and would further promote RP. At present, In the UK 48% of farms require less than 250 SMDs (Gasson 1983); in Italy, 59% of farms require less than (the equivalent of) 250 SMDs (Commission 1986). In a study in a county in Canada, 61% of farms were found to have less than 250 days (Fuller 1976). In Yugoslavia, a modern vineyard (of average size) in the mountainous areas require 40-50 man days a year (Krasovec 1983). Second, the threshold of economic viability has been moving upwards due to the rising income aspirations of FHHs and the worsening terms of trade between the farm and non-farm sectors (Krasovec 1977; Arkleton Trust 1985). Thus, even if the farm is capable to provide a year round employment, the holder is still in a precarious condition.

3.2 TYPES OF FARM HOUSEHOLDS AND BUSINESSES

The gradual integration of the farm sector with other sectors into an increasingly interlinked economic system, the continuous changes in the socio-economic conditions of farm population and technological changes have brought about a wide range of organizational changes in the farm sector structure. The family type of farming, though still dominant, was adapted or has given place to new types which better reflect the place of farming economically and socially on the agenda of the farm households.

It was earlier suggested that farm households were quite heterogeneous in their socio-economic characteristics and objectives under varied socio-political systems and dynamic development processes. Therefore, reducing these complexities through classification of farm households, operators and businesses into socio-economic categories (using key variables such as ownership of land or capital, division of farm labour and management) is instrumental for better understanding of the state, problems and prospects of rural population so that proper policies might be adopted and targeted to relevant categories.

Reinhardt and Barlett (1989), in reviewing the literature regarding the place of family farms in the USA, have noted that some researchers from both neo-classical and Marxist perspectives predicted that family farms will vanish. From the Marxist perspective, family farms were considered to be technologically backward and inefficient in scale. From the neo-classical perspective, the lack of economies of scale and hence inability to use large pieces of equipment and limited scope for task specialization will not enable family farms to compete and to achieve the goal of profit maximization (Reinhardt and Barlett 1989). In contrast, and drawing upon the work of Chayanov[18] on the peasant farm economy, the family farm is considered to be the primary production unit. Based on their distinct behavioral logic, farm families have composites of socio-economic objectives and survival strategies built upon diversified farming and other sources of income through sending one or more FHH members into OFE. Output would be adjusted between consumption and marketing depending on yields and market prospects (Pfeifer 1987; Reinhardt and Barlett 1989). The biological character of

[18]Chayanov (1966) *The theory of peasant economy*. Irwin, Homewood as noted by Reinhardt & Barlett (1989).

agriculture makes the use of labour highly irregular. The flexibility of family labour use adds to the competitive advantage of this type (Reinhardt and Barlett 1989, MacKinnon 1990).

Yet, although farm families declined in number and share of production, they continue to be a dominant type of organization in the USA (Reinhardt & Barlett 1989), in the UK (Whatmore et al., 1987; Gasson et al., 1988), France and most developed capitalist countries (Pfeifer 1987). This was supported by the findings of the Arkleton Trust recent study in 12 Western Europe countries where it was found that in 59% of farms, family labour provided more than 75% of the total farm labour (MacKinnon 1990).

Newby (et al., 1978) have attempted to classify farmers in East Anglia in England on the bases of their market orientation and on-farm work situations. Four types of farmers were identified; the gentleman farmer with lowest involvement in farming activities and market orientation, agro-business, family and the active managerial farmer, on the other side of the spectrum, with highest involvement (largely managerial) in farming and highest market orientation.

Whatmore (et al., 1987a) have reviewed the literature on the classification of farmers and farm business and attempted to develop a relational typology of farm businesses. A system of ordinal scaling and scoring was developed to a range of categories of a number of internal and external indicators. Internal relations were mainly the ownership of land and business capital, management control and labour relations. External variables were related to the extent of financial and marketing independence. Aggregate scores of indicators were used to arrive to four ideal or theoretical types of farm businesses based on the extent of their subsumption to internal and external relations of production under advanced capitalism. These types being marginal, transitional, integrated and subsumed units. Later on, they were tested against empirical data derived from three areas in southern England (Whatmore et al., 1987b). The development of uniform measures for a systematic comparison between farm businesses might have an explanatory value and as such is a clear contribution of the researchers. However, they have recognized the need to refine the scoring system to minimize inconsistencies and admit that decisions were taken subjectively in ranking categories according to what might best work in practice.

MacKinnon (1990) has attempted to classify FHHs in a manner that would reflect the divergence of income sources and farm business sizes. Sources of income were FI, OFI and unearned income . Based on the ESUs, farm businesses were grouped into small (<4 ESUs), medium (4-16 ESUs) and large (>16 ESUs). Utilizing the data compiled in the Baseline Survey from 24 areas in Western Europe which was conducted by the Arkleton Trust in 1987 and covered a large number of (over 6000) cases, 12 types (including a residual type) were identified. Three groups were virtually dependent on FI, three were dependent on FI and OFI, small and medium farm sizes virtually dependent on OFI, three groups dependents on FI and unearned income and a residual type. To identify vulnerable (income wise) groups, their characteristics, geographical distribution and policy implications, types were cross-tabulated by agricultural and labour market conditions, age and education. Thus, the typology is essentially three dimensions cross-tabulation by farm size, income and other variables.

The purpose of categorization dictates the key variables to be employed. Unlike the Newby (et al., 1978) typology which put the focus on the farmers, Whatmore's (et al., 1987) typology focused on the farm business. MacKinnon's (1990) typology on the other hand, was oriented to the policy implication in an attempt to provide evidences that agricultural focused policies (e.g., price support) carry less potential to solve the income problems (55% of farms with >50% OFI) of the small farm businesses which represent a sizable proportion of FHHs (39% with 4 ESUs) in the EEC and more emphasis should be laid on direct payments and the promotion of OFE opportunities. This option was also advocated by Furness (1982, 1983) and Hill (1990).

In summary, the rapid pace of overall socio-economic developments have brought about a wide range of changes in the farm sector structure. The family type of farming, though still surprisingly dominant[19], are under mounting pressure either to adapt itself or to give way to new types of organization. Therefore, classification of farm households or operators and businesses into socio-economic categories is essential for implementing relevant policy measures. Thus, the purpose of categorization dictates the key variables to be employed such as division of farm labour and management, market integration and income diversification.

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[19] In the sense that the family labour is the mainstay of farming activities.

CHAPTER 4

MAIN HYPOTHESES

MAIN HYPOTHESES

Rural pluriactivity (RP) and its socio-economic role is yet to be explored in Jordan. It was not a subject of research in the past, though the agricultural censuses did distinguish between farm operators whose main occupation were agricultural and those with non-agricultural occupations in relation to farm size. Beyond this limited information, there are many questions still to be answered in relation to RP such as motives, farm and non-farm characteristics and organization of farming and whether these differences are significant. Answers would provide better insight on the nature of RP and its implications in Jordan.

Following a review of literature on the socio-economic conditions of the farm population and the state of the agriculture sector in Jordan and on issues of RP in different parts of the world, several hypotheses can be set up which appear to be capable of testing against empirical data derived from the field survey in Jordan which forms part of this present research.

Below are listed the major broad hypotheses. Each has associated with it a number of more detailed sub-hypotheses which are also outlined.

(1) The Incidence of Rural Pluriactivity

The incidence RP in Jordan was investigated in the Agricultural Censuses 1975 and 1983 which showed that 35% and 43% of farm operators declared that their main occupations were non-agricultural. Other studies have put the figure in some areas at about 60%, but definitional problems make it difficult to assess the past significance of RP. However, empirical studies in many countries, and limited references from statistics in Jordan suggest that small farmers may be largely involved in activities other than farming on their farms.

Thus, the broad hypothesis to be tested will be:

"More than 50% of farm households are pluriactive".

Using different set of definitions, attempts will be made to assess whether the survey data indicate a high incidence of RP among farm households (FHHs) members and farm operators.

(2) Rural Pluriactivity and the Limited Resource Base

Jordan has a limited resource base. The cultivable and irrigable area is less than 10% and 1% respectively of the total area. The agrarian structure is dominated by increasingly smaller and fragmented holdings. Most of the cultivable land is in mountainous areas under dry and traditional farming. Consequently, crop yields are low, production is unstable and hence income is low and unstable.

Technological developments in the irrigated sub-sector, have led to substantial increases in production ahead of the local and external demand. Costs of production have increased in line with inflation rates while output prices have remained almost stagnant in the last decade and marketing outlets have become increasingly limited. The agricultural terms of trade have worsened over time, decreasing and destabilizing farm incomes and widening income disparities. The threshold of economic viability has increased while the expansion of farming activities has been curbed by the financially prohibitive land prices.

Available evidence suggests that RP is associated with the level of physical resources.

Therefore, a broad hypothesis to be tested will be:

"Rural pluriactivity is particularly associated with farm households with limited resource base".

More detailed hypotheses relating to specific aspects of the resource base will be examined. Attempts will be made to investigate whether the empirical observations in Jordan indicate that RP is associated with small farms, rain-fed farming and mountainous areas and whether the economic consideration was the primary motive for rural pluriactivity.

(3) Dependence on Off-farm Income

Building on the above mentioned argument the limited employment and income generating potentials, depressed terms of trades and instability of farm income have prevented the majority of farmers from establishing full-time viable farming and have led to highly precarious living conditions. Under these circumstances, evidence from empirical data in different parts of the world indicates growing reliance on various forms of OFE and growing relative contribution of OFI.

Thus, the broad hypothesis to be tested will be:

"Rural pluriactive farm households are more dependent on off-farm income and employment than farm income and employment".

The relative dependence on off-farm income will be examined to test whether FHHs in general rely more on non-farm income than farm income and whether pluriactive FHHs derive the greater part of their income from non-farm sources. Types and number of members with OFE, locations and economic sectors, sources and levels of income will be compared. Comparisons will be made between different income-classes to evaluate whether RP contributes to reducing poverty, intra and inter-sectoral income disparities (using the available income statistics) and whether RPAs are less indebted.

(4) Rural Pluriactivity and Farm Household Characteristics

Jordan has witnessed high real annual rates of economic growth since the early 1950s and up to the mid 1980s. This was accompanied by extending basic services to virtually the entire population, particularly education facilities. This has resulted in high mobility of the educated young members, changes in family structures, increasing female participation, new attitudes to work and leisure and high income expectation and aspirations.

Much of the available evidence suggest that the incidence of RP is associated with variables such as age and education.

Thus, the broad hypothesis to be tested will be:

"Pluriactive farm operators have characteristics different from full time farmers, e.g., age, levels of education and family type and size".

Attempts will be made to test relationships between the socio-demographic characteristics and the incidence of RP to see whether there is sufficient evidence to support the view that compared with FTFs, rural pluriactive farm operators (RPAs) by type are younger, have higher levels of education, have larger FHHs with more educated members and more dependants and different types of families.

(5) Spatial Distribution of Rural Pluriactivity

Special attention was given throughout the economic development phases to develop a good transportation network. Thus, almost every corner in the country is served by paved road. OFE opportunities have expanded dramatically, largely in the public administration and the service sector. Hence, in the late 1970s and early 1980s, full employment was achieved, with shortages of labour most notably in the service sector and the irrigated farm sub-sector. The available evidence appears to be inconclusive on whether the relative distance from the urban centres or the geographical distribution of rural areas has a bearing on the incidence of rural pluriactivity.

Therefore, a hypothesis to be tested will be:

"Rural pluriactivity is not associated with the geographical distribution or proximity to urban centres".

Attempts will be made to investigate whether the incidence of RP is associated with the spatial distribution of FHHs by governorate, region and zone and whether these factors are associated with statistically significant differences in the levels of RP. Attempts will also be made to test whether proximity to the nearest and main urban centres had significant effects on the incidence of RP.

(6) Rural Pluriactivity and Cropping Patterns

Jordanian holdings display a wide variety of land uses. Evidence from many countries suggest that RPAs have distinct cropping patterns as compared to full time farmers. RPAs are thought likely to have lower number of enterprises and to farm less intensively. Hence, the Jordanian counterparts are expected to be less likely to produce vegetable crops and to contribute less to the production of surplus products. As they grow fruit trees in the marginal mountainous areas, they contribute to the production of fruits which are in short supply and more environment-friendly agricultural activity by retaining land in agriculture which otherwise would have been abandoned.

Thus the main hypothesis to be tested will be:

"Pluriactive farm households have different cropping patterns from full time farmers".

The actual observations of the cropping patterns and the number of enterprises of the income classes of FHHs and farm operators will be compared to test whether RPAs have statistically different patterns, fewer enterprises and they are more likely to grow fruit trees rather than vegetables, especially in the hilly areas.

(7) Rural Pluriactivity and Adoption of Innovations

By definition, RPAs have diversified sources of income. It follows that they may also have easier access to financial resources for the purpose of investment in modern technology and improved methods of production. Little evidence is available to substantiate or contradict this claim.

Thus the hypothesis to be tested will be:

"Rural pluriactive farm operators are more progressive than full time farmers".

Progressive in this context implies the use of modern technologies of which the

main examples in the irrigated areas are drip irrigation and greenhouses and application of fertilizers in the rain-fed areas especially for cereal production. Attempts will be made to investigate whether RPAs were more likely to adopt improved methods of production. As a sub-hypothesis, an investigation will be made of whether RPAs rely more on institutional agricultural credit and are more dependent on primary sources of information.

(8) Land Mobility

Social factors related to the attachment to the land are a strong tradition in Jordan. They enhance the tendency to preserve small farms, and hence promote RP. The social values of ownership of land, future security and capital gains backed by the existence of OFI make it possible for the FHHs to retain and farm their small farms even when not warranted by economic considerations. Recent experiences in different parts of the world revealed that a new outlook and broader perception of the role of the distribution of land is emerging.

Thus, the hypothesis to be tested will be:

"Land mobility is low across the socio-economic and agro-climatic conditions".

Low mobility in this context implies limited supply of land for sale. Attempts will be made to investigate by income classes, regions and zones, whether land transaction in the past ten years were more frequent on pluriactive farms as compared to FT farms, whether their future intentions are different and whether entering RP is restricted or associated with the generational shift.

(9) Types Of Farm Households

Although family type of farming is dominant in Jordan as in other parts of the world (in the sense that farming activities are mainly carried out by family labour (80%)), the family type has undergone several changes in response to the gradual integration with the overall economy and hence new or modified types have emerged.

Recent studies from many countries indicate that the family type is still prevailing.

Thus the hypothesis to be tested is:

"Farm households are heterogeneous in their socio-economic characteristics and hence they organize their farming activities in different ways".

Attempts will be made to classify FHHs into different types. Their farm and off-farm characteristics such as main sources of income, involvement in farming activities, types and number of enterprises, market orientation and methods of production will be tested against the actual observation to assess whether there are statistically significant differences.

(10) The Permanence of Rural Pluriactivity in the Agrarian Structure

Rural pluriactivity in its new forms is more likely to be a permanent feature of the farm sector. On and off-farm environments suggest little prospects of conditions under which they might be conducive to an alternative course. Much of the available evidence suggests that RP is persistent over time.

Thus the hypothesis to be tested will be:

"Rural pluriactivity is a permanent feature of the agrarian sector".

The term permanent feature is in the sense that RP is not a transitional period whereby farm operators use it as a phasing in period for full time farming or phasing out period to quit farming. Attempts will be made to explore the length of time FHHs have been involved in RP and whether RPAs are satisfied with the present situation, if they have more positive and optimistic outlook and whether they have the intention to preserve the status quo.

CHAPTER 5

SURVEY METHODOLOGY

SURVEY METHODOLOGY

5.1 METHODS OF DATA COLLECTING

Data were collected through the following means:

(a) Primary data collection[1] using a structured questionnaire from a sample of farm households. Background data were also collected for villages covered in the survey in the rain-fed areas from community leaders.

(b) Secondary sources to be used in conjunction with the primary data including statistics and reports from Government agencies such as the Department of Statistics (DOS), the Ministries of Agriculture (MOA), Planning and Labour and the Central Bank. In addition, publications by non-governmental organizations in Jordan were utilized such as the work of the Arab Organization for Agricultural Development (AOAD), German Technical Agency GTZ) and the USAID.

5.2 THE UNIT OF ANALYSIS

As the extended type of family is significant in Jordan, and the farm household is the social, production and consumption unit, the farm household is taken as the unit of analysis for the study. The definition of household adopted by the DOS is "a person, or group of two persons or more, living together under one roof, sharing pooled income, common budget and one meal or more, they may be related or unrelated persons or a combination of both. The member who is vested with the main responsibility to support the household is regarded as the head of the household regardless of his age". For simplicity, this was interpreted to the respondents as "a group of people who live and eat together, and share in a common income and

[1] Sideline limited surveys were also used to investigate the association between the extent of RP and the characteristics of agricultural credit borrowers and the Highland Development Project beneficiaries. Random samples of farmers' records were utilized as sampling frames. Problems of definition made it difficult to integrate the findings of these surveys into the main survey.

budget".

One of the objectives of the study is to assess the incidence of rural pluriactivity. Therefore, the sample was chosen from the holders of agricultural units regardless of the legal ownership of the land, their sources of income whether farm or off-farm income, earned or unearned income and regardless of the their place of residence whether rural or urban areas. No definition of RP was required *a priori* as more than one definition is utilized to assess the degree of dependence on off-farm sources of income.

The selection of holders in the rain-fed areas was based on the criterion that the operational holding should be at least 4 dunums[2], but no minimum size was adopted for the irrigated areas as the return from one greenhouse (typically 0.5 dunum) may exceed the return from 10 dunums under dry conditions. None however were found with less than 4 dunums.

5.3 THE SAMPLE DESIGN AND PROCEDURE

In deciding on the **sample design,** the main considerations were the following:

(a) The main objectives of the research, namely the investigation of the extent of RP in the farm sector, its significance and implications and testing hypotheses regarding the characteristics and motives of RPAs.

(b) securing and updating the sampling frames to be employed for the drawing of the sample.

(3) Time, financial and travelling constraints.

Hence, a sample representing the wide variety of social, agro-climatic conditions and off-farm employment opportunities, was required to permit comparisons across the diversity of socio-economic and environmental conditions[3]. This also was necessitated by the need for this survey to serve as an exploratory and

[2] One dunum is equivalent to 1/10 of hectare.

[3] Governorate of Ma'an was excluded from the study due to time and financial constraints. The socio-economic conditions of its agricultural areas was well represented by the neighbouring Tafila District.

a pilot study as no previous research has centred on the socio-economic role of RP in Jordan. Random sampling would be essential for drawing conclusions on the study areas. Although the irrigated areas were over represented and hence it is not claimed that the sample was representative, from the farm structure standpoint, Table 9.3 shows that the distribution of farm size groups was quite close to the national figures of the Agricultural Censuses 1975 and 1983 and consistent with the general trend of increasing share of holdings in the smallest farm sizes (< 30 dunums). Thus, the findings of the survey may provide general indications on the national levels.

There are two main agricultural areas in Jordan with more inter than intra variability in environmental conditions; the rain-fed and the irrigated areas. Thus, the sample was stratified accordingly.

The rain-fed areas in the highlands consist of areas with favourable and unfavourable agricultural potentials. They are highly populated and located close to the main urban centres with diversed OFE opportunities. More than 80% of the rural population and more than 90% of the total population reside in the area.

However, in terms of production, the irrigated areas produce the greater part of agricultural production. 40% of the total agricultural production was accounted for by the Jordan valley alone (USAID 1988). The irrigated areas are located in three ecological zones in the Arid, Highlands and the Jordan Valley.

Against this background, it was necessary to give more weight in the sample to the more variable stratum which represent the more populated rain-fed areas in the highlands. Nevertheless, the importance of the irrigated sub-sector to the agriculture sector cannot be overlooked. Therefore, about 65% of the sample have been allocated for the holders in the rain-fed areas and the rest for holders in the irrigated areas in the Jordan Valley and the highlands.

Relatively outdated and incomplete sampling frames for the 18 rain-fed villages were provided by the Department of Statistics. 12 sample frames of the villages in the remotest areas were updated by the extension agents of the MOA and the remainder by the researcher through informants in the villages.

In the irrigated areas, a cropping system was compulsory in 1989 for vegetables production under the management of the MOA. Therefore, the lists of holders for the different districts were found to be the most reliable sampling frames for the use

in this study.

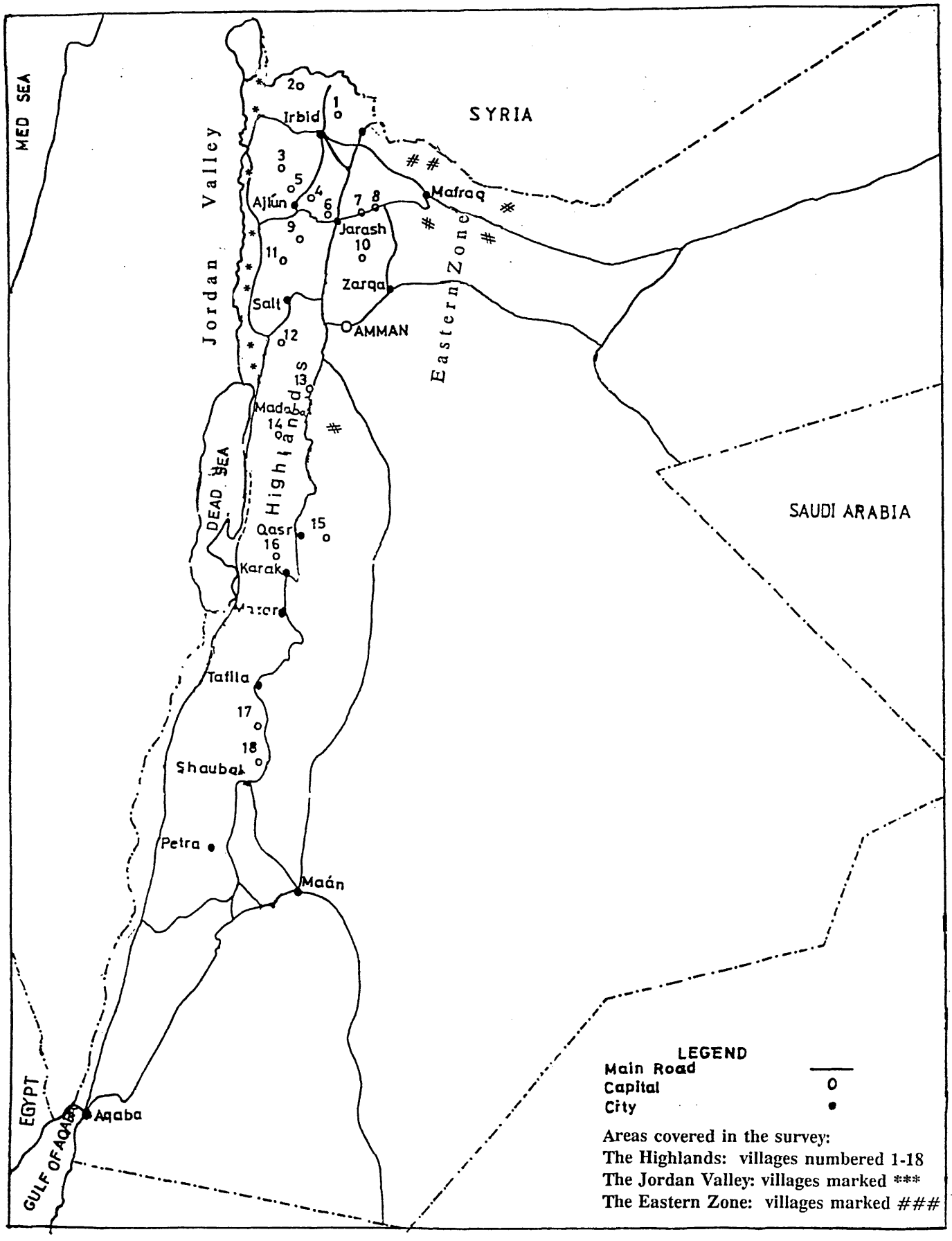
The initial target was to interview 120-160 farm operators. However, with the support from the DOS and MOA, it was possible to increase the number to about 200. Minimum number per village in the rain-fed areas was five respondents, but in one village there were only four respondents.

Considering the time, financial and travel constraints, and the need to select suitable rural areas, 18 villages in the rain-fed areas were purposively selected by consultation with the agricultural directors and the extension agents in ten districts. The criteria for selection included the following: (a) the villages should be within the isohyets lines above 200 mm, and (b) they should represent the prevailing socio-economic and agricultural conditions, that is a typical village for the surrounding farm communities. Relative proximity to urban centres have been considered to provide a wider coverage of the sample.

Since reliable information was not available to stratify holders by variables such as the type of farming and the size of holdings, a simple random sample was drawn from every village using a table of random numbers.

Within the stratum representing the irrigated areas which are located in three distinct zones, different sampling procedures have been followed, (a) the arid zone, east of Amman and Mafraq governorates is relatively homogeneous area, thus, a simple random sample was drawn. (b) in the highlands, 4 villages were selected randomly from the main irrigated area in Balqa Governorate. In a second stage, random samples of holders was taken from every village proportional to the number of holders, (c) in the Jordan Valley which is the biggest and the most productive agricultural land, 8 blocks were selected randomly out of 39 blocks to represent the relatively homogeneous northern, middle and southern regions, and in a second stage, samples of farm units rather than holders (including the fruit trees growers) proportional to the number of units in the blocks, were drawn due to the frequent changes of sharecroppers and tenants. The Map presented in this chapter shows the distribution of villages in the rain-fed areas (numbered 1-18) and the irrigated areas covered in the survey and Appendix B, Table B.4 shows the distribution by governorate, district, and the relative agricultural conditions, sources of irrigation and proximity to the urban centres.

MAP OF JORDAN



5.4 THE QUESTIONNAIRE

The questionnaire was structured largely in close-ended form and tested in the field in three different areas. A number of modifications and rearrangements were found to be essential. Some unnecessary questions were dropped. However, even after putting the questionnaire in the final form, it was found necessary to drop some other questions and not to ask all questions in the same order to all holders to establish a good rapport with the rather more suspicious respondents (the revised form is in Appendix D). Questions related to family labour were found to be the most difficult to answer, whereas the questions related to household composition were the least liked. Only two refused to declare their incomes, many however, were reluctant to do so. Clarity, frankness and goodwill has proved to be the best strategy for approaching the of respondents and the majority were most cooperative.

Background data was collected from the community leaders of the villages in the rain-fed areas only. The aim was to gain general information about the social services, the agricultural activities, land tenure, population, sources of income and OFE opportunities. Personal observations and discussion with government officials, field technicians and farm operators in the rural areas were also found to be a useful orientation in broadening the understanding of the agricultural conditions, problems and prospects. To put the information to be extracted from farm operators into perspective, field work always started with interviewing the community leaders on background data of the village. Clarifying the objectives of the study also indirectly contributed to the creation of a positive image about the purposes of the study in the target communities and a cooperative mood on the part of the leaders by involving themselves or their delegates in locating holder's homes, gathering places and addresses.

5.5 THE ORGANIZATION OF FIELD WORK

Being a Jordanian citizen with a fairly well-known civil servant identity has helped the researcher to reach people and community leaders who would not otherwise be easily accessible.

To promote the cooperation of respondents in the rain-fed areas to increase response rate, mayors and village councillors and later on all respondents (mostly at the time of the survey) were informed in a written statement about the objectives of the study as purely academic. For respondents who were questioning the potential outcome of this data-collection exercise, the answer was knowledge thus accumulated would and should eventually rationalize policies towards rural population. No attempt was made to give them an impression of possible direct potential benefits to the village. Name of the researcher, address and the name of the University was included to give them indirect assurance of objectivity. A sample of names of holders in the village was sent to them through the extension agents including the proposed date for interviews. In nine cases, mayors and heads of village councils were interviewed. In the rest, ex-heads, other members of the councils were delegated. In the process, the list of samples was verified. In some villages, some names were removed because they were found not to be holders or they had abandoned farming. New names were randomly selected in the presence of them and added to the list which included about 20% additional names as a reserve sample. As the intra-village variation was more salient than inter-village variations, it was decided to interview more holders from the reserve sample if the possibility arose to do so. This working relationship has contributed to a substantial reduction in travelling time and costs to a tolerable level.

In the irrigated areas, most of the respondents were approached through the extension agents, whereas in the rain-fed areas, the respondents were approached through the village councils in cooperation with the extension agents in most cases. Cooperation of respondents, therefore, was almost instant which explains the high rate of overall response. It is to be noted that hospitality to visitors in the Arab culture is a matter of honour. Out of 236 sampled holders, 194 were interviewed. Interviews were conducted by the researcher in the farms, houses, village councils and

the streets of the villages in the rural areas as well as in fancy offices and villas in the urban centres. Some farms were only accessible by 4 wheel drive cars. In many cases, more than one try was necessary to locate holders and in few extreme cases, as many as 5-7 times. 17 names were excluded because they were not farm holders any more. Only two refused to cooperate. Two farms were not accessible and the rest (21) could not be found given the limited available time. 168 of the interviews (87%) were conducted with the heads of the farm households, although some assistance by other members of the household was necessary to complete the questionnaire, 10 with wives or sons (5%) and the rest with close relatives, mainly brothers not living in the household. Since some of the holders in the rain-fed areas were found to be partly farming under irrigation, the percentages in the sample have turned out to be about 61% and 39% respectively for rain-fed and irrigated farming.

Mutual understanding was established with the extension agents and the council's delegates about the utmost importance of giving the respondents the opportunity to express their ideas and information freely in their own words. This was evident in their generally negative response with respect to the MOA extension services. In situations not conducive to fulfil this condition, respondents were interviewed privately. This however, is not to suggest the all interviews were carried out in ideal environments, but merely to emphasize that efforts were made to create a climate of impartiality.

The survey was carried out over the period May-September 1989. The timing conforms with the peak season in the Arid and Highlands zones and covers part of the agricultural season for the Jordan Valley which normally ends by the end of June.

5.6 Data Analysis

For data analysis, SPSS/PC+ V3.0 was adopted. Variables were defined and a coding system was established to facilitate entering the data using the SPSS data entry package. Types and qualifications of statistical tests can be found in the statistical notes C.1 in Appendix C.

PART II

RESEARCH FINDINGS

CHAPTER 6

INCIDENCE OF RURAL PLURIACTIVITY IN JORDAN

INCIDENCE OF RURAL PLURIACTIVITY IN JORDAN

6.1 INTRODUCTION

According to the 1975 Agricultural Census, the main occupation for 35% of the total farm operators was not farming. In 1983 Census, the percentage increased to 43% (DOS 1977, 1985). Holders were classified into two classes; holders with farming as their main occupation if they spent more than 50% of their working time on farming, and those with off-farm employment (OFE) as their main occupation.

However, the censuses' definition has the following limitations: First, it does not have a specified time reference such as the number of working days or hours in a specified period. That is, the time reference is the individual working time and it is for the holder to decide whether to be considered a farmer or not. Second, it does not distinguish between farm, non-farm work on own farms and on other farms, that is, any farming or para agricultural activities is included in farming activities. Third, it does not take into consideration farm or off-farm income. Fourth, only main occupation is considered. Those with OFE as a secondary occupation are not accounted for.

Except for what is reported in agricultural censuses, there have been no past studies directed specifically at RP in Jordan. However, incidental fragmentary information has emerged from some socio-economic studies. In a study on soil conservation, farming and afforestation programme in the Lower Zarqa Catchment in the middle of the highlands, 35% of farm operators in 1981 were found to be pluriactive (AGRAR 1986). More recent study on the Zarqa River Basin Project indicated that 25-81% of holders in different parts of the same area were pluriactive (Ghannam et al., 1989). In these studies no definitions were given for RP but the contexts suggest that it was restricted to non-agricultural employment.

One purpose of the survey which forms part of this thesis was to improve knowledge of the extent of RP in Jordan. The survey data allow RP to be assessed according to a number of criteria. Therefore, the incidence of RP can be compared with the available data in Jordan and with the extent of the phenomena in other countries.

6.2 DEFINITIONS AND CLASSIFICATION

The definition of Rural Pluriactivity (RP) adopted in this thesis is the one put forward by a CEAS/ Wye College Workshop in 1977. This says "the practice of a farm household (FHH) in which one member or more is gainfully engaged in work other than or in addition to farming the family's holding". Thus, (a) only earned income is considered, (b) it can be earned by any member of the household and (c) non-farm work can be any form of economic activity undertaken other than farming on their holdings.

The typology of RP adopted in this study is the one used in many OECD countries. Farms of the households are broadly classified into main living farms (MLFs)wherethe FHHs are wholly or mainly dependent on farm income (>50% of total income) and supplementary living farms (SLFs) where FHHs are more dependent on off-farm income (>50% of total income). MLFs are further broken down into full time farmers (FTFs) where less than 10% of income is derived from OFE and class I farms where the percentage of off-farm income (OFI) is 10-50%. Drawing on the literature review, MLFs classes were assumed to have different on and off farm characteristics. Furthermore, the use of this common typology enables the case of Jordan to be compared with other countries.

However, the present (1989-1991) economic crisis in Jordan, which is expected to have a long term effects on the economy and high rates of unemployment might suggest that, at least in the near future, time rather than income might be a more proper criterion for classifying farm operators for policy considerations as employment rather than welfare would be the overriding consideration. Thus, labour measure will be used as well whenever it is deemed to be relevant. Full time farmers (FTFers) are the operators with farming as their main occupation[1] and dual job holders with off-farm occupation as their main occupation.

In brief, RP will be examined on the bases of the following; (a) main living FHHs (MLFs) and supplementary living FHHs (SLFs) classes which will be referred

[1] Some farm operators were found to sell their fruit products with the help of their children for a short period. Such minor activities were not considered as OFE.

to thereafter as **main income classes,** (b) the broad classification; full time FHHs, class I and class II which will be referred to thereafter as **income classes.** (c) dual job holders (DJHers) and full time farmers (FTFers) which is based on the main occupation of the farm operators to be referred to thereafter as **main occupation classes.**

6.3 INCIDENCE OF RURAL PLURIACTIVITY

The incidence of RP in this study will be examined on the bases of two units of analysis (1) farm households (FHHs) for income classes and (2) farm operators for labour measure.

6.3.1 FARM HOUSEHOLDS AS A UNIT OF ANALYSIS

Analysis of the survey data, as Table 6.1 shows, indicated that in 81.4% of cases, at least one member of FHHs was involved in off-farm employment. The proportion increases to 85% if the sample is weighted in accordance with the fraction of the irrigated holdings which are over represented. If total off-farm Income, whether earned[2] or unearned, is to be considered, the percentage of holders who depend solely on farm income was found to be only 12% for the unweighted sample and 9% for the weighted sample. If the FHHs which practice farming as a supplementary activity (SLFs) only are to be considered, Table 6.1 shows that the they represent more than 60% of the farm households.

6.3.2 FARM OPERATORS AS A UNIT OF ANALYSIS

Based on the above definition of RP and considering the main occupation of farm operators, survey results (Table 6.2) indicate that 54% of respondents declared that their main occupations was not farming. The percentage for the weighted sample was found to be 58%. Looking more closely at the time allocation, 19% of the dual

[2] All subsequent classifications will be based on earned income unless indicated otherwise.

Table 6.1 Income Classes Based on Earned and Total Off-farm Income
(per cent of farm households)

Income Class	Earned Income Only		Total Off-farm Income	
	Unweighted	Weighted	Unweighted	Weighted
MLFs	39.7	34.9	37.1	32.0
- FT holders	18.6	15.0	11.9	9.1
- Class I	21.1	19.9	25.2	22.9
SLFs (Class II)	60.3	65.1	62.9	68.0
Total	100.0	100.0	100.0	100.0
Number of Cases	194	155	194	155

Source: survey results[3].

job holders (DJHers) were found to work more than 50% of the year on the farm against 62% of those who considered themselves as full time farmers (FTFers). Only 11% of (all) farm operators were found to work 10-50% of the year. These figures suggest that (a) time was not a satisfactory criterion to classify DJHers, (b) there is a high degree of underemployment among FTFers and (c) farm operators either allocate limited time to farming or spend a good deal of their time on farms.

The findings of this study on dual job holding are comparable to the results of the Agricultural Censuses (DOS 1977, 1985). As the figures were 35% and 43% for the 1975 and 1983 Censuses, the survey findings for 1989 suggest that percentage of DJHers has increased during the 1980s.

These figures support the hypothesis that the incidence of RP among FHHs or farm operators is quite high regardless of the definitions and basis of classification. The steady increase in the percentage of DJHers partly supports the hypothesis that RP is a permanent feature of the agrarian structure.

[3] **All subsequent tables are derived from the survey results unless stated otherwise.**

Table 6.2 Dual Job Holding by Farm Operators (per cent)

Main Occupation	Unweighted	Weighted
Dual Job Holders	53.6	58.0
Full time farmers	46.4	42.0
Total	100.0	100.0
Number of Cases	194	155

6.3.3 THE REGIONAL DISTRIBUTION

Table 6.3 indicates that the distribution of income classes was found not to be (statistically) significantly different across the administrative areas[4]. This holds

Table 6.3 Distribution of Income Classes by Governorate (percent)

Income Class	Amman	Balqa	Irbid	Karak
MLFs	41.9	47.6	40.0	25.8
- FT farms	16.1	28.6	17.8	9.7
- Class I	25.8	19.0	22.2	16.1
SLFs (Class II)	58.1	52.4	60.0	74.2
Total	100.0	100.0	100.0	100.0
No. of Cases	31	42	90	31

Chi Square: P = NS

regardless of whether we take the FHHs or the farm operators as unit of analysis.

[4] This list of governorates is according to the pre 1985 administrative system of five governorates (Ma'an excluded). The Table B.5 in Appendix B presents the distribution according to the new system (of eight governorates). The previous system was adopted throughout the study for two reasons, Firstly, if the new system is to be used, the number of cases was found not to be satisfactory to validate the results of Chi Square tests. Second, the Agricultural Censuses results were produced according to that system. Thus, using this system makes the data more comparable.

Comparing the survey findings and the results of the 1975 and 1983 Agricultural Censuses (Table 6.4) indicates a steady increases in the proportion of DJHers in all governorates. Highest rates of increase were found in Karak where the agricultural potential is least favourable. As expected, high rates can also be observed in rural Amman and Balqa as they are close to the centre of the public

Table 6.4 Distribution of Dual Job holders by Governorate (%)

Main Occupation	Amman	Balqa	Irbid	Karak	Overall
1975 Census*	33.2	20.8	40.4	23.1	34.9
1983 Census*	39.4	37.1	48.0	46.5	42.5
Survey Findings	58.1	47.6	51.1	61.3	53.1

* Source: DOS 1977, 1985.

administration and the location of the bulk of industrial development where OFE opportunities was readily available in the 1970s and most of the 1980s.

After controlling for the effect of the irrigation variable, there were no significant differences in the distribution of income classes (or main occupation classes) by region (geographically) as Table 6.5 shows.

Proximity to the nearest city, urban centre or the capital was found to have insignificant effect in influencing RP regardless of the unit of analysis (FHHs or farm operators). However, only if the analysis is based on main income classes, proximity to the nearest city was found to have a low significance on the decision to take off-farm employment. Contrary to what is expected, holders in the more remote villages were found to be more likely to be pluriactive. The extensive transportation network in Jordan has made it possible for them to travel the relatively short distances between the rural areas and the urban centres. The greater part of economic activities in Jordan are concentrated in a radius of about 30 miles around the capital Amman and more than 90% of the population live in a radius of 50 miles of Amman.

Table 6.5 Distribution of Income Classes by Region[5] (per cent)

Income Class	North	Middle	South
MLFs	22.0	34.3	26.7
- FT Farms	10.0	14.3	10.0
- Class I	12.0	20.0	16.7
SLFs (Class II)	78.0	65.7	73.3
Total	100.0	100.0	100.0
Number of Cases	50	35	30

Chi Square: P = NS

These findings support the hypothesis that RP is not influenced by the geographical distribution and proximity to the nearest cities or urban centres.

6.3.4 THE AGRICULTURAL POTENTIAL

In contrast to the lack of relationship between RP and the spatial distribution, Table 6.6 shows that RP was found to be associated with agro-ecological variation which better reflects the agricultural potential than governorates which is arbitrarily divided for political and administrative considerations. While about 40% were found to be class II pluriactive in the eastern and Jordan Valley zones, about 69% were found to be so in the highlands.

RP was also found to be associated with areas with less favourable conditions for farming in the rain-fed highlands areas. Table 6.7 shows that less than 50% in the lowlands were class II pluriactive against 77% in the mountainous areas. Similarly, one in four was found to be FTFer in the lowlands but one in ten in the highlands.

[5] Table B.6 in appendix B presents the distribution of income classes by region without controlling the irrigation variable.

Table 6.6 Distribution of Income Classes by Zone (per cent)

Income Class	Eastern Zone	Jordan Valley	Highlands
MLFs	58.3	59.4	30.8
- FT Farms	37.5	29.7	12.0
- Class I	20.8	29.7	18.8
SLFs (Class II)	41.7	40.6	69.2
Total	100.0	100.0	100.0
No. of Cases	24	37	133

Chi Square (a) MLFs/SLFs: P = .002, (b) FT/Class I/Class II: P = .001

There was no evidence to indicate that rates of annual rainfall, which should have a bearing on farming activities,have any effect on the incidence of RP. This suggests that farming in the highlands under dry farming conditions provide limited employment opportunities, no matter how favourable they are. In 8 villages in the

Table 6.7 Distribution of Income Classes by the Topography of the Area (per cent of farm households)

Income Class	Low Land	Mountainous
MLFs	51.8	23.2
- FT Farms	25.0	9.8
- Class I	26.8	13.4
SLFs (ClassII)	48.2	76.8
Total	100.0	100.0
No. of Cases	112	82

Chi Square (a) MLFs/SLFs: P = .0003, (b) FT/Class I/Class II: P = .0001

highlands (out of 18), there were no full time FHHs and in five of which, there were only class II pluriactive.

The distribution of RP by farming system varies whether we consider the main income classes or the main occupation of the operators. Table 6.8 shows that 27% of FHHs in the dry farming areas depend wholly or mainly on farming (MLFs) against 58% in the irrigated areas divided equally between full time class and class I. Whereas 37% and 61% of operators with farming as their main occupation (FTFers) were in the rain-fed and irrigated farming areas respectively (Chi.002). Irrigation as expected is a critical limiting factor in a semi-arid country such as Jordan.

These differences can be explained by the existence of a dual system in the agricultural sector with almost two distinct sub-sectors; a developed irrigated sector and a backward rain-fed system.

Investment in the irrigated sub-sector is high; two thirds of the irrigated area was characterized by the use of modern irrigation technologies in 1986 (AMO 1987). Use of greenhouses is widespread to the extent that the government authorities have found it necessary to control its use by the requirement of prior licenses. Farm operators in this sub-sector are more professional and commercially oriented. The

Table 6.8 Income Classes by Source of Irrigation (Per cent)

Income Class	Dry Farming	Irrigated Farming
MLFs	27.0	58.2
- FT Farms	11.3	29.1
- Class I	15.7	29.1
SLFs (ClassII)	73.0	41.8
Total	100.0	100.0
No. of Cases	115	79

Chi Square (a) MLFs/SLFs: P = .0001, (b)FT/Class I/Class II: P = .0001

use of high yielding varieties, fertilizers, and pesticides is a common practice. Cropping intensity of production is high and varied cropping patterns are feasible.

In contrast, in the rain-fed areas, static traditional technology is the norm. Choice of enterprises is constrained by the ecological conditions. Underemployment and seasonality of the agricultural operations are salient feature of dry farming. Farms are predominantly small and fragmented. Rainfall is highly variable. Therefore, integration between agricultural and animal production and efficient intercropping is hindered which might increase production and level farm employment. These conditions have led to; low crop yields and instability in production and in farm income.

Against this background, RP would be expected to be more widespread in the rain-fed areas as a rational response to the low potential incomes and uncertainty in farming and to overcome the otherwise hazardous way of life. This partly support the hypothesis that RP is associated with the levels of agricultural resources.

To this must be added that the main urban centres are found in the highlands where rain-fed farming is the norm while the irrigated areas are relatively far from these centres. Consequently, farm operators in the rain-fed areas have much more access to OFE opportunities which compensate for the limited farm resources available to them.

It appears that the effect of the availability of water for irrigation is the underlying variable in influencing the regional distribution of pluriactive. Other influencing factors on RP are topography on the supply side and the availability of OFE on the demand side

6.4 CONCLUSIONS

The available data from the agricultural censuses underestimated the extent of RP due to the limitations of the definition. Analysis of the survey data has indicated that the incidence of RP among FHHs or farm operators is high regardless of the definitions and bases of classifications. The steady overall increase in the percentage of DJHers and across the different governorates suggest that RP is a permanent feature of the agrarian structure. The incidence was found to be negatively associated with the availability of water for irrigation which is largely located in the lowlands. Regional differences and proximity to urban centres were found to have insignificant influence on the distribution of RP. The availability of extensive transport system and OFE opportunities have made it possible for FHHs to combine farming and non-farming activities.

CHAPTER 7

FARM HOUSEHOLD CHARACTERISTICS

FARM HOUSEHOLD CHARACTERISTICS

The literature review established that, in many countries the farm household (FHH) characteristics are important factors in shaping the behaviour and the reaction of their members to the rapidly changing socio-economic conditions. In this chapter, using survey data from Jordan, types of FHH, size of household, age and education characteristics of farm operators, wives and other members will be explored to test whether pluriactive FHHs or operators have different characteristics from full time FHHs or operators.

7.1 TYPES OF FARM HOUSEHOLD

Types of households in Jordan can be classified into 'nuclear' and 'extended' types. Table 7.1 shows that about 28% of FHHs in the sample were of the extended [1] type of family. The extended type was the prevailing system until the last two decades, but with rapid socio-economic development, young and educated members of the FHHs have become more mobile and their social values and obligations have

Table 7.1 Distribution of Income Classes by Type of Family (percent)

Income Class	Extended	Nuclear	Total	No. of Cases
MLFs	26.0	74.0	100.0	77
- FT Farms	5.6	94.4	100.0	36
- Class I	43.9	56.1	100.0	41
SLFs (Class II)	29.1	70.9	100.0	117
Overall Sample	27.8	72.2	100.0	194

Chi Square: (FT /Class I/Class II) P = 0.001

[1] The nuclear family is defined as a unit composed of a married couple with (or without) their offspring. The extended family is defined as the family unit in which other members, other than parents and children, are present.

drastically changed. Consequently, the nuclear type of family is increasingly becoming the norm.

There was significant difference between income classes with respect to household type. Contrary to what is expected, there were more nuclear families among the full time FHHs; only two families were of the extended type in the irrigated areas, while more than 40% of class I and II were joint extended[2] families. This is not to suggest that a full time FHH who is totally dependent on farm income is more amenable to social change; rather because farming does not seem to be, in general, capable of providing employment or supporting more than one family.

Table 7.2 Type of Farm Household by Source of Irrigation (percent)

Farming System	Extended	Nuclear	Total	No. of Cases
Under Irrigation	40.5	59.5	100.0	79
Rain-fed Farming	19.1	80.9	100.0	115
Overall Sample	27.8	72.2	100.0	194

Chi Square: P = 0.002

There was a significant difference between income classes in the irrigated areas with respect to household type. Highest percentage of extended type was found in class I while class II rank second (Chi.001), but there was no difference in this regard in the rain-fed areas. The difference in the type of family was significant between FHHs in the irrigated areas and rain-fed areas (Table 7.2) and by the agricultural zones (Chi.02). While 19% of the FHHs in the rain-fed areas were of the extended type, there were 40% of FHHs of this type in the irrigated areas. However, there was no significant difference either between the main income classes or between main occupation classes generally or under dry or irrigated farming. These results suggest that other variables such as irrigation, which implies intensive

[2] Joint extended family is defined as a unit composed of two couples or more with or without their offspring and other members.

farming, is the underlying variable rather than the main source of income for FHHs or occupation of the farm operator. This might be explained by the need to provide family labour for irrigated farming which seems to be a critical factor in attaining a degree of economic viability under worsening conditions of the farm sector. Thus the economic necessity motivates farm families to join forces and stick together as a survival strategy to minimise costs of living as well as costs of production. But under other conditions, the evidence suggests that the preference for the nuclear type is prevailing.

Of the overall sample, 73% of households were found to be composed of two generations, only 6 FHHs were composed of one generation. Full time FHHs were the most represented in the two generations category while class I FHHs were the most represented in the two and three generations. However, there were no differences in the distribution of number of generations when the main source of income or main occupation classifications was considered. These findings are in line with the above mentioned findings regarding the type of family.

We can conclude that there is enough evidence to support the hypothesis that the type of FHHs and number of generations were related to the distribution of income classes. The same can be said with the farming system. However, there was no evidence to support the view that the type of family and main income of the FHH or the main occupation of the farm operators are related.

7.2 FARM HOUSEHOLD SIZE

The average size of FHH for the rural areas seems to be underestimated in national statistics. The national average size of family in 1987 was 7.2 members in general and 7.5 members for rural areas (DOS 1988b).

The average size of FHH for the entire sample was found to be 9.6 members (SE 0.36)[3]. Phocas (1982), Sadeq (et al., 1988) and Bani Hani (et al., 1989) estimated the average to be 10, 10.2 (on national level) and 9.2 members (Zarqa Catchment area) respectively. More recent survey carried out by DOS (1990b)

[3] The median was found to be 9 members and the mode was found to be 10 members.

estimated the average to be 8.7 in the Highlands and 8.95 members in the Jordan Valley.

The lowest family size group (1-5) represented 26% of the size groups in the Agricultural Census 1983 (DOS 1985), 10.5% in Sadeq (et al., 1988) study as compared to 17% in this study as Table 7.3 shows. However, the sample was slightly negatively skewed due to the existence of 10% of rather big families with more than 15 members. Three FHHs were found to be extremely large (27, 32 and 37 members). Table 7.3 shows that 47% of FHHs were composed of ten members or more, and only 17% were of five members or less. This suggest that the FHH size is large even when the exceptionally large families are excluded.

The difference in household size between income classes was found to be of low significance (Table 7.3). Full time FHHs were more evenly distributed among family size groups, while class I and II were more represented (58% and 44% respectively) in the largest group.

Table 7.8 shows a significant difference between the means of income classes with class I as the largest and full time farms with lowest mean size of FHH. These findings suggest that the larger the size, the more likely the FHH to be involved in RP. This tendency has many possible explanations; the oversupply of family labour, the necessity to seek OFE to support the family or to share the available accommodations in the rural areas while commuting to OFE to reduce the increasing costs of living.

However, there were no significant differences either in the distribution of family size groups or in the means of classes if the main income classes or the main occupation of the farm operators were applied for the overall sample. But, there was significant difference between the means of FHHs in the irrigated areas (10.7 members) and the rain-fed (8.9 members) areas (ANOVA.02). Based on the main occupation classes and unlike the irrigated areas, DJHers were more represented in the larger FHHs in the rain-fed areas than FTFers (Chi.03). On one hand, this might lend support to the above mentioned explanation as OFE opportunities are more available in the rain-fed areas within a commuting distance than the irrigated areas. On the other hand, this suggests that the availability of OFE might be the underlying factor for RP rather than the size of the FHH. Thus, the line of causality is not clear.

Table 7.3 Farm Households Size Groups by Income Classes (percent)

Income Class	1-5	6-9	10-	Total	No. of Cases
MLFs	18.2	32.5	49.3	100.0	77
- FT Farms	30.6	30.6	38.8	100.0	36
- Class I	7.3	34.2	58.5	100.0	41
SLFs (Class II)	16.2	39.4	44.4	100.0	117
Overall Sample	17.0	36.6	46.4	100.0	194

Chi Square: (FT /Class I/Class II) P = 0.07

It can be concluded that there was some evidence to support the hypothesis that the size of FHHs was associated with the distribution of income classes. However, there was no evidence to suggest that this was the case if the main income of the FHH or the main occupation of the farm operators were considered.

7.3 CHARACTERISTICS OF FARM OPERATORS AND WIVES

7.3.1 MARITAL STATUS

Pluriactive farm operators, like most farmers in Jordan, tend to be married[4]. Table 7.4 shows that 93% of farm operators were found to be married, of which 9% were married to two women. 6% were single (all except one, were less than 30 years old) and the remaining 1% were widowed. Only one farm operator of the full time class was single and the only non-Jordanian in the sample, an Egyptian share cropper in an irrigated area in the Baq'a Valley near the capital Amman. These results suggest that marital status has no influence on the decision to be pluriactive or otherwise.

[4] Marriage is a religious act in Islam. Unless there is valid health consideration, every adult moslem (males or females) should be married to a suitable partner as soon as it is economically feasible.

Table 7.4 Marital Status by Income Classes (Per cent)

Income Class	Married		Single	Other	Total
	Monogamy	Polygyny			
MLFs	82.1	11.5	5.1	1.3	100.0
- FT Farms	80.6	16.7	2.7	0.0	100.0
- Class I	83.0	7.3	7.3	2.4	100.0
SLFs (Class II)	85.5	6.8	6.8	0.9	100.0
Overall Sample	84.0	8.8	6.2	1.0	100.0

Chi Square: P = NS

Of the married farm operators of the full time class, 17% were found to be polygamous (11% of the MLFs), but only 7% among class II. Polygyny[5] is a diminishing type of family and it is almost vanished in the urban areas[6].

7.3.2 AGE OF FARM OPERATORS

The overall average age of farm operators was found to be 49.6 years. This was the same result found by Bani Hani (et al., 1989). Similar results (49 years) were found by Phocas (1982) and Sadeq (et al., 1988).

Based on the main occupation classes of farm operators, Table 7.5 shows that there were significant differences in the distribution of age groups between DJHers and FTFers. DJHers were found to be much younger both generally and in each of

[5] Polygyny is defined as the marriage practice whereby a man has more than one wife at the same time. The term polygamy, however is more broad and refers to the marriage practice whereby any partner has more than one spouse at the same time. Such partners are called polygamous.

[6] Polygyny, which is largely restricted to the rural areas, is the product of social values rather than religion as it is acceptable in Islam under very strict conditions which hardly can be fulfilled and indeed, in practice they are very rarely so. This might explain the observed change in this practice due to increased awareness with the gradual disappearance of illiteracy, disapproval of the new generations and economic pressure.

the irrigated and rain-fed areas[7]. While among the DJHers 61% and 38% were less than 44 years among the DJHers in the irrigated and rain-fed areas respectively, only 25% and 5% respectively were of these age groups among the FTFers.

There were significant differences between the means of age between farm operators either of the main occupation classes (ANOVA.001) or between the main income classes (ANOVA.05). DJHers and SLFs farm operators were younger than full time farmers, especially in the **rain-fed areas** where more than two thirds of full time farmers are over 55 years.

Table 7.8 shows a significant difference between the mean age of different classes. Full time operators (both income and main occupation classes)were found to be older than pluriactive operators. Farm operators in the **irrigated areas** were

Table 7.5 Age Groups of Farm Operators by Main Occupation by Source of Irrigation (Percent)

Main Occupation	-34	-44	-54	-64	>65	Total
Under Irrigation	20.3	19.0	26.6	24.1	10.0	100.0
- DJHers	35.5	25.8	19.4	19.3	0.0	100.0
- FTFers	10.4	14.6	31.2	27.1	16.7	100.0
Under Rain-fed	7.0	18.2	33.9	27.0	13.9	100.0
- DJHers	11.1	26.4	38.9	16.7	6.9	100.0
- FTFers	0.0	4.6	25.6	44.2	25.6	100.0
Overall Sample	12.4	18.6	30.8	25.8	12.4	100.0
- DJHers	18.3	26.0	32.6	18.3	4.8	100.0
- FTFers	5.5	9.9	28.6	35.2	20.8	100.0
DOS 1985	15.1	24.2	26.3	19.1	15.3	100.0
DOS 1977	18.1	48.9		14.8	18.2	100.0

Chi Square (a) overall: P = .001 , (b) under rain-fed/irrigation: P =.001

[7] It is worth mentioning that while more than two thirds of FTFers in the rain-fed areas were over the age of 55 years, 44% of FTFers were of this age in the irrigated areas and none were over 65 years in the irrigated areas.

significantly younger than farm operators in the rain-fed areas (47 vs 51 years) (ANOVA.04), and DJHers were significantly younger than FTFers under both conditions (ANOVA.001).

Only 12% were found to be 65 years or more and the same percentage were less than 34 years. The large percentage of full time FHHs in the over 65 years category may be explained by the limited OFE opportunities, social constraints or low financial requirements. Considering the agricultural censuses 1975 and 1983, it appears that the percentage of the youngest and eldest was decreasing over time from about 18% to about 15% in both categories. The findings of this study might suggest that the trend is continuing as 12% were found to represent both groups.

Wives (1st) were much younger, 19% were 55 or over as compared to 38% for Farm operators. There were significant differences between main income classes, while 59% of the wives of the SLFs farm operators were less than 44 years, only 27% of the wives of those of the MLFs were of this age. Similar results were found if the main occupation of the farm operators was considered.

These results suggest that farming, in one hand is often and perhaps increasingly a less likely occupation for the young members. It tends to be a second occupation for the middle aged farm operators who might not practice farming under different circumstances. On the other hand the older generations who pass away or quit farming are less likely to be replaced by others.

The findings support the hypothesis that farm operators of the supplementary living farms (main income classes) and dual job holders (main occupation classes) and their wives are younger than full time farmers and this was more evident in the irrigated areas. They also suggest that an investigation of the dynamics of RP is necessary.

7.3.3 EDUCATION LEVELS OF FARM OPERATORS

Empirical studies in many countries suggested that education is an important variable in promoting RP. There was a significant difference between the levels of education of the farm operators of the main income classes for the overall sample and in the dry farming areas but with lower significance in the irrigated areas

(Chi.08). Table 7.6 shows that while 40% of SLFs (class II) were found to have secondary or high education, less than 20% of the MLFs were found to have these levels. The levels of education for full time farm operators and class I were similar though class I was found to have slightly higher levels. Higher education was not linked to agriculture except for two farm operators of whom one was a manager of an agricultural company. However, there were three other members of FHHs with a degree in agriculture.

Table 7.6 shows that the levels of education are consistent with the results of the agricultural Censuses 1975, 1983 (DOS 1977, 1985) except for the percentage of illiterate which is lower than what would be expected. Other differences might be attributed to improvements which are taking place over time[8].

Table 7.6 Levels of Education of Farm Operators by Income Class (percent)

Class	Illiterate	Elementary	Secondary	High Education	Total
MLFs	42.8	37.7	13.0	6.5	100.0
- FT Farms	47.2	33.3	13.9	5.6	100.0
- Class I	39.0	41.5	12.2	7.3	100.0
SLFs					
- Class II	19.7	40.2	22.2	17.9	100.0
Overall	28.9	39.1	18.6	13.4	100.0
DOS 1985	45.2	34.8	15.4	14.6	100.0
DOS 1977	52.1	36.2	10.0	1.7	100.0

Chi Square (a) MLFs/SLFs: P = 0.001, (b) FT /Class I/Class II: P = 0.02

Table 7.7 shows a significant difference between DJHers and FTFers for the entire sample, under irrigation and rain-fed conditions. The table also shows figures from a recent DOS farm management survey in 1988 which are close to the figures of FTFers in this study. This is understandable as the DOS surveyors were relying on

[8] Illiteracy is virtually eliminated in the younger generations.

FTFers for their information as it is more practical to collect data from them.

Table 7.8 shows a significant difference between the mean years of education for farm operators of income classes and main occupation classes in general. The average number of years of education for the pluriactive operators (whether income or main occupation classes) were higher than full time farm operators. There were also differences between the mean years in general between the irrigated and dry farming areas, holders in the irrigated areas were more educated.

Wives were found to be less educated, while 28% of farm operators were illiterate, 64% of wives were illiterate. There were differences in the levels of education between the wives of DJHers and FTFers. 52% of the wives of the DJHers were found to be literate compared to 29% of the wives of FTFers. The percentages for post elementary education were 29% and 10% respectively.

Table 7.7 Levels of Education of Farm Operators by Main Occupation by Source of Irrigation (percent)

Income Class	Illiterate	Elementary	Secondary	High Education	Total
Under Irrigation	29.1	32.9	21.5	16.5	100.0
- DJHers	12.9	22.6	38.7	25.8	100.0
- FTFers	39.6	39.6	10.4	10.4	100.0
Under Rain-fed	28.7	43.5	16.5	11.3	100.0
- DJHers	18.1	43.0	22.2	16.7	100.0
- FTFers	46.5	44.2	7.0	2.3	100.0
Overall Sample	28.8	39.2	18.6	13.4	100.0
- DJHers	16.3	36.6	26.9	20.2	100.0
- FTFers	43.3	42.2	8.9	5.6	100.0
* Rain-fed	50.5	36.3	10.0	3.2	100.0
* Irrigated	40.5	39.2	13.1	7.2	100.0

Chi Square (a) overall: P = .0001, (b) under rain-fed/irrigation: P =.001

* Source : DOS 1990.

To conclude, The full time FHHs were the smallest in size and class I is the largest. The pluriactive farm operators and their wives were younger and more educated than the full time operators. Farm operators in the irrigated areas tend to be younger, more educated and have larger FHHs.

Table 7.8 Some Characteristics of Farm Operators
(standard errors in brackets)

Class	Age(yrs)	Education(yrs)	FHH size	No. of Cases
MLFs	51.8 (1.4)	3.9 (0.5)	9.9 (0.7)	77
- FT Farms#	53.4 (2.2)	3.6 (0.8)	8.5 (1.0)	36
- Class I#	50.3 (2.0)	4.1 (0.7)	11.3 (0.9)	41
SLFs				
- Class II#	48.2 (1.1)	6.7 (0.5)	9.4 (0.4)	117
Overall	49.6 (0.9)	5.6 (0.4)	9.6 (0.4)	194
ANOVA#	.07	.001	.03	
DJHers	45.1 (1.0)	7.4 (0.5)	9.2 (0.4)	104
FTFers	54.9 (1.3)	3.6 (0.4)	10.1 (0.6)	90
ANOVA	.001	.001	NS	

Thus, there is overwhelming evidence to support the hypothesis that the pluriactive farm operators and their wives have significantly different characteristics with respect to age and education levels than FTFers. Higher education levels would have positive effects on the development of agriculture and will enhance the competitiveness of farm operators who will be more likely to seek OFE.

7.4 THE AGE STRUCTURE AND LEVELS OF EDUCATION OF HOUSEHOLDS

Only in 12% of FHHs there were no young children below the age of 15 years. 43% of the FHH members in the sample were found to be under the age of 15 years. There were no significant differences between classes in this regard. The overall average number for young members below the age of 15 years was found to be 4.6 and the average number of students per FHH (in school and in higher education) was found to be 3.6.

Although the results suggest that class I FHHs have more young children as well as more students than other classes, there were no statistically significant differences between the means of either variable in the three types of classification. There were also no significant difference between the means if the number of young members were broken down into members below 6 years age and from 6 to 15 years or if the numbers of students were broken down into students in different levels of education.

However, there were significant difference between the proportion of youth (<15 years) between DJHers (48%) and FTFers (37%) (ANOVA.003). There were also significant difference between the means of young children within the rain-fed and irrigated areas (ANOVA.01). FHHs in the irrigated areas had more children, and class I had the most among them. It is to be recalled that the FHH class I had the largest average FHH size, and there was enough support for the hypothesis of significant difference between the classes with regard to the average size of FHH.

It appears that the differences in the FHH characteristics are not systematic, and more related to the family sizes rather than the distribution of income classes or the main occupation of farm operators. For example, 57% of the FHHs of DJHers in the rain-fed areas have more than five young children, while 30% of FTFers have this number (Chi.06) and it may be recalled that DJHers have larger sizes of FHHs in these areas. In one out of three FHHs there was one member with high education. The lack of difference in the number of young members and students might be concealed by the existence of about 30% of relatively large and joint extended families and young children below the age of 15 years in almost 90% of cases which have made it difficult to trace the family cycles among the FHHs. The

widespread uptake of education services and interest in education may explain the indifference of FHHs with respect to education.

7.5 CONCLUSIONS

This chapter has dealt with FHHs and farm operators characteristics. Analyses of the survey data have provided evidence that the type and size of FHHs and number of generations were related to the distribution of the income classes. But this was not the case with the main income of FHHs or the main occupation of the farm operators. The pluriactive farm operators and their wives were found to be younger and more educated than full time farmers and this was more evident in the irrigated areas. This suggests that an investigation of the dynamics of RP is necessary. These characteristics would have positive effects for the development of agriculture and will enhance the competitiveness of farm operators in the labour market and more effective use of the abundant farm family labour.

There was no systematic data from the survey to support the view that the age structure of the FHHs and their levels of education were related to the distribution of income classes or the main occupation of farm operators. Where differences exist, they were more likely to be associated with the size of FHHs. However, significant differences might be concealed by the existence of about 30% of relatively large and joint extended families which have made it difficult to trace the family cycles among the FHHs. The widespread uptake of education services may explain the indifference of FHHs with this aspect.

These findings suggest that the use of broad income classes was more effective in examining the FHHs characteristics while using the main income and main occupation was more effective for examining the characteristics of farm operators. The breakdown of MLFs into FT farms and class I has proved to be useful as they were found to have different characteristics.

CHAPTER 8

FARM HOUSEHOLDS LABOUR AND THEIR ECONOMIC ACTIVITIES

FARM HOUSEHOLDS LABOUR AND THEIR ECONOMIC ACTIVITIES

There is a wide variation in labour use among farm households in Jordan, but family labour is seen by many farm operators as a major element in sustaining farming, and without which viability of a large number of farms under the present farm structure and marketing prospects is, at best, questionable. By the same token, off-farm employment is seen by many farm operators as a crucial element in sustaining the livelihood of the FHHs and without which their welfare will be severely undermined.

This chapter explores the state of labour force in the sample households and its involvement in economic activities on and off the farm.

8.1 THE STATE OF THE LABOUR FORCE

In this section, five related characteristics of the labour force, will be examined to test whether they vary by income classes, regions and agro-climatic zones.

Table 8.1 shows the distribution of the sample households with respect to the number of economically active members (16-64 years), the labour ratio[1] and the participation ratio.

The mean **number of economically active** for the sample was found to be 4.7 members. The distribution by income classes was significantly different, class I FHHs having the largest average members and FT farm households having the smallest mean. This is not unexpected, and is consistent with the mean size of FHH for income classes as Table 7.8 shows. This was also reflected in the lack of significant difference in the **labour ratio** between income classes. Similar results were found, if the number of economically active males and females were considered separately. However, the labour ratio varies if the classification is based on the main occupation of the farm operator. The mean household labour ratio was found to be significantly higher for FTFers than for DJHers as they were relatively older. The labour ratios

[1] The labour ratio is derived by dividing the number of economically active members by the number of FHH members.

Table 8.1 The State of Labour Force by Income Class

(Means, standard errors in brackets)

Income Class	Economically Active(a)	Labour Ratio(b)	Participation Ratio(c)	No.of Cases
MLFs	4.7 (.29)	.51 (.02)	.71 (.06)	77
- FT Farms	3.4 (.32)	.47 (.04)	.74 (.10)	36
- Class I	5.8 (.38)	.55 (.03)	.68 (.06)	41
SLFs (Class II)	4.8 (.24)	.54 (.02)	.54 (.02)	117
Overall Sample	4.7 (.18)	.53 (.02)	.61 (.03)	194

ANOVA: FT/Class I/Class II (a) P =.001 (b) P = NS (c) P =.004

were generally low which represents the typical demographic pattern in the developing countries.

Table 8.2 shows the mean **number of working members** involved in economic activities including farming activities regardless of periods of time worked on farms which would give an indication of the degree of activity of FHHs.

The overall **participation ratio**[2] was found to be 0.6 and it was well above the average on the MLFs with a significantly higher ratio on full time FHHs than other classes. This might be partly explained by the partial involvement in farming activities by members other than the farm operators. Other explanations could be the necessity of dependence on family labour to achieve some degree of economic viability and the relatively older FHH age structure. The significant differences among income and main occupation classes (including males and females) with respect to the number of economically active members are echoed in the number of working members. But, unlike the labour ratio, there were significant differences with respect to participation ratio between the MLFs and SLFs, the former being significantly higher as Table 8.2 indicates (ANOVA.001). The same reasoning mentioned above might be applied

[2] The participation ratio is derived by dividing the number of effectively working members by the number of economically active.

Table 8.2 Average Number of Farm Household Members Engaged on and Off the Farm by Income Class by Sex (Standard errors in brackets)

Income Class	Females		Males		No. of Cases
	On Farm*	Off farm	On farm*	Off Farm	
MLFs	1.2 (.12)	.09 (.06)	1.8 (.11)	0.64 (.08)	77
- FT Farms*	1.0 (.16)	.00 (.00)	1.3 (.13)	0.00 (.00)	36
- Class I*	1.3 (.19)	.17 (.10)	2.2 (.16)	0.12 (.10)	41
SLFs					
- Class II*	0.8 (.10)	.17 (.04)	1.8 (.11)	1.59 (.09)	117
Overall Sample	1.0 (.08)	.14 (.03)	1.8 (.08)	1.21 (.07)	194

ANOVA: * Females P =.03 Males P = .003

here too.

The low overall participation ratio might be attributed to the high percentage of population under sixteen as evidenced by labour ratios in Table 8.1 and high rate of school and university enrolment of persons older than 6 years (overall 38% of FHHs) and low female participation rate in OFE (5.6%)[3].

The average number of economically active members varies significantly among income classes by region (ANOVA.05). Similarly, the mean number of working members varies by zone (ANOVA.01). The mean numbers of economically active members for the east region and the Jordan Valley were the highest. This might be explained by the larger sizes of FHHs in these two regions where farming is under irrigation. The lack of significant difference in the overall as well as male and female labour ratio by region (and zone, governorate and source of irrigation) lend support to this explanation. However, there were significant differences in the participation ratio by income classes and the main occupation of the operators for the

[3] Female participation rate in Jordan was found to be 7.7% (MOP 1986) and it is expected to be lower in the rural areas. However, 40% of active females were found to be engaged in farming activities. This suggests that females in the rural areas are more active in productive activities (other than household activities) than their counterparts in the urban areas.

overall sample. Similar significant differences were found among FHHs within the rain-fed areas, (ANOVA.01) but the differences in the irrigated areas were either of low significance or not significant. Full time FHHs and class I were consistently more active than class II. There were also differences by region (ANOVA.04), the eastern region being 0.39 against more than 0.60 in other regions. Similar results were found by zone (ANOVA.04). This might be explained by the low contribution of other family members in the farm labour as the differences by region were manifested more strongly if females were considered only. This suggest that, although there might be no difference between the contribution of males in the labour force, the female members' contribution does vary by region. Participation ratios were significantly lower in the east region and to a lesser extent in the middle and north regions. The east region is characterized by large holdings, progressive farming practices and its remoteness from the residential areas of farm operators. These factors are more conducive for dependence on hired labour rather than family labour. Farming in the northern and southern regions is virtually under dry farming conditions where farming activities are limited, requiring less involvement from FHHs. Thus, the irrigation variable might be the main underlying variable with the female contribution form the most important secondary variable.

There were no significant differences between income classes in any of the above mentioned variables by governorate for its overall labour force or for males and female members. This is a further indication of the lower significance of the administrative divisions and the commuting distance in promoting rural pluriactivity. This suggest the spatial variations were largely related to the agricultural potential rather than to geographical distribution or distance from urban centres.

The average **number of dependants**[4] was found to be 6.1 (SE .27) and the mode was 5 dependants. Farm operators with main off-farm occupation (DJHers) were found to have significantly higher mean number of dependants (6.6 vs 5.4 members) (ANOVA.03). As Table 8.3 shows, the relationship between groups of number of dependants and the occupation of the operators was significant. While 54% of DJHers have 6 dependants or more, 32% of FTFers have this number

[4] The number of dependants are based on formally employed FHH members off the farm and on members with farming as a main occupation.

(Chi.01). The difference was highly significant in the rain-fed areas (Chi.001) but there was no significant difference in the irrigated areas at all. This might be explained by the older age of full time farmers in the rain-fed areas, but this was not so in the irrigated areas as FTFers were found to be relatively young (as indicated in Chapter 6).

Table 8.3 The Main Occupation of Operators by Number of Dependants (%)

Income Class	1-3	4-5	6-7	8-10	>10	Total
DJHers	14.4	31.7	15.4	25.0	13.5	100.0
FTFers	28.9	38.9	13.3	8.9	10.0	100.0
Overall	21.1	35.1	14.4	17.5	11.9	100.0

Chi Square: P = 0.01

8.2 THE ENGAGEMENT IN FARM WORK

The mean number of members engaged in farming activities were found to vary by income classes with the highest mean on class I farms (3.5) and the lowest on full time FHHs (2.3) (ANOVA.003). Similar significant differences were observed if males and females were considered separately (Table 8.2).

The findings of the study indicate that the average size of FHH is 9.6 members of which 2.75 (28%) were engaged in farming (regardless of the period of time of their engagement). More than one third of the farm family labour (36%) were females and to a large extent it represented the wives contribution. A recent farm management survey put the overall mean on 2.28 members, 2.84 members for the irrigated areas in the highlands, 2.51 members for the Jordan Valley (DOS 1990b) while another study in the middle region put the figure for the rain-fed areas as 2.2 members (Bani Hani et al., 1989) which is lower than the irrigated areas. The discrepancy between the study figures and those in other studies was perhaps due to the inclusion of minor activities. With a farm structure dominated by small farms,

many activities which individually seems to be minor add up to many working days over the year and indicates a way of life. However, these figures cannot be taken as an indicator of the level of man-days worked on the farm, but they do give an impression of the nature of farming as a family venture. As indicated in Chapter 2, the Agricultural Census 1983 results (DOS 1985) reported that the farm work on 80% of holdings was virtually carried out by family labour and that FHHs were increasingly dependent on their members for seasonal labour.

The mean number of FHH members engaged in farming varies by region, with the highest mean (3.2) in the Jordan Valley and the lowest in the eastern region (1.7) while the mean in other regions was about 2.7 members (ANOVA.05).

8.2.1 LABOUR INPUT OF FARM OPERATORS

Table 8.4 shows that 38% of the farm operators in the sample were engaged in farming activities for about one month and less than one third of operators (28%) had a year-round involvement.

Table 8.4 Farm Labour Input of Operators by Income Class (percent)

	Farm Man-days groups					
Income Class	<30	30-90	91-270	>270	Total	Cases
MLFs	14.3	11.7	16.9	56.1	100.0	77
- FT Farms	16.7	8.3	11.1	63.9	100.0	36
- Class I	12.2	14.6	22.0	51.2	100.0	41
SLFs (Class II)	53.9	16.2	21.4	8.5	100.0	117
Overall Sample	38.2	14.4	19.6	27.8	100.0	194

Chi Square (a) MLFs/SLFs: P =.0001, (b) FT/Class I/Class II: P =.0001

The percentage of farm operators spending up to one month in the main living farms is much less, but contrary to what is expected, class I and not the FT farms' operators has the lowest percentage. At the other extreme and as expected, the

percentage of farm operators who spent more than 270 days (that is a year-round employment) were highest on FT farms (64%) and lowest on the class II farms (8%).

However, man-day estimations might be misleading, as it is possible that a full day of work may not be actually a whole working day for FT operators. Physically they may be present on their farms as a source of personal pleasure or to kill time, the work involved may not require that amount of time due to variations such as physical strength, micro agro-climatic conditions and degree of mechanization. By the same token, a man-day on the farm by class I (or class II) might be a part day. It was hard in practice to elaborate on this intractable issue of structural underemployment during the field work. It is still possible, however, to consider these figures as an indicator of the degree of farm operators' involvement in farm work.

8.2.2 FARM LABOUR INPUT OF WIVES AND OTHER MEMBERS

Table 8.5 presents the **wives' contribution** which indicates that 44% of wives were found not to be involved in farming altogether with the highest percentage in class II farms and the lowest on class I farms (not on the FT farms). The higher percentage of wives who contribute more than 30 or 180 days were among class I farms and those with class II were the lowest.

Wives contribution appears to be significantly influenced by the level of involvement in farming by the farm operators. While 45% of the wives of operators who worked less than 30 days contributed nothing to farm labour, 50% of operators who worked more than 270 days had wives who worked more than 30 days (Chi .001). Females (largely wives) play an important role in the farm family labour force where the farm operators are active in farming activities (relative to labour requirements).

Wives of farm operators with main off-farm occupation (DJHers) were found to be significantly less supportive than their counterparts with husbands having farming as their main occupation. While 52% of wives of the DJHers contribute nothing to farm labour and only 5% worked more than 180 days, 36% of FTFers had nil contribution and 18% worked more than 180 days (Chi .006). Wives of FTFers tend to reside in the villages (except the eastern zone) and hence farms are more

Table 8.5 Farm Labour Input of Wives by Income Class (Per cent)

Income Class	Farm Man-days groups None	< 30	30-180	>180	Total	Cases
MLFs	31.9	15.3	34.7	18.1	100.0	72
-FT Farms	34.3	25.7	28.6	11.4	100.0	35
-Class I	29.7	5.4	40.6	24.3	100.0	37
SLFs (Class II)	52.8	30.5	10.2	6.5	100.0	108
Overall Sample	44.4	24.4	20.1	11.1	100.0	180

Chi Square (a) MLFs/SLFs: P =.0001 (b) FT/Class I/Class II: P =.001

accessible and as such, perhaps they are more oriented to farm work as a way of life.

Table 8.6 presents the combined **contribution of other FHH members.** They slightly exceed the actual figures as they include the minor contribution of the non residents members of the farm family. In 47% of cases, other members contribute nothing to farm labour. Contrary to what was expected, members of full time FHHs had the highest percentage among those who contribute nothing to farm labour and the lowest in other man-days categories except the >180 category where they rank second. Other members of class I were the most active in the 30-180 and >180 man days categories and the least likely to have nil contribution to farm labour. The

Table 8.6 Farm Labour Input of Other FHHs' Members by Class (%)

Income Class	Farm Man-days groups None	<30	30-180	>180	Total	Cases
MLFs	40.0	10.7	21.3	28.0	100.0	75
-FT Farms	61.8	5.9	17.6	14.7	100.0	34
-Class I	22.0	14.6	24.4	39.0	100.0	41
SLFs (Class II)	52.2	19.5	23.0	5.3	100.0	113
Overall Sample	47.3	16.0	22.3	14.4	100.0	188

Chi Square (a) MLFs/SLFs: P =.0001, (b) FT/Class I/Class II: P =.0002

explanation might be that, (a) full time farming was most likely to be in the eastern region (Table B.6 in Appendix B) and hired labour is the backbone of farming, and (b) a lower per cent of full time FHHs reside in the village or a nearby village (68% vs 93% for class I) (Chi .004) so that other members, including wives, have less access to work on the farm. Some 90% of wives (and other members) who spent more than one month or more than 6 months were residing in the villages. It might be added that children of full time FHHs (with rural orientation) are often more resentful of farm work than RPAs' children as the image of farming as an occupation is not very positive among the younger generations. Some operators were dismayed as their children refrain from work on their farms even when they are unemployed.

It was found that the more the operators worked on the farm, the more the other members tend to work on the farm. While 47% of other members who contribute nothing were found in FHHs where the farm operators worked less than 30 days, 67% of other members who worked more than 180 days were found in the FHHs where the operator was working FT over 270 days (Chi .001). The association with wives farm man-days was similar. While 65% of other members who contribute nothing were found in FHHs where the wives had nil contribution to farm labour, 56% of other members who worked more than 180 days were found in the FHHs where the wives worked over 30 days (Chi .001).

The number of males working on the farm did not vary with the man-days of the operator. But the number of females were clearly positively related to the man-days of the operator. While 40% of FHHs where females were not involved in farming activities were found in the below 30 day category, 52% of FHHs where three females or more were involved in farming were found in the over 270 category (Chi.006). If females work on the farm at all, the more the number the more likely to be in the MLFs especially class I households (Chi .06), with small to medium farms and in the irrigated areas (ANOVA.002).

8.2.3 FARM LABOUR INPUT VARIATIONS

8.2.3.1 Variations with Household Characteristics

There were no significant relationships between age and education of the farm operator and his engagement in farming activities. But, there was a significant link with the size of FHH. Farm operators with larger FHHs tend to work more man-days on the farm. Operators who worked less than 30 days were found to have on average 8.5 members, while those who worked more than 270 days had on average 10.9 members (ANOVA.001). It was also found that 13% of operators with a FHH size of less than five members worked FT on the farm (> 270), but 61% of the FHHs with 10 members or more did so (Chi .001). It might be recalled that FHHs in the irrigated areas tend to be larger in size, and to work more man-days on the farm.

Farm man-days worked by operators and to a lesser extent by wives were significantly associated with the number and the relative percentage of the young members in the FHH. It was found that the more young members (<15 years) and the higher their proportion the more likely the wife to contribute labour to the farm and the more likely to work more man-days. Wives who did not contribute in the farm labour were found to have an average of 4.1 youngsters and less youthful households, but wives who worked about 30 days and over than 30 days had on average 4.7 and 5.6 members respectively (ANOVA.07). This tendency was more evident with farm operators. Those who worked more man days, tend to have more youngsters in their FHH (ANOVA.02). This might be attributed to the simple fact that young farmers work harder or to the life cycle of the family where their greatest financial input is required at the early stages of the family cycle. However, the presence of large extended families make it difficult to assign more confidence to these explanations.

8.2.3.2 Variations with the Size of the Farm and Farming systems

Table 8.7 shows that, and as expected, the larger the farm, the more man-days the farm operator worked on the farm. However, there was wide variation in the man-days between size groups, but generally man-days increase with the size of the holding to a point before they start to decrease. This may be influenced by the type of farming (whether under dry farming or under irrigation) or the type of enterprise (whether vegetables, fruit trees), type of technology (whether open fields, under drip irrigation or greenhouses), the ownership of animals and the extent of the operators' involvement on and off the farm.

Table 8.7 Man-days Worked by Farm Operators By the Operated Area

Man-days Worked	Size Groups (dunums)* <20	-50	-100	> 100	Overall	Cases
- 30	62.7	21.6	30.3	25.6	38.2	74
30 - 90	11.9	19.6	21.2	7.0	14.4	28
91 -270	17.9	27.4	21.2	11.6	19.6	38
over 270	7.5	31.4	27.3	55.8	27.8	54
Total	100.0	100.0	100.0	100.0	100.0	194

Chi Square: P = .001

* Areas in dunums. One dunum = 1/10 hectare.

A similar pattern was observed under rain-fed conditions. However, the pattern in the irrigated areas was different. The operators involvement in farming activities decrease as the size of holding increase to a point where it increases. This suggest that operators in the irrigated areas are more involved in farming activities in the smallest and the largest sizes. It is to be mentioned that small sizes of farms under irrigation are much more viable compared to farms in the dry areas. Greenhouses are more likely to be found on small farms to achieve more efficient scale and normally drip irrigation is used; these conditions are highly demanding for labour.

Farm labour input of operators varies with the availability of water for irrigation. Labour requirements are significantly higher under irrigated farming as compared with dry farming. While 53% of operators in the irrigated areas were fully employed on the farm, only 10% were so employed in the rain-fed areas (Chi .001). There is a distinct seasonality for farming in the rain-fed areas, while farming in the irrigated areas is intensive for a considerable time of the year. In the Jordan Valley it is almost evenly spread throughout the year and double cropping is the norm. Labour requirement for production in the dry farming areas had 1-2 seasonal peaks, basically for harvesting while labour peaks are much more frequent in the irrigated areas for land preparation, planting, weeding, application of fertilizers and pesticides and harvesting.

Of full time and class I operators, 91% and 56%spent more than 270 days, but 14% and 44% respectively spent this time under rain-fed conditions (Chi.001). These figures suggest that full timers are the mainstay of farming in the irrigated areas but it is mainly class I in the rain-fed areas.

Wives' contribution was more significant in the medium sized farms in the irrigated areas and on class I farms, but on larger farms in the rain-fed areas. As explained earlier, FT farm families, specially with larger farms in the irrigated areas were less likely to reside in the village. This, however, applies more to areas outside the Jordan Valley where irrigated farms are relatively remote and dependence on hired labour was the norm specially during late 1970s and 1980s.

Other members contributions were also more important in medium-sized farms generally but take the form of 'either or'. If they contribute at all in the irrigated areas, their contribution is more than 180 man-days, while in the rain-fed areas, they are more likely to be less than 180 man-days.

8.2.3.3 Variations by the Type of Enterprise and Farm Income

Table 8.8 shows that the percentages of farm operators in the under 30 man-days group were lowest for vegetable growers, and highest for dry fruits growers. The variations were highly significant (Chi.001) between FHHs with different principal enterprise except for fruit trees generally where the level of significance was (Chi)

.04 only. The findings were found to be consistent with what were expected, except for cereal enterprise where the percentage of growers who worked less than 30 man-days were expected to be higher and the reverse for the over 270 man-days category. This might be explained by the tendency of the vast majority of farmers to grow cereals as an integral crop in the cropping pattern. Apart from reducing the plant disease problems, utilizing the residuals of fertilizers and reducing the risk of soil depletion due to intensive farming, cereals, especially wheat is an important crop to

Table 8.8 Operators' Farm Labour by Type of Enterprise (percent)

Type of Enterprise	Farm Man-days groups <30	31-90	91-270	>270	Total	Cases
Vegetable Growers***	14.9	11.7	28.7	44.7	100	94
Non-veg. Growers	60.0	17.0	11.0	12.0	100	100
Fruit Trees***	43.3	18.2	17.6	20.9	100	148
Non-fruit Growers	21.7	2.2	26.1	50.0	100	46
Dry fruits only***	51.2	21.5	14.9	12.4	100	121
Non-dry fruit Gr.	16.5	2.7	27.4	53.4	100	73
Cereals (General)*	30.9	16.4	18.2	34.5	100	110
Non-cereal Gr.	47.7	11.9	21.4	19.0	100	84
Animal Raising***	26.7	22.7	15.5	35.1	100	97
Non-owners	49.5	6.2	23.7	20.6	100	97
Overall Sample	38.2	14.4	19.6	27.8	100	194

Chi Square : *** P = .001 * P = .04

secure supply to FHHs of the much preferred hard wheat which is more compatible with the traditional taste as well as in making domestic bread (technically wise).

It is worth mentioning (a) that diversification rather than specialization is the norm which makes it difficult to differentiate between operators (b) the type of crop in the rain-fed areas is constrained by the agro-climatic conditions such as climate, rainfall, soil and slope. The choice of the type of crop, therefore, is limited. It is still

however possible to identify some differences which will be dealt with in the farm characteristics in Chapter 9.

The wives' contribution varies with the type of enterprise too. Percentage of wives in the lowest man-days groups was found to be among owners of animals; cereals rank second (Chi .001). As expected, apart from shepherding, looking after animals is almost exclusively a female job (wife or mother in law if present and fit). For cereals, in addition to what was mentioned earlier, another important reason for growing cereals, is to secure feed for animals either in the form of barley or straw. Therefore, cereals go hand in hand with raising animals. For fruit trees where wives contribution is highest in the less than 30 man-days group (Chi .01), family members, including wives, play a major role in harvesting which normally lasts a matter of few weeks. For vegetables, growers are less dependent on family labour, especially in the larger farms and in the eastern areas, but if wives contribute at all, it is more likely to be more than one month.

Other FHH members were most supportive among the animal owners, cereals and vegetables. As explained earlier cereals play an important role in the animal and vegetable production (as source of feed and an element in the cropping pattern).

As expected, **farm income** was positively related to the man-days worked by the farm operator. While 66% of FHHs in the farm income category of less than 500 JD (one JD = 0.9 UK Pound in 1989) were found where the operators worked less than 30 days. Conversely, 63% of the FHHs in the over 5000 JD category were found where the operators worked over 270 days (Chi.001). FHHs' income relationships will be dealt with in Chapter 10.

8.2.3.4 Regional Variation

There were significant differences between man-days on the farm (Chi.001) by governorate. Percentages of farm operators in the lowest size group were lowest in Balqa and Irbid and vice versa for the largest group. One explanation for the regional differences might be that the Jordan Valley is divided with respect to administration between these two governorates. The irrigated area in the east is within Irbid governorate. The distribution of operators by man-days by region lend

support to this line of reasoning, as there were very significant differences between man-days groups and regions (Chi .001). Only one operator in each of the eastern region and the Jordan Valley worked less than 30 days, but about two thirds worked more than 270 days. This suggests that a year-round employment is feasible in these two regions. However, Balqa and Irbid receive the highest annual rainfall and hence, rain-fed agricultural conditions are most favourable in these two governorates.

Wives' contribution is just the reverse, as they were more supportive in the rain-fed areas in Karak governorate where farms are small or medium sized, animal and cereal fruits production are relatively more prevalent than in other governorates which include the irrigated areas. Three out of four (72%) of wives in the eastern region contribute nothing to farm labour but only one in four was so in the southern region (Chi .07), while in other regions wives support was more or less indifferent. There are many possible explanations for this observation; the generally higher status of operators in the eastern region, tendency to rely on hired labour in the eastern (and to a lesser extent in the highland) zone under irrigation where farms are much larger than average, their residence being far away from their farms which are least accessible by paved roads. The flexibility and less labour demanding nature of enterprises in the rain-fed areas and perhaps the type of enterprise is directly linked to the basic food security of the FHH. This might be supported by the already mentioned findings that the more young members (<15 years) and the highest the percentage of youth the FHH have, the more likely the wife tend to contribute and the more man-days she works. The contribution of other members is similar to the wives except that they were most supportive in the Jordan Valley and to a lesser extent in the eastern area (Chi .001). Here again the either-or way of behaviour can be observed; that is either they contribute a good deal or very little.

8.2.5 HIRED LABOUR

Hired labour is largely casual labour. Only 24% of FHHs did not hire labour at all in the last year. Table 8.9 shows that the percentage of operators who hired regular and casual labour were highest on full time FHHs. Class I farms were more dependent on casual labour and class II farms were the least likely to have regular

Table 8.9 Hired Labour by Income Class (Per cent)

Income Class	None	Casual	Regular and Casual	Total	No. of Cases
MLFs	19.5	40.3	40.2	100.0	77
-FT Farms	22.2	33.4	44.4	100.0	36
-Class I	17.1	46.3	36.6	100.0	41
SLFs	27.4	52.1	20.5	100.0	117
Overall Sample	24.2	47.4	28.4	100.0	194

Chi Square (a) MLFs/SLFs: P = .01, (b) FT/Class I/Class II: P = .04

labour. Full time FHHs had also the highest mean of total hired man-days of labour which is more than two times the means of class I and more than three times the mean of class II (ANOVA.002).

The average number of regular workers was found to be 2.1 on FT farms and .67 on class II farms (ANOVA.03). Total hired man-days were 1460 on FT farms (1058 on MLFs) and 420 on class II farms (ANOVA.002).

As expected, the average number of regular workers was significantly higher in the irrigated than rain-fed areas (4.4 vs 1.0 workers) (ANOVA.02)). The average total hired man-days significantly higher, (1673 against 101 man-days) (ANOVA.001).

Again as expected, hiring labour was found to be positively related to the size of the holding and man-days worked by the operators. While 33% of the less than 20 dunums group did not hire labour at all, only 7% of operators with holdings over 100 dunums did not do so. Total hired man days too were positively related to the size of holding (ANOVA.001). The lower the man-days the operator worked on the farm the less likely he is to hire regular labour. The more educated and young farm operators of the age groups of 35-54 years were found to hire more regular and casual labour, and operators of the age below 34 years rank second (ANOVA.05). Their average hired man-days was 2-3 times the averages of the aged operators over 54 years (ANOVA.08). This suggest that farming is more intensive in the farms with younger and more educated farmers. We might recall that operators in the irrigated

areas were relatively younger and farming tended to be an occupation for the medium-aged farm operators as demonstrated in Chapter 7.

Half of full time FHHs in the sample did not hire regular labour against 63% and 80% for class I and class II. But 30% of full time FHHs hired three labourers or more against 15% and 4% for class I and class II respectively. Similarly, operators, with farming as their main occupation were found to hire more workers and more man-days than DJHers (Chi .001).

8.3 FARM HOUSEHOLD PARTICIPATION IN OFF FARM EMPLOYMENT

8.3.1 NUMBER OF MEMBERS WORKING OFF THE FARM

The survey findings show that 81.4% of the FHHs have at least one member involved in off-farm employment. 79% have at least one male member, but only 10% have at least one female member. This suggests that female participation among the FHHs in the off-farm labour force is substantially lagging behind male participation. However, secondary data indicates an upward trend in female participation (this will be discussed later in this section).

For most FHHs, only one or two members were working off the farm but 12% have three or more[5]. As expected, the larger the FHH size, the more likely it was to have members working off the farm (ANOVA.001). This might be explained either by the larger supply of labour or the tendency of members working off the farm to stay with their families while commuting to their work due to high costs of living at least until they are married.

Active members who are engaged off the farm are also largely involved on the farm. More than two thirds (72%) of the FHHs have at least one member of which only 15% have two or more. However, engagement in farming activities for

[5] In one extreme case, there were 10 members of one household (with a very large farm by the Jordanian standards) working off the farm and all of them without exception have had high education which include four engineers, two doctors, one lawyer and three wives, one with degree in chemistry and two in nursing. Besides, they have a sister studying engineering, and a married sister with a degree in engineering, but neither was part of the FHH. Their mother is illiterate, still alive and fit.

members other than operators and their wives is mainly seasonal. Demand for labour is especially high to assist in harvesting in the rain-fed areas and for planting in the irrigated areas. Otherwise, it is a matter of few hours each week, from time to time throughout the year. This was supported in the low contribution of other members; Table 8.7 shows that only 37% had collectively contributed more than one month on the farm.

The number of pluriactive was found to be influenced by region (Chi .007). Although FHHs in the east region had the largest average size, none were found to have more than one member engaged on and off the farm. This suggests a tendency to monoactivity rather than dual job holding in this region.

8.3.2 VARIATION BY CLASSES OF FARMS, REGIONS AND SOURCE OF IRRIGATION

Significant difference was found between class I and II farms in the number of members with OFE (Chi .001). More than half (53%) of Class II households were found to have two members or more working off the farm, whereas only 18% of class I households have more than one member.

Differences in the mean numbers of members working off the farm appears not to be influenced by regions and governorate. Source of irrigation, however, was found to be a significant variable (Table 8.10). As mentioned earlier, rural pluriactivity

Table 8.10 Number of Household Members Employed off the Farm by Source of Irrigation (Per cent)

Type Of Farming	None	One	Two-	Total	Cases
Rain-fed	14.0	47.4	38.6	100.0	114
Under Irrigation	29.5	41.0	29.5	100.0	78
Overall Sample	20.3	44.8	34.9	100.0	192

Chi Square : P = .07

is more widespread among FHHs in the rain-fed areas as such, and, numerically wise, they are more involved in off-farm activities. On average, there were 1.5 members per FHH working off the farm in the rain-fed areas, whereas the average in the irrigated areas was 1.1 members (ANOVA.04).

The findings support the hypotheses that, FHHs who are more dependent on off farm income (class II), are more likely to have more members working off the farm and they are more likely to be in the rain-fed areas.

8.3.3 EMPLOYMENT BY SECTOR

Off-farm employment was mainly outside agriculture. Over half (58%) were in the private sector and over than four fifths were in service industries (Table 8.11).

The low percentage of work in the agricultural sector might be explained by the limited non-family employment opportunities in the rain-fed areas, the availability of cheap foreign labourers in the irrigated areas and the lower status attached to

Table 8.11 Off-farm Employment by Type of Employer and Sector

Sector	Percentage	No. of Cases
Private Sector	58.3	60
Agriculture	12.6	13
Mining	3.9	4
Trade;retailers	15.5	16
Other Services	26.3	27
Public Sector		
Government Services	41.7	43
Overall Sample	100.0	103

farm work off own farms[6]. Reliance on foreign labour, however, is bound to be reduced significantly from 1990 onward due to the severe economic problems and the depreciation of the Jordanian currency in late 1988 and 1989 which will make employment in Jordan less attractive to foreign labour.

Perhaps surprisingly, employment in industrial production was found to be even more limited. Only 4% were found to be so employed (in a phosphate mine close to the capital and a cement factory in the south). The long and relatively hard working hours may explain the difficulty in taking another job. It is also possible that the industrial workers, being in well-paid occupation, are perhaps less motivated to seek farm employment.

These figures suggest that employment in the tertiary sector is the most likely to be mated with farm employment. Short working days for public work and flexibility of timing for self-employment, among other reasons, may explain the easy matching of on- and off-farm work. It was found in a recent study in Jordan (DOS 1989c) that dual job holding among wage earners, including agricultural workers, was very limited (0.5%) which suggest that farming is virtually the only occupation to be combined with other occupations.

Although farm operators with jobs in the public sector appear to be more educated, there was no significant statistical difference in the number of years of education between the operators employed by the public and the private sector. But, public sector workers were significantly younger (ANOVA.001). This is to be expected as there is an age limit for working in the public sector.

Those who were employed in the public sector were more likely to be in the rain-fed areas (Chi.09). This might be explained by the fact that main urban areas are situated in the rain-fed areas. It is also possible that working in the public sector, with rigidity in work time make it difficult to combine intensive farming with this type of OFE.

The findings support the sub-hypothesis that the type of OFE varies by income classes. Class II were found to be more likely to be employed in the services sector (Chi.003) and in the public sector (Chi.10).

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[6] Working on other farms by Jordanian labour was found to be virtually nonexistent in the Jordan Valley (JVA 1988). The same observation was also found in other irrigated areas.

8.3.4 TYPES OF OFF-FARM EMPLOYMENT

In this section the types of OFE for farm operators and other members will be explored separately to examine whether OFE for the younger generations differ from the older generations.

8.3.4.1 Farm Operators' Occupations

There was a wide range of off-farm occupations for farm operators and other FHH members (Table 8.12). Regularity is the most salient feature of OFE. 83% of the respondents were found to be working year-round in off farm jobs, of which almost 40% were salaried or waged jobs and the rest were basically self-employed. As few as 4% were in casual jobs. The remaining 13% were seasonal or farm related jobs, mostly complementary to farming activities.

The civil service is the largest source of employment for class II operators. The short working day, the relatively soft work load, status, and the ease with which government work could be acquired especially up to 1986, in addition to social and health security, may explain the tendency to have this type of employment. However,

Table 8.12 Household members by Type of Off-farm Employment (percent)

Type of OFE	Operators	Others	Overall
Civil Servant	35.6	22.1	27.5
Military Service	5.8	40.9	26.7
Self Employment	22.1	8.5	14.0
Business;employers	12.5	1.9	6.2
Professional	7.7	9.7	8.9
Off farm employee	3.8	7.1	5.8
Farm (related) work	12.5	9.8	10.9
Total	100.0	100.0	100.0
Number of Cases	104	154	258

this suggest that economic activities are yet to be developed in other sectors to create a demand for labour as the public sector cannot (and should not) be expected to absorb the increasing labour force in the future.

Self employment ranks second in importance. Three out of four of the self-employed were working in retailing, a popular job after retirement. Some were retailing part of their produce of fruits, vegetables and poultry. Few were trading in sheep and goats. Business and professionals ranked third, where farming is a side line business for them to generate income, add value to the land, in addition to the social values, financial security and inflation-resistant asset which serve as a cushion against hard times.

As mentioned earlier, work on other farms, farm-related work and employment in the industrial sector were limited. Only five respondents were working as labourers off their farms. Four were ploughmen doing custom work, of which one used a horse and the rest were using tractors.

Casual labourers and those with farm related work were well represented in class I FHHs. In general, one in every three labourers and one in every four self-employed were in class I. But only 7% and 5% of the operators in the government services and business and professional work respectively were in class I. This is a further indication that OFE is largely regular and farming ranks second as an occupation to the vast majority of operators.

About one third of the pluriactive were skilled, in the sense that their type of work require certain qualifications and/or training. These are to be found among the civil servants, military, business men and professionals where 61% of them have secondary or high education, whereas the percentage for others is 23%. There were significant differences in the mean years of education between occupation groups. Professionals and businessmen have the highest mean, government services rank second (ANOVA .001). However, 58% of the those who were working in military and civil services were in semi-skilled jobs such as drivers, and unskilled jobs such as guards and messengers.

Farm operators working in salaried and wage occupations were almost exclusively working in the public sector in the civil and military services. They were the youngest and the most educated. 63% were found to be less than 44 years.

Whereas, one third or less were in this age in other categories (Chi .00). Unskilled operators working as casual labourers were the oldest.

Professionals and businessmen were most represented in the largest and medium size holding groups in the irrigated areas. This conform to common sense as farming under irrigation is much more economically viable relative to farming under rain-fed condition, modern technology is available which is adapted to the local conditions, thus return prospects are more promising and more stable. While about 50% of professionals and businessmen were farming in the irrigated areas, less than 30% of other occupations were in these areas (Chi.07).

Almost two thirds of operators working in the public sector and the self employed were found in the smallest farm size group (Chi.01). Other occupation groups were more evenly distributed between the rain-fed and the irrigated areas (Chi.07). Although, figures indicate that operators employed in the government services have less tendency to rent or sharecrop land, tenure was found to be independent of occupation groups. Occupation group varies by governorate. Operators in Amman governorate were the least likely to be self employed, while operators in Irbid were the most likely to be so. Operators in Karak[7] governorate (less populated, less developed with less favourable agricultural conditions, although the gaps with main urban centres are increasingly bridged) were more represented in the government services or unskilled waged labour (Chi.05).

More than half of the professionals and businessmen were living in urban centres while two thirds or more of the other categories were living in or near their villages (Chi.001).

The vast majority of the pluriactive were found to have one job in addition to farming. 18% of pluriactive operators were multiple job holders having two jobs or more. Only one was found to have three jobs.

The findings support the sub-hypothesis that the type of employment is influenced by income classes. Class II were more likely to be in the public administration, professional and business, while class I operators were more likely to be self-employed and in casual employment (Chi.04).

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[7] The development gap between the main urban centres are increasingly bridged.

8.3.4.2 Other Members' Occupations

Apart from the farm operators, whether pluriactive or not, 50% of FHHs have at least one member working off the farm. Only four wives were found to have OFE and all of them were wives of DJHers. Three were teachers and one wife was a nurse. The low participation rate of wives and females generally has many possible explanations. It may be recalled that their education levels were lower; thus they are less competitive, the average size of the FHH is large; thus they have less time to be allocated for OFE. In addition, it is also due to the lack of OFE within a short commuting distance and to social factors which favour less involvement on off farm activities, although observation suggests that this attitude is changing rather rapidly.

The distribution of occupations for other members is in contrast to the distribution for operators. While military services was a minor occupation for operators (6%), it was found to be the most important for other male members (41%). However, public work in general, seems to be the main employer for both. Two out of five operators were working in the public administration but two out of three other members.

Business and self-employment were found to be limited among other members. This is not unexpected, as it requires capital, experience or training which young members are less likely to have. Only three brothers were found to have small industrial establishment, while the rest were self employed such as in workshops, retailing and driving. It is also possible that self-employment does not require high levels of education and operators therefore, with their low levels of education are more inclined to have this type of occupation. About two thirds (63%) of the self employed operators were found to have elementary education and 10% were illiterate.

8.3.5 LOCATION OF OFF-FARM EMPLOYMENT

Table 8.13 suggests that more than one third of farm operators were working locally in their villages but this was not the case for other members. Although this

might indicate greater mobility for other members as they were younger, more educated and more responsive to pull factors in the urban centres, it seems also that it is the product of push factors resulting from structural employment problem related to the limited suitable jobs opportunities in the rural areas to match their educational levels.

Table 8.13 Distribution of Household Members by Work Location (percent)

	Local Work	Non-local	Total	No. of Cases
Farm operators	36.2	63.8	100.0	102
Other Members	17.9	82.1	100.0	156
Overall Sample	25.2	74.8	100.0	258

There were significant differences between the occupation groups with respect to the location of the work. About 86% and 72% of professional and business jobs and government services respectively were found outside the rural areas where the land is situated, whereas, 60% and 44% of the self employed and casual labourers were found locally (Chi.004).

As mentioned earlier, the percentages of operators and other members working in the civil and military services taken together, were very significant for all members. The main difference however, was in the self-employment and businesses where sons are less equipped to be so. Three quarters of the self employed were shopkeepers mainly in their own villages, an occupation requiring essentially more dedication and less imagination. Business requires experience or perhaps training, some capital or security base which are normally beyond the means of youngsters.

Local employment varies significantly by zone and the irrigation variable. Of the other members who work locally in the rural areas, about 60% were in the Jordan Valley zone against about 10% in other zones (Chi.001). Besides, about three quarters of those who work locally were found in the irrigated areas (Chi.004) where the need to be close to the farm is more critical.

The location of jobs was found to be quite independent of the governorate. This adds support to the hypothesis that OFE is not related to the distance to be travelled or proximity to urban centres.

The findings support the hypothesis that the location of OFE varies by income classes for operators only. Class II operators were much more likely to work in non-local jobs than class I (68% vs 36%) (Chi.001). But OFE for other members (though class I members appear to be more represented in local work) was largely in non-local jobs for both income classes.

8.3.6 COMMUTING TO OFF-FARM EMPLOYMENT

Just over half (55%) of respondents with off farm employment were commuting to their work which is located outside their place of residence. On the average, pluriactive travel 14 km to their off farm jobs. Of the commuters, 30% were found to travel less than 10 km, 53% travel 10- 20 km and 17% were found to travel over 20 km. Operators employed by the government services were found to travel the longest distance compared with the self employed (Chi.03) as public workers have little control over the place of work. However, it was not possible to determine the distance travelled by about a quarter of respondents who were working in variable locations in the army or due to the nature of the jobs such as drivers.

It is to be noted that more than two thirds of the population and the agricultural land are located in a radius of 30 and 50 miles respectively from the capital Amman. Road and transportation networks are more than adequate and provide easy access to urban centres for practically all villages. Commuting therefore, does not seem to be a particularly difficult daily exercise.

8.4 CONCLUSIONS

This Chapter has explored and examined some aspects of the state of farm household labour force, farm labour and OFE. Class I and II farm households had the highest mean of economically active but the difference in its ratio of labour was

insignificant. Members of class I were most active on the farm and those in class II were the most active in OFE. The participation ratio was generally low due to high education enrolment of active members and low female participation. However, it varies by income class, being highest on class I and on irrigated farms (except the eastern region) and lowest on full time farms (due to more intensive engagement on the farm). The number of dependants varies by the main occupation of the operators; DJHer were most represented in the largest categories of number of dependants.

Class I FHHs had the highest level of family labour on the farm. More than one third of operators spent about one month in farming activities but less than one third of them were found to be involved in year round employment. Operators' involvement was positively related to the wives and other members involvement, size of FHHs, farm size, availability of water for irrigation, vegetable production, farm income. Young and more educated full time and class I FHHs in the irrigated areas were the most likely to hire labour in substantial numbers.

81% of the FHHs have at least one member involved in off-farm employment. This involvement was largely in the rain-fed areas, in salaried or waged and regular jobs, outside the agricultural sector and in the tertiary sector. Public administration was a major employer for all FHH members, self employment and business ranked second for operators and farm- related jobs ranked third. Casual work was most likely to be for class I. Type of OFE varies by governorate, largely due to the availability of OFE. Farm operators were more likely to work locally than other members. More than half of the RPAs were commuting to their work, largely less than 20 km and public servants were found to travel the longest distance.

The findings support the hypotheses that, FHHs who are more dependent on off farm income (class II), are more likely to have more members working off the farm and they are more likely to be in the rain-fed areas. The findings also support the sub-hypotheses that the type of employment and location were influenced by income classes. Class II were more likely to be in non-local jobs in the public administration, professional and business, while class I operators were more likely to be self-employed and in casual employment.

CHAPTER 9

FARM CHARACTERISTICS AND FARMING ACTIVITIES

9.1 THE FARM STRUCTURE

The farm structure in Jordan is dominated by small farms in the greater part of the agricultural area. The survey farms are located in three zones; the Jordan Valley, the highlands and the eastern arid lands. The overall average size of holding was found to be 114.7 dunums[1]. Table 9.1 summarise the basic statistics of the

Table 9.1 Main Statistics of the Operated Area by Zone (dunums)

Zone	Mean	SE	Skewness	Kurtosis	1st Quartile	Median	3rd Qartile
J.Valley	114.2	42.2	4.9	25.3	30.0	50.0	89.0
Highlands	51.7	6.1	2.8	8.5	12.0	25.0	60.0
Eastern	465.0	118.1	2.5	6.3	110.0	287.5	482.0
Overall	114.7	19.5	5.8	39.7	16.0	39.0	91.2

One dunum = 0.1 hectare.

operated areas. As the table shows, means of the operated area by zone were found to be significantly different (ANOVA..001). However, two reservations are due to this point;

first, the distribution of holdings for the sample as a whole and for each zone was found to be positively skewed and of the leptokurtic type. The distribution for the Jordan Valley was the most skewed and the most leptokurtic. Therefore, the median better represents the overall as well as the regional averages. The overall median for the holdings was 39 dunums.

[1] Areas in all subsequent sections are measured in dunums. One dunum = 0.1 hectare.

Second, the irrigated areas were over represented in the sample (as explained earlier in chapter 5). Irrigated farms were more represented in the largest size groups (Chi.001) and the means were found to be significantly different (ANOVA.01). This was due to the large sizes of farms in the eastern zone which are well above the average. Therefore, the weighted average was calculated according to the sample fractions. This weighted average (78.7 dunums) approximates to the average operated area according to the 1983 Agricultural Census (74.8 dunums for holdings over 4 dunums).

Table 9.2 shows the distribution of owned land which indicates higher degree of inequality as compared to the distribution of the operated area shown in Table 9.1.

Table 9.2 Main Statistics of the Owned Area by Zone (dunums)

Zone	Mean	SE	Skewness	Kurtosis	1st Quartile	Median	3rd Quartile
J.Valley	59.8	17.7	4.4	20.8	18.0	36.0	58.0
Highlands	77.6	10.8	4.3	27.0	17.5	31.0	87.0
Eastern	731.3	169.5	1.2	0.5	151.0	465.0	1100.0
Overall	147.0	25.5	4.6	24.1	19.0	37.0	108.8

This inequality was reduced by sharecropping and renting in and out. The overall mean for the owned land was 147 dunums (non-owner operators were excluded). The distribution was also positively skewed and of the leptokurtic type. Again, the median (37 dunums), represents better the typical size of holding in the main agricultural zones in the highlands and the Jordan Valley.

The distribution of the operated areas (Table 9.3) indicates that more than 40% of operators were operating small holdings of less than 30 dunums and more than 55% operate less than 50 dunums. Only about 10% were operating holdings of 200 dunums or more. Holdings less than 100 dunums, although constituting 81% of the total number of holdings, only represent 23% of the total area (34% according

Table 9.3 Distribution of Holdings by Size Groups (Per cent)

size group (dunums)	Agricultural Censuses(1) 1975	1983	Survey Results(2) Weighted	Unweighted
5 - 9	9.0	11.3	11.6	9.6
- 29	29.1	33.6	35.2	30.3
- 49	18.1	19.2	16.1	16.0
- 99	20.4	18.6	18.4	20.2
- 199	13.0	10.2	9.7	10.1
- 499	7.9	5.4	7.4	10.1
500 -	2.5	1.7	1.6	3.7
Total	100.0	100.0	100.0	100.0

(1) Adapted from the General Results of the Agricultural Censuses 1975 and 1983, Department of Statistics 1977, 1985 Amman, Jordan.

(2) In order to make the survey results comparable to the results of the Agricultural Censuses of 1975 and 1983, 6 holdings with 4 dunums were excluded.

to 1983 census). This suggests that with such a farm structure, farming alone especially under rain-fed conditions, can hardly support FHHs and if it is possible at all for the small operators, it is bound to be progressive farming. Further growth in agriculture is bound to depend on more intensive use of small farms, the use of improved inputs and methods of production, better cropping mix and farm management. Otherwise, the families concerned will have to contend with a very low level of living or to increase their dependence on off-farm employment and income.

As mentioned earlier, the agricultural area in Jordan is situated in the following three zones which vary in farm structure and agro-climatic conditions[2] and potential (Map in Appendix A):

[2] The inadequacy of measuring the agricultural potential by farm area is discussed in a special section in the Annex to the literature review in Chapter 3 and section 14.4 (the proposed further research) in chapter 14.

9.1.1 THE JORDAN VALLEY

One of the major steps towards the development of the Jordan Valley was the land reform in the early 1960s that followed a comprehensive socio-economic development program, the core of which was an irrigation scheme with a simultaneous heavy public investment in social and physical infrastructure. Farm structure therefore, is rather egalitarian with relatively few large farms (see Table 2.10). This is supported by the large coefficient of kurtosis (25.3) which indicates that the distribution of farm sizes is concentrated around the mean (Table 9.1).

The average size of holding according to the survey was found to be 114 dunums. This average is inflated by the presence of one farmer with a holding of 1500 dunums, if excluded, the average would fall to 76 dunums. However, the median was found to be 50 dunums which represents better the average size of holding in the area.

It should be noted also that 19 farm operators (51% of operators in the valley) have rented or sharecropped an average area of 161 dunums. This also contributes to the larger than expected average size of holding in this zone.

9.1.2 THE HIGHLANDS

The total area of the highlands represents less than 10% of the total area of Jordan but more than 90% of the population used to live in it. Thus, the agrarian history in Jordan took place in this zone where the people used to farm for their subsistence for generations as rainfall is high enough to sustain dry farming. Irrigated farming was limited to the semi-flat banks of the valleys and around some springs. Thus, population pressure on agricultural land was always concentrated in this area. Farms, therefore, were always subjected to fragmentation according to the inheritance law. Consequently, they are typically small. The average area of holding was found to be 52 dunums. The median was found to be 25 dunums, which would better reflect the average size of holding (Table 9.1).

9.1.3 THE EASTERN ZONE

The eastern area is dry relative to other areas, and until the 1980s, it was sparsely populated. Thus, there was no population pressure on land in this area due to the very limited agricultural potential apart from grazing by nomads. Land rights, therefore, were limited to the then thin population. Consequently man/land ratio was quite low relative to other areas. The development of underground water has made it possible to initiate farming activities on larger scale by Jordanian standards. Farms therefore, are significantly larger than the national average (Table 9.1).

The average area of holding in this zone was found to be 465 dunums, and the median is 287 dunums. Three quarters of holdings in the eastern zone were found to be larger than 100 dunums. However, there are wide variations in the natural quality of the land which is of rather poor quality and land prices are significantly lower than other agricultural areas. Irrigated farming in the eastern areas is a recent advancement which followed the development of the use of ground water. Improved farming methods and use of modern technology are the norm throughout the area.

9.2 FARM CHARACTERISTICS AND ACTIVITIES BY INCOME CLASSES AND OPERATORS' STATUS

9.2.1 OPERATED HOLDINGS

Drawing from the literature review, an inverse relationship was reported between the degree of involvement on off-farm activities and the size of operated areas. The findings of this research are in line with this observation. Table 9.4 shows that the percentage of class II of pluriactive FHHs in the size groups up to 50 dunums is 73%, whereas 43% of the MLFs are in these categories. Class I was found to have the largest percentage in the over 50 dunums size groups and class II was found to be least represented in these size groups while the full time class were more likely to be found in the medium and large farms. This indicates an inverse relationship between the main income classes of FHHs and the size of holding, that is the higher the dependence on off-farm income, the more likely that they will

Table 9.4 Farm Size Groups by Income Class (percent)

Income Class	Farm Size groups (dunums) 4-20	-50	-100	101-	No. of Cases
MLFs	16.9	26.0	24.7	32.4	77
- FT Farms	16.7	33.3	19.4	30.6	36
- Class I	17.1	19.5	29.3	34.1	41
SLFs					
- Class II	46.1	26.5	12.0	15.4	117
Overall Sample	34.5	26.3	17.0	22.2	194

Chi Square (a) MLFs/SLFs: P = .0001, (b) FT/Class I/Class II P = .0004

operate smaller holdings. This inverse relationship was found to hold if the analysis is based on the main occupation of the operator. Likewise, the negative association exists if the sample is weighted, but with relatively lower significance (Chi .01).

When the irrigation factor is introduced to the picture, (Table 9.5) although the inverse relationship has become clearer for the three income classes for the irrigated areas, the relationships were found of lower significance. Similarly, low significance was observed if the main occupation of the holder is considered.

It is interesting to find that the full time class was the least represented in the largest size groups under rain-fed conditions, and Class I was the most represented. The reverse was found under irrigation. However, if the two largest size groups were combined together, full time class and class I were found to be very much alike. The average cultivated area under irrigation and dry conditions for class I was found to be higher than either the full time class or class II.

The means of the operated areas for the entire sample, under rain-fed and irrigated farming by income classes seems to be different, with class I well above the overall mean under all conditions and class II ranked second and with full time farms well below the overall mean in the rain-fed area. However, the ANOVA has failed to show any significant differences among the means due to the high variance of the sample (which might conceal true differences). When the largest holdings which were over 500 dunums were excluded, full time class was found to have the largest

Table 9.5 Farm Size Groups by Source of Irrigation by Income Class (percent)

Income Class	Farm Size groups (dunums) 4-20	-50	-100	101-	No.of Cases
Dry Farming	45.3	24.3	13.9	16.5	115
MLFs	25.8	25.8	22.6	25.8	31
- FT Farms	38.4	30.8	23.1	7.7	13
- Class I	16.7	22.2	22.2	38.9	18
SLFs					
- Class II	52.4	23.8	10.7	13.1	84
Irrigated	19.0	29.1	21.5	30.4	79
MLFs	10.9	26.0	26.1	37.0	46
- FT Farms	4.3	34.8	17.4	43.5	23
- Class I	17.4	17.4	34.8	30.4	23
SLFs					
- Class II	30.3	33.3	15.2	21.2	33
Overall Sample	34.5	26.3	17.0	22.2	194

	Rain-fed	Irrigated
Chi Square : MLFs/SLFs	P = .04	.08
: FT Farms/Class I/Class II	P = .04	.08

operated area under irrigation (ANOVA.08). The same effect was observed when the analysis was based on the main occupation of the farm operator (t-test.00) but with lower significance for the sub-sample in the rain-fed area (ANOVA.09). FTFers were found to have consistently larger farms.

As indicated in Chapter 7, full time farmers in the rain-fed areas were relatively old and farming for many of them was more a *de facto* occupation rather than real full time farming while in the irrigated areas they were younger, active and more educated. These findings may suggest that the full time class is the mainstay of the farm household community in the irrigated areas, but it is a marginal class in the rain-fed areas. Class I does seem to be of more importance under rain-fed conditions, but it is also a prominent class in the irrigated areas. Class I therefore might be, nation-wide, the backbone of the farm household sector.

The size of the holding was affected by the type of occupation of the farm operators. Professional and business operators were more likely to be found in the larger size groups and full time farmers ranked second (Chi.01). The means were also significantly higher (ANOVA.01). The means of operated area were found to be fairly significantly different by the place of residence for operators (ANOVA.07). Farm operators residing in the main urban areas were found to operate an average area of 300 dunums whereas farm operators living in the villages and district centres had an average holding size of 108 dunums. This might be explained by the tendency of professional and businessmen to operate larger farms as explained above and by their tendency to reside in urban centres as indicated in Chapter 8.

The means of the number of the fragments under cultivation by income class were significantly different. Class I farm operators were found to operate holdings scattered in an average of 3.3 fragments, 2.6 fragments for FT class and 1.8 for class II (ANOVA.04). This might be explained by the finding that class I (full time FHHs ranked second) were found to be the most likely to rent or sharecrop lands which are not normally adjacent to their farms. Land tenure relationships will be discussed in more detail below.

These findings suggest that there is sufficient evidence to support the sub-hypothesis that RP^{in}_{λ} Jordan is associated with the limited resource base; it is associated with small farms in general and in the rain-fed areas (based on main income classes) and in the irrigated areas but with lower significance (based on the broad income classes).

9.2.2 TENURE STATUS

Although secondary data suggests that there is a downward trend[3] in tenancy towards owner-operator farming systems, tenancy still plays a major role especially

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[3] Wholly owned operated area in the Jordan Valley represented 32% in 1960, 57% in 1980 (JVA 1988) and 64% in 1988 (DOS 1990b). As the definition of mixed tenure and wholly tenanted land was not consistent in different studies, comparison with secondary data can only be made between 'wholly owned' and 'other tenure'.

in the irrigated areas. The survey data in 1989 show that the owner-occupiers accounted for 63% for the overall sample, 46% for the irrigated areas and 75% for the rain-fed areas as compared to 73%, 60% and 87% respectively in a recent farm management study in 1988 (DOS 1990b).

The distribution of operators in the sample by tenure shows that more than 50% of the main living income class were involved in some form of tenancy (Table 9.6) but only about 25% of supplementary living class were so involved. Full time FHHs were found to be the least likely to be owner-occupiers. Class I was most represented in the mixed group and full time FHHs ranked second. If farm operators were classified by their main occupation, only about one third of DJHers were

Table 9.6 Tenure Status by Income Classes (percent)

Income Class	Owner only	Tenants	Mixed	No. of Cases
MLFs	45.4	18.2	36.4	77
- FT Farms	44.4	27.8	27.8	36
- Class I	46.3	9.8	43.9	41
SLFs				
- Class II	74.4	6.8	18.8	116
Overall Sample	62.9	11.3	25.8	194

Chi Square (a) MLFs/SLFs: P = .0001, (b) FT/Class I/Class II P = .0001

tenants[4] against two thirds of the FTFers (Chi.01). The same results were found under rain-fed conditions (Chi.05) and under irrigation but the differences were not significant. The possible explanation is that farming for RPAs in the rain-fed areas is a side-line activity while the observation suggests that farming for all FHHs in the irrigated areas is an important economic activity.

The mean tenanted area was found to be significantly different across the

[4] The term 'tenant' is used to cover both renting in cash and in kind. Renting in kind (sharecropping) is proportional as sharing in fixed quantity is not practised in Jordan.

different zones. The mean area in the highlands was found to be the smallest (54 dunum) as compared to 161 and 246 dunums in the Jordan Valley and the eastern areas respectively (ANOVA.009). Farm operators in the eastern areas do not put the same land under crops every year due to some soil deficiencies.

Although it appears that class I was most likely to rent in land and full time class ranked second, the differences in the means of the rented in or rented out land by income classes and the main occupation of the holder were found to be insignificant. This indicates that either the difference between classes is restricted to whether they might be involved in any form of tenancy or not, but when they do involve themselves, they do behave in much the same manner as mentioned above[5].

Apart from labour, the sharing of output and inputs costs on a 50:50 basis is the common form for sharecropping in the irrigated areas. Leases are normally annual and informal. There are regional variation, in the terms and forms of tenancy according to the type of crop and whether farming is under irrigation or rain-fed.

It seems that there are two opposing forces which might give rise to owner-occupation or otherwise. On one hand, factors which promote owner-occupation are related to the new development in agriculture and market conditions. First, farming has become more developed, thus it employs a relatively large sum of fixed capital especially for modern technologies such as drip irrigation (which are imperative in Jordan where water resources are limited) and the use of plastic houses (to intensify production which is also imperative in a farm structure dominated by small farms). Second, because of the relative movements of costs and market prices and relatively high rents. Thus farming is increasingly less rewarding and the need to rely on own family labour are pressing. Against this background, tenancy is expected to lose ground.

On the other hand, first, high rates of unemployment in other sectors means that alternative job opportunities are limited. Second, parcels of owned land are generally small, the price of land is higher than its productive capacity justifies (especially in the outskirts of the urban areas), and in the case of the Jordan Valley, land trade is outlawed. Thus, tenancy is the practical option for larger scale and

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[5] It is also possible that the apparent difference in the means was true but it was concealed by the high variance of the relatively small sample.

more efficient use of fixed capital to achieve more economically viable farming. This might be supported by the finding that operators practising either form of tenancy were most represented in the largest holding size (Chi.01).

9.2.3 TYPE OF ENTERPRISE

The type of enterprise was found to vary by income class. Much of the available evidence from many countries suggest that RPAs are less likely to have labour demanding enterprises. The findings of this research support this view. As expected, main living farm households were more likely to have vegetables and livestock enterprises (Table 9.7) which are high in labour demand and they were more likely to have cereal enterprise too. Fruit tree enterprises in general, and under dry conditions were found to be the most favourable enterprise for class II. Almost the same significant levels mentioned in Table 9.7 were observed if only the main occupation of the operators are considered, that is DJHers were most represented only in the fruit trees enterprise. The mean area of vegetables on full time FHHs was found to be more than twice the area for class I and II. More than half (54%)

Table 9.7 Type of Main Enterprise by Income Classes (percent of growers)

Type of Enterprise	MLFs	FT Farms	Class I	SLFs	Overall
Vegetable**	64.9	69.4	61.0	37.6	48.5
Fruit Trees(General)*	64.9	63.9	65.9	83.8	76.3
Dry fruits only**	42.9	41.7	43.9	75.2	62.4
Cereals (General)**	70.1	66.7	73.2	47.9	56.7
Keeping Animal*	61.0	58.3	63.4	42.7	50.0
No. of Cases	77	36	41	117	194
Overall sample	40.2	19.1	21.1	59.8	100

Chi Square : ** P < 0.00 * P < .05

of the total operated area for full time class was under vegetables against less than 20% for class I and II (Table 9.11). This is to be expected as vegetable crops are high in labour demand.

Class I had the highest mean for irrigated fruit trees. Class II had the highest mean for cereals and class I ranks second. However, the ANOVA has failed to show any significant differences, perhaps for the same reasons already mentioned.

Cerealswerefound to be an important crop for all classes. This might be due to its many-sided importance in the cropping pattern: (1) it is an important crop in the cropping pattern to encounter the wide-spread pest problem. (2) To utilize the residuals of moisture and fertilizers in the irrigated areas especially when the land is rented. (3) it provides the much wanted supply of the local wheat varieties which is considered to be most suited to the home-made bread. (4) It provides a supply of feed for animals in the form of barley or straw even if the crop has failed. (5) It requires little attention from the holder.

However, cereals is still the most compatible crop for class II FHHs as it requires the least possible involvement and shortest time as compared to any other crop[6]. As Table 9.11 shows, 60% of the total operated area for class II was under cereals against about 40% for MLFs. Thus, they could play a positive role in promoting cereal production.

Orchards in the rain-fed areas such as olives and grapes and recently stone fruits such as peaches in the high rainfall areas have become a popular enterprise during the 1980s. One third of olives and 21% of other fruit trees were found to be in the pre-bearing period. They have low demand for labour in a limited period of time. This might explain the concentration of SLFs (75%) in this type of enterprise (Table 9.7). The percentage of the area under dry fruits for class II was found to be 3 times the percentage of the area for MLFs (Table 9.11). Growing fruit trees replaces cereals on hilly land and is normally accompanied by soil conservation

[6] One RPA cereal producer has said that cereal production might be labelled for some producers like himself as 'remote control farming' as there is no need to be present in the field. You may rent land if you do not own it, ask someone to plough it, to sow the seeds and fertilize it possibly by a seed drill, to spray it with herbicides and finally you might mechanically harvest it by custom work, and whatever the crop might fetch should be satisfactory. If the crop fails, the planted field will be sold to be grazed by animals which will cover all or a good part of the costs involved.

measures, thus the soil is protected from erosion by being less disturbed as compared to perennial crops, by the widespread rooting system and reducing the intensity of rain by the permanent foliage and less use of chemicals (pesticides and fertilizers). Thus, class II can be looked at as the most represented in environment-friendly activities.

Citrus and apples and some other stone fruits under irrigation is a successful type of enterprise as the market for the produce is readily available and the prices are favourable but, it requires much more labour than the rain-fed fruit trees. Although there was a high incidence of SLFs (84%) in this type of enterprise (Chi.01) depending on hired labour, a larger proportion of the operated area of class I was occupied by this enterprise (29%) relative to class II (10%) and full time class (13%).

These findings support the hypothesis that RPAs have different cropping patterns from full time farm households. The type of enterprise is found to be influenced by income classes and main occupation of the operators. Full time farms were most likely to have vegetables as a principal crop, class I and II are more likely to grow fruit trees in general and class II most likely to grow fruit trees in the hilly, marginal and rain-fed areas which contribute positively to environment oriented activities.

9.2.4 OWNERSHIP OF LIVESTOCK

Ownership of livestock was found to be associated with income class and main occupation of the operators. As Table 9.8 shows and as expected, MLFs were more likely to keep animals. Although class I was found to have the highest average number of cows (Table 9.8) but the difference stops short of significance (Chi.11). However, as Table 9.11 shows, full time class was found to be the most likely to have cows *per se*. Class I was most represented in keeping either sheep and goats (Chi.03).

As Table 9.8 shows, the overall percentage of FHHs who own dairy animals is low. 14% and 15% were found to have cows and sheep respectively. About two thirds of the cow owners have one or two animals and one third of the sheep owners

have less than 10 animals. About one third (36%) were found to have goats but more than two thirds of them had less than 10 animals. MLFs were more likely to have cows or sheep. Sheep were most likely to be found in the rain-fed areas in the highlands. Cows were most likely to be found in the irrigated areas including the Jordan Valley as they require green fodder. Goats ownership was not sensitive to class, type of farming or the agricultural zone.

Table 9.8 Livestock Ownership by Income Classes (percent)
(Averages in brackets)

Income Class	Cows	Goats	Sheep	No. of Cases
MLFs	23.4 (3.0)	41.6 (22.8)	23.4 (64.1)	77
-FT Farms	27.8 (2.0)	27.8 (15.0)	11.1 (72.5)	36
-Class I	19.5 (4.3)	53.7 (26.3)	34.1 (61.7)	41
SLFs				
-Class II	7.7 (1.9)	32.5 (10.5)	9.4 (97.6)	117
Overall Sample	13.9 (2.6)	36.1 (16.1)	14.9 (76.9)	194
No. of Cases	27	70	29	

		Cows	Goats	Sheep
Chi Square (a) MLFs/SLFs:	P =	.002	NS	.008
(b) FT/Class I/Class II:	P =	.005	.03	.001

Draft animals were most found in the MLFs in the rain-fed areas in the highlands where farming is still lagging behind (technologically), although ploughing by animals is imperative in some mountainous areas. About one of every four households were found to have domestic hens and four poultry farms were found, three of which were owned by pluriactive households. A Bee enterprise was found in one RPA farm only.

These findings suggest (as Table 9.8 shows), that RPAs, especially class I, accounted for a significant share of livestock ownership and hence they could play a positive role in increasing animal products and promoting more integrated pattern

of agricultural production. Such integration could have multi-fold advantages, (a) animal products are in short supply on the micro and macro levels as the average diet is poor in animal protein content, (b) the demand is elastic and marketing prospects are high, (c) farm man days are low even for those who have no other job, thus redundancy in farm labour can be put into productive use, (d) organic matter is badly needed under the dry conditions to enhance the fertility, productivity and moisture retaining capacity of the soil.

In brief, animals were more likely to be found in the main living farms, class I, in the rain-fed areas and in the highlands. Cows and hens were more likely to be found in the full time farms in the irrigated areas in the Jordan Valley. The eastern zone was found to have the least numbers or nothing at all. RPAs, especially class I, accounted for a significant share of livestock ownership and hence they could play a positive role in increasing animal products and promoting more integrated pattern of agricultural production.

9.2.5 MARKET ORIENTATION[7]

Vegetable production was found to be the most market oriented produce regardless of the income class of FHHs or the status of the holder. Of the overall vegetable growers, 84% (but all growers in the irrigated areas) were found to be producing almost solely for the market. Only one of the MLFs was consuming more than 50% of his production, whereas 30% of class II were consuming this percentage.

On the opposite side of the continuum, olives produced by two thirds of FHHs in the sample, is the least market oriented product. FHHs were found to be indifferent in their orientation regardless of the income class. Overall, more than two third were consuming more than 50% of the produce. These figures suggests that olives are primarily produced for household consumption. As Table 9.9 shows, 88% of class I and 47% of full time FHHs among the other fruit tree growers were market oriented, while 33% of class II were so (Chi.07). However, it is to be noted that

[7] Per cent with less than 50% consumption of produce.

olives growing in particular and other fruit trees in general is a recent development and significant percentages of farms under olives (33%) and other fruit trees (21%) were in the pre-bearing period. Higher proportions would be directed to the market in the future.

There were no significant differences between classes for consumption of cereals. Between half and two thirds were consuming less than 50% of their cereal produce.

A clearer relationship was found between income classes and the percentage consumption of animal products. Three quarters of the MLFs (FT class and class I) were found to be market oriented against about one third of class II (Chi.01).

Table 9.9 Income Classes by Market Orientation (percent)

Produce	MLFs	FT Class	Class I	Class II	No. of Cases
Vegetables	98.0	96.0	100.0	70.5	94
Olives	29.7	27.9	29.6	27.1	122
Fruits	60.6	47.1	87.5	32.8	94
Cereals	61.1	66.7	56.7	58.9	110
Animal Products	74.5	76.2	73.1	38.0	97

Animal ownership for class II is largely for their own consumption except for a few of them who were found to have relatively large number of sheep.

9.2.6 NUMBER OF ENTERPRISES

Having a specific enterprise in Jordan is not always an open choice to be decided by FHHs. It is largely influenced by the agro-climatic conditions[8]. Although

[8] Agro-climatical conditions such as rainfall (annual rate, distribution and the length of the wet period which normally covers the period November through April), soil, slope, temperature, altitude.

diversification is widespread among the farm households classes, vegetables are the principal enterprise in the irrigated areas and fruit trees are dominant in the rain-fed areas with some other satellite enterprises.

There were significant differences between the income classes in the number of enterprises per farm. Table 9.10 shows that 63% of Class I FHHs were found to have three enterprises or more. The FT class was the most represented in the four enterprises or more. Only two FHHs were found to have more than four enterprises and they were FT class. Although class II FHHs were the least likely to have a diversified type of farming, nevertheless more than one third of them had three enterprises or more. When the operators were classified according to their main occupation, the picture was almost the same (Chi.01).

The number of enterprises was found to be positively associated with the source of irrigation. Whereas 72% of FHHs who have one enterprise were found in rain-fed areas, only 38% of those who have four enterprises were found in the irrigated areas (Chi.01). There were no significant difference in this regard between zones. As mentioned earlier, the number and type of enterprises in the rain-fed areas are constrained by the ecological conditions.

Table 9.10 Number of Enterprise by Income Class (percent)

	Number of Enterprises				
Income Class	One	Two	Three	Four-	No. of Cases
MLFs	19.5	20.7	36.4	23.4	77
- FT Class	25.0	19.4	27.8	27.8	36
- Class I	14.6	22.0	43.9	19.5	41
SLFs					
- Class II	33.3	30.8	29.1	6.8	117
Overall	27.8	26.8	32.0	13.4	194

Chi Square (a) MLFs/SLFs: P = .002, (b) FT/Class I/Class II: P = .005

The size of the operated area was found to be associated with number of enterprises. Medium sized holdings were found to be adopting the most diversified type of farming (Chi.01). This might be explained if we recall that full time FHHs were more likely to have medium sized holdings. Large holdings, where businessmen and professionals were most likely to be found, were least likely to be involved in a diversified type of farming.

The finding that more than 50% of the overall sample and about 60% of MLFs were found to have three enterprises or more suggest that diversification might be a strategy to reduce risks involved in specialization e.g., limited marketing outlets, lower prices (from 1984 onward) and diseases, but the observations suggest that it is also to secure FHH consumption of basic food items such as cereals and animal products under increasingly unfavourable market conditions. This is not, however, to suggest that operators, including the small farmers, can be considered as subsistence farmers.

These findings support the sub-hypothesis that the pluriactive farm households or operators have significantly fewer enterprises.

9.3 CONCLUSIONS

The findings presented in this chapter suggest that the land ownership pattern is increasingly dominated by small units. Resorting to different forms of tenancy has improved the farm structure, but the operated areas were generally small and fragmented. The agricultural area in Jordan is situated in three zones which vary in farm structure and agro-climatic conditions and potential. Most favourable conditions are found in the irrigated areas in the eastern and Jordan Valley zones while the lowest are found in the rain-fed highlands.

Main living FHHs were found to be more diversified in production, but vegetables was found to be the principal enterprise, virtually completely market oriented. These FHHs were also most represented in cereal production and market orientated animal production. Fruit production was the least market oriented enterprise except for class I FHHs. Class I FHHs were found to be the mainstay of dry farming, but full time farming was found to be more (or equally) important in the

irrigated areas. Tenancy was found to be most practised by class I and the full time class (and operators) and more prevalent in the largest holding size groups, thus they were most fragmented as tenanted land was less likely to be adjacent to the owned farms.

Class II FHHs were most represented in the smallest groups for the overall sample, under rain-fed and irrigated conditions, but they were most likely to be found in the dry farming areas. They were most represented in growing rain-fed fruit trees, which is normally accompanied by soil conservation measures and replace cereals on hilly land. Thus, class II were found to be the most represented in environment-friendly activities. A high percentage of Class II were found to own livestock and to grow cereals, though their produce was the least market oriented, they could contribute in increasing the production of animal products and cereals which are in short supply.

Table 9.11 summarises the significance of different classes in farming activities. Full time farms were most significant for vegetable production under irrigation, and they have higher than average area under drip irrigation and greenhouses and number of dairy cows. Class I farms were most significant for fruits under irrigation and livestock ownership. Their share in the operated area[9] was above average while class II farms were surprisingly slightly under represented but they were above average only in dry fruit growing.

The findings of the research work support the hypotheses, that RP is associated with the limited resource base i.e., small farms and rain-fed farming in the mountainous areas. They also support the hypothesis that RPAs have less intensive production pattern than full time farm households and they have fewer number of enterprises. RPAs, especially class II were found to be the most represented in environment-friendly activities.

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[9] According to the agricultural Censuses in 1975 and 1983, holders with non-farming main occupation occupied 18% and 29% respectively of the total agricultural area. The difference in the unit of analysis (main occupation of operators vs FHHs) make it difficult to compare these results with the findings of this study. However, Class II in this study was found to occupy about 50% of the area which might suggest that the trend is continuing for larger proportion of the area to be operated by RPAs.

Table 9.11 Some Farm Characteristics and Activities; Percent Accounted for by Income Classes (%)

Activity	MLFs	FT Farms	Class I	SLFs	Total
Operated area	49.2	19.1	30.1	50.8	100.0
Area under:					
Irrigation	67.2	31.5	35.7	32.8	100.0
Rain-fed	37.1	10.8	26.3	62.9	100.0
Drip Irrigation	54.2	37.7	16.5	45.8	100.0
Greenhouses (no.)	83.6	62.9	20.7	16.4	100.0
Vegetable	64.1	41.3	22.8	35.9	100.0
Wet Fruits	69.3	15.8	53.5	30.7	100.0
Dry fruits	25.8	12.9	12.9	74.2	100.0
Cereals	39.5	11.1	28.4	60.5	100.0
Number of Animals					
Cows	76.1	28.2	47.9	23.9	100.0
Goats	64.6	13.3	51.3	35.4	100.0
Sheep	51.8	13.0	38.8	48.2	100.0
Number of Cases	77	36	41	117	194
Per cent	39.7	18.6	21.1	61.3	100.0

CHAPTER 10

FARM HOUSEHOLDS INCOME

FARM HOUSEHOLDS INCOME[1]

As demonstrated in Chapter 2, the farm sector in Jordan is dominated by small farms, limited water resources, low rainfall and chronic marketing problems. Although farm households (FHHs), especially in the irrigated areas have succeeded in increasing productivity, cropping intensity and income, nonetheless this has only partially helped in overcoming the unemployment and underemployment in the farm sector and the fluctuations in farm income (FI).

Against this background, it is to be expected that off-farm income (OFI) is seen not only as a crucial element in the survival strategy of FHHs but also as a stabilizing factor to smooth the flow of FI and to provide FHHs with a sense of security under the uncertainty of rainfall, marketing outlets and prices.

In this chapter, farm income, off-farm income[2] and their implications will be explored.

10.1 THE FARM INCOME

The survey results indicate that 19% of the farm households in the last year prior to the survey generated less than 100 JD farm income (virtually break-even) or experienced a loss. An additional 22% were able to generate from farming 100-500 JD. Combined together, 41% of FHHs in the lowest FI category were not in a position to make living from farming (Table 10.1). Besides, another 23% in the 500-1499 JD category (mid point 1000 JD) which can only provide for subsistence level,

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[1] (a) farm income as stated by respondents is in terms of gross margin, that is total value of outputs minus variable costs.
(b) as the data is cross-sectional for what was considered to be a bad season, figures of household incomes are bound to be rough estimates.
(c) all subsequent income figures are measured in Jordanian Dinars (JD).
(d) One Dinar was equivalent to about 0.9 UK Pound in 1989.

[2] All subsequent analyses are based on earned off-farm income unless indicated otherwise.

bearing in mind the typically large size of FHHs. A recent study (Skour et al., 1989) has estimated the poverty income in the rural areas to be 1070 JD per household (of an average of 7.2 members). Thus, according to the present survey, only one third of FHHs were above the poverty line expected to make living out of farming alone. Considering the average annual income of households in the rural areas in 1987 was 2725 JD (DOS 1988), it follows that perhaps only those in the over 2500 JD category (21%) were able to make at least a reasonable living from farming.

10.1.1 VARIATIONS WITH FARM INCOME

10.1.1.1 The Operated Area and Tenure

Data from many parts of the world indicate that FI varies with farm size. Although the debate on the inadequacy of area as a measurement of the level of farming activities is more valid in Jordan as mentioned in Chapter 9 due to the wide variations in micro agro-climatic conditions, nevertheless, the findings of the survey indicate that Jordan follows in general pattern in that FI was found to vary positively with the size of the operated holding. Table 10.1 shows that three out of four of farm operators (76%) in the smallest farm size group were able to generate less than JD 500, whereas only 12% of FHHs in the top farm size group were found in this income category. In contrast, 1.5% of the households in the smallest farm size group were in the largest income category against 63% of households of the largest farm size group. The adoption of progressive biological technology in farming, namely the application of chemical fertilizers, use of high yielding seed varieties, greenhouses and drip irrigation explains how some households in the small and medium sized farms come to be in the largest income groups.

The relationship between farm income and tenure status was found to be highly significant (Chi.00). Farm operators with mixed land tenure status and (share) tenants were most likely to be in the highest FI category and least likely to be in the lowest FI category. Two out of five of operators (40%) with mixed tenure status and

Table 10.1 The Operated Area Groups by Farm Income Groups (%)

Farm Size Groups(du)[3]	Farm Income Groups <500	-1499	-2499 (JD)	>2500	Total	No. of Cases
4- 20	75.8	13.6	9.1	1.5	100	66
- 50	27.5	41.2	17.6	13.7	100	51
-100	33.3	27.3	21.2	18.2	100	33
100-	11.6	14.0	11.6	62.8	100	43
Overall	41.5	23.3	14.0	21.2	100	193

Chi Square: P = .001

tenure status were found in the lowest FI category against. However, about one third of tenants (36%) were found in the lowest FI category, an income far below the poverty line as mentioned above against 54% of owners in this category. Although this low income might be unusual due to unfavourable climatic or market conditions in 1989, it did highlight the precarious living conditions of tenants who were found to be the least likely to be involved in OFE as will be explained later in this chapter. It might also help in explaining the downward trend in tenancy mentioned in the previous chapter.

Expanding the scale of farming can either be vertical or horizontal. Intensifying farming by the use of greenhouses is highly demanding for labour and long-term fixed investment, a situation more compatible with the circumstances of owner-occupiers with small farms. In addition, as land prices are typically high, it is to be expected that professional farm operators tend to expand farming horizontally by renting land to increase FI. Tenants have to struggle to generate the highest possible FI as they are far less dependent on OFI. Owner-occupiers with the security of land ownership have less incentive to work harder on the farm and rely more, at least in the short run, on the more secure OFI, while the farming option is feasible

[3] Area is measured in dunums (du). One dunum = 0.1 hectare.

should the circumstances change.

10.1.1.2 Farming System and Agro-climatic Zones

As explained in Chapter 2, the agricultural sector in Jordan is characterized by the existence of a dual system; a progressive sub-sector largely in the irrigated areas and a backward sub-sector largely in the rain-fed areas with traditional cereal and fruit production. Table 10.2 shows that 55% of households in the rain-fed area were found in the lowest FI category against 22% in the irrigated areas. In contrast, only 4.4% of households in the rain-fed area were in the highest category against 18% in the irrigated areas. This might be explained by the existence of remunerative enterprises in the rain-fed areas such as progressive cereal growing (on relatively large farms) and growing fruits in high rainfall areas, poultry and livestock enterprises.

Neither FI nor OFI was found to vary by governorate. However, FI do vary by the agro-climatic zone. As Table 10.2 indicates, households in the highlands are largely clustered in the lower FI groups. In the eastern zone, the distribution was found to be polarized with more households in the highest FI category. In the Jordan Valley FHHs were more spread among the FI groups with more than half (54%) in the lowest two categories which is low for the typically large FHH. These differences have many possible explanations, (a) farming in the highlands is largely under dry conditions while it is virtually under irrigation in other zones, (b) with the land reform in the Jordan Valley during the 1960s (which had accompanied a major irrigation project within an integrated rural development scheme), the average size of farms there is lower while in eastern area (where agricultural development was purely the product of private initiative), farms are significantly larger, (c) farming in the rain-fed highlands is largely traditional while farming on other zones is capital intensive and it needs high input of working capital. The type of farming in the Jordan Valley is largely family farming where FI is significant and it is largely business-oriented in the eastern area (this will be dealt with in Chapter 13).

Table 10.2 Farm Income by Farming Systems and Zones (percent)

Variable	Farm Income Groups <500	-1499	-2499 (JD)	-4999	5000-	No. of Cases
Farming System						
Rain-fed	55.3	18.3	13.2	8.8	4.4	114
Irrigated	21.5	30.4	15.2	15.2	17.7	79
Zone						
The Eastern	29.2	8.3	8.3	12.5	41.7	24
Jordan Valley	16.2	37.9	16.2	16.2	13.5	37
Highlands	50.8	22.0	14.4	9.8	3.0	132
Overall	41.5	23.3	14.0	11.4	9.8	193

Chi Square: P = .01

10.1.1.3 Type and Number of Enterprise

The distribution of FI was found to vary significantly with the type of enterprise (Table 10.3), except for keeping animals where the significance was found to be low. The differences between growers are largely in the smallest FI category and in the categories over JD 2500 as all growers were found to be similar in their distribution in the 500-2499 two categories.

Vegetable and cereals growers were found to have higher levels of FI than others (Chi..01). As discussed in Chapter 9, cereals are integral element in the cropping pattern in the irrigated areas where vegetables are the main crop. Whereas, 52% of fruit growers under rain-fed conditions were found to be in the lowest FI category. Only 12% of fruit growers were found in the over JD 2500 categories. Fruit growers in general were more likely to be represented in the low to middle FI categories (<JD 2500), but they have a more equal stand in the largest category (Chi.02). A possible explanation is that citrus and banana in the irrigated areas, grapes, figs, stone and pome fruits are increasingly popular in the rain-fed areas and that these are remunerative enterprises. There was no significant difference between

Table 10.3 Farm Income by Type of Enterprise (per cent of growers)

Type of Enterprise	Farm Income Groups (JD) <500	-1499	-2499	-4999	5000-	No. of Cases
Vegetables*	29.0	29.0	16.2	12.9	12.9	93
Fruit(general)*	45.6	22.4	15.0	7.5	9.5	147
Dry fruits **	51.7	22.5	13.3	7.5	5.0	120
Cereals **	30.3	29.4	11.9	16.5	11.9	109
Keeping Animal	37.1	27.8	15.5	14.4	5.2	97
Overall	41.5	23.3	14.0	11.4	9.8	193

Chi Square: ** P <.00 * P <.05

fruit and non-fruit growers under irrigation as growing vegetables is no less remunerative.

Households with animal enterprises were found to be more represented in the low to middle FI categories (Chi.06). The possible explanation is that the majority of operators keep small number of animals to secure basic food supplies as demonstrated in Chapter 9 which is associated with low FI, thus underrating the levels of FI for FHHs with livestock as a principal enterprise.

Farm income was also found to vary with the number of enterprises with two-enterprise combinations generally being the most profitable. As Table 10.4 shows, 41% of FHHs in the lowest FI category were found with one enterprise while 46% households in the middle-high category (JD 2500-4999) were found to have three enterprises.

These foregoing points may indicate that households with the lowest income are more likely to have one enterprise. They are more likely to be found in the rain-fed areas. It may be recalled that 55% of the lowest income group were found in the rain-fed areas and as indicated earlier, small FHHs with small farms were more likely to have one enterprise. This is not to suggest that they are more specialized, but perhaps it is influenced by the agro-climatic conditions and partly a reflection of an attempt by the RPAs to limit their farming activities while undertaking regular OFE.

Table 10.4 Farm Income by Number of Enterprises (per cent)

Farm Income Groups (JD)	Number of Enterprises One	Two	Three	Four-	Total
- 500	41.2	25.0	26.3	7.5	100
500 - 1499	15.6	24.4	37.8	22.2	100
1500 - 2499	22.2	22.2	37.1	18.5	100
2500 - 4999	22.7	22.7	45.5	9.1	100
5000 -	15.8	52.6	15.8	15.8	100
Overall Sample	28.0	26.9	31.6	13.5	100

Chi Square: P = .02

Households with medium FI and medium-sized farm sizes are more inclined to diversify their production to minimize the risks of price fluctuations and to achieve some level of self-sufficiency. They have enough labour to deploy both on and off the farm. It may be recalled that the larger the household size the more enterprises they tend to have.

On the other hand, households with the highest FI and largest farms seem to be more specialised in two enterprises, vegetables (as a principal enterprise) with cereals or fruit trees. They tend to reside in urban centres, to be more market oriented and as such they are less likely to produce for personal consumption.

10.1.1.4 Variations with Other Household Characteristics

Age was found to have some influence on the levels of FI of the household (Chi .08). Farm operators in the 35-44 years age group were found to be the most represented in the highest FI category and in the lowest category. As mentioned in Chapter 9, farmers in the irrigated areas, where FI is typically higher, tend to be younger (and more educated). Otherwise, operators of this age are most likely to be working in the public administration. Operators of 45-54 years ranked second in the highest category while other groups were distributed in the smallest and the middle

FI categories.

Although FHHs with illiterate operators were least represented in the highest FI category, education was found to have no significant influence on the levels of FI of the household. The general dynamism of the Jordanian farmers, the distribution of land ownership which is dominated by elderly people, and the ability to invest and hire trained labour might provide explanations for this lack of association. It might be recalled that full time farmers (whether income or main occupation classes) were found to be older and less educated than RPAs.

The size of the FHH, however, was found to have significant influence on the levels of FI (Chi.02). Of the smallest FHH size group (< 5 members), only 6% were found in the highest category against 31% of the households with more than 10 members. The possible explanation is the larger the FHH, the more labour available for farm work.

Farm income was found to vary by the occupation of the operator. Table 10.5 shows that full time farmers were the most likely to be in the highest FI category and professional and businessmen ranked second. Public servants and labourers were most represented in the lowest category which suggests that their farming activities were largely subsidiary.

Table 10.5 Farm Income by the Main Occupation of Operators (percent)

Main Occupation	Farm income Groups <500	-2499	>2500 (JD)	Total	No. of Cases
Public Servants	72.1	20.9	7.0	100	43
Self employed Professionals /Businessmen	46.7	46.7	6.6	100	30
Labourers	45.5	22.7	31.8	100	22
Farmers	55.5	33.4	11.1	100	9
Overall	22.5	46.0	31.5	100	89
	41.5	37.3	21.2	100	193

Chi Square: P = .001

Farm income was also found to vary by place of residence, though with low significance. Households in the urban areas were found to be more represented in the highest FI category (Chi.07). It may be recalled that urban residents were more likely to have large farms, a factor positively related to FI.

The contribution to farm labour by farm operators, wives and other members was found to vary positively with FI, but for members other than holders, this held true until a point before it declined as their contribution to farm labour in the highest FI category (>JD 5000) was as low as the lowest FI category (Chi.001).

10.2 OFF-FARM INCOME

10.2.1 SOURCES OF OFF-FARM INCOME

Table 10.6 shows the importance of various sources of OFI. The survey results show that 81% of the FHHs had at least one member involved of off-farm employment (OFE) and 88% were found to have at least one source of (earned or unearned) off-farm income. As mentioned earlier, off-farm income[4] (OFI) is a crucial element in the survival strategy of FHHs and a stabilizing factor for the flow of FI against the uncertainty of climate conditions in the dry farming areas, the insecurities of marketing outlets and prices (and water resources to a lesser extent in the irrigated areas).

As mentioned above, gainful employment was found to be the most important source of OFI. Among other sources of OFI, pension and rents were important, while remittances and other sources were less important.

The majority of all FHHs has sources of OFI but the proportions were higher in the rain-fed and highland areas. Table 10.6 presents the different sources by zone and source of irrigation. Pension and rent were the most important in the rain-fed highland zone and in the eastern zone ranked second. Elderly pensioners resort to their villages, largely in the north and south regions in the rain-fed areas. They

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[4] Earned off-farm income unless indicated otherwise.

practise limited farming activities in small farms, while a minority and the more active go for irrigated farming. No pensioner was found in the Jordan Valley, which might be explained by its long standing practice of keeping farming as a main occupation for farm operators.

Renting property, as expected, is more important to households with large farms and in the middle region where it is more rewarding close to the urban centres

Table 10.6 Proportions of Groups Having Certain Sources of Off-farm Income

Variable	TOFI#	OFE##	Sources of Income Pension	Sources of Income Rent	Remittances	Other OFI
Farming System						
Rain-fed	94.8	88.7	26.1	16.5	5.2	9.6
Irrigated	78.5	70.9	6.3	16.5	7.6	7.6
Zone						
The Eastern	79.2	62.5	12.5	16.7	4.2	25.0
Jordan Valley	75.7	70.3	0.0	5.4	8.1	2.7
Highlands	93.2	88.8	24.1	19.5	6.0	7.5
Overall	88.1	81.4	18.0	16.5	6.2	8.8

TOFI stands for earned and unearned off-farm income.

OFE stands for gainful off-farm employment.

and around which rain-fed farming is largely practised. Rent was much less important in the Jordan Valley except for renting out land.

Remittances were found to be of minor importance. Members of the rural population are less likely than the urban people to work abroad and those who migrate to the urban centres are more likely to be supported by their families than otherwise due to the high costs of living in the urban areas. This might be substantiated by the finding that 6% of the households in the sample have an inflow of remittances against 12% of households who were found to support non-resident members of the family.

Other sources of income included interest and dividends. They also include

OFI from unknown sources, as a few respondents chose not to reveal their sources of OFI.

10.2.2 VARIATIONS WITH OFF-FARM INCOME

10.2.2.1 The Operated Area and Tenure

As mentioned earlier, the high incidence of rural pluriactivity is a natural response to the limited potential of farming to provide minimum income to satisfy the basic needs of the rural households coupled with unwillingness to leave the farm. This is demonstrated by the low percentage of households who depend solely on FI even among households in the highest farm size group (Table 10.7). Although there is an inverse relationship between farm size group and the percentage of FHHs who

Table 10.7 Off-farm Income by the Operated Area Groups (percent)

Farm Size Groups (du)	Off-farm Income Groups (JD)					
	None	-1499	-2499	-4999	5000-	Total
4 - 20	9.1	28.8	22.7	30.3	9.1	100
21 - 50	23.5	25.5	7.9	19.6	23.5	100
51 -100	21.2	33.3	12.2	21.2	12.1	100
100-	26.2	19.0	14.3	16.7	23.8	100
Overall Sample	18.7	26.6	15.1	22.9	16.7	100

Chi Square: P = .08

have OFI, the relationship was found to be of low significance for the overall sample, but was found to be insignificant if the source of irrigation is controlled.

Although the percentage of households in the smallest farm size group having no OFI is smaller (9%) than those in the highest farm size group, nevertheless, the percentage there is surprisingly low (26%). Furthermore, households with over 100 dunums group were also most represented in the highest OFI category, while

households in the smallest farm size category were least represented. Although this may suggest that the income distribution might not be improved by the OFI, it is equally important that the position of the small farmers would have been far weaker and much more precarious without the OFI.

The distribution of OFI categories among the farm households in the smallest farm size group is more even and more represented in all OFI categories except the highest category which might reflect the necessity for OFI to these families. In the contrary, the distribution of OFI categories for the largest farm size group is rather polarized in the two extremes, either nothing or a high income, which might reflect the potential of farming to provide year round employment if the household members wish to do so, or the choice to rely almost exclusively on hired labour while undertaking regular OFE.

The position of the households in the medium sized groups is not clear due to the influence of other factors such as the availability of water for irrigation, age and education of the operators and the size of FHH. However, fewer FHHs were found in the middle OFI categories when compared to the smallest category. The tendency of FHHs with medium-sized farms in the irrigated areas to be more occupied by farming activities might explain the lower involvement in off-farm activities.

The relationship between land tenure and OFI was found to be statistically significant (Chi.01). Almost half (48%) of the owner-occupiers and one third (32%) of the mixed category were found in the over JD 2500 categories against 9% of the tenants. Similarly , 14% and 20% of owner-occupiers and those with mixed status were found to depend solely on FI, against 46% of the tenants. It may be recalled that more than one third of the tenants (36%) were found in the lowest FI category. Against this background, it is not surprising that tenancy is diminishing as suggested earlier in this chapter and in Chapter 9.

10.2.2.2 Farming System and Agro-climatic Zone

Off-farm income varies by farming system. Table 10.8 shows that as few as 12% of FHHs in the rain-fed areas have no OFI against 29% in the irrigated areas.

Furthermore, a higher percentage of FHHs in the irrigated areas were found in the largest OFI category, which reflect the either-or situation (Chi .002).

As Table 10.8 indicates, OFI also varies by zone. Farm households in the highlands were least likely not to have a source of OFI (12%), whereas FHHs in the eastern zone were most likely to be so (42%). FHHs in the highlands are more evenly distributed among OFI groups while the distribution in the Jordan Valley shows more clustering at the lower end. Just like the FI, almost one third were found in the less than 1500 OFI category, which may suggest a complementary relationship between FI and OFI. The same polarized distribution found in the eastern area

Table 10.8 Off-farm Income by the Farming Systems and Zones (percent)

Variable	None	Off-farm Income Groups -1499	-2499 (JD)	-4999	5000-	No. of Cases
Farming System(1)						
Rain-fed	11.5	27.4	15.9	31.0	14.2	113
Irrigated	29.1	25.3	13.9	11.4	20.3	79
Zone(2)						
The Eastern	41.8	8.3	8.3	8.3	33.3	24
Jordan Valley	27.1	32.4	13.5	8.1	18.9	37
Highlands	12.2	28.2	16.8	29.8	13.0	131
Overall Sample	18.7	26.6	15.1	22.9	16.7	100.0

Chi Square: (1) P = .002 (2) P = .001

for FI was repeated for the distribution of OFI. Households with larger farms generate large FI as well as OFI. This might suggest that the distribution of the resource base is more skewed in this zone in comparison to other zones and OFI seems to widen the gap between the better-off and the poor. This might call for some policy measures to reduce income disparity.

The **relative dependence** on OFI varies by zone. Table 10.9 shows that 69% of households in the highlands were in class II against about 40% for the other zones.

This is not surprising, not only because farming in the highlands is generally much less remunerative, but also that it is much less demanding for labour in peak seasons. AGRAR (1986) estimated the labour requirements per dunum to be 5-8 man-days for fruit growing and 1.5-2.7 man-days for cereals which are the main enterprise in the rain-fed areas. Thus, given the typical small sizes of farms and large size of FHHs, oversupply of labour is evident and the excess of FHHs' labour force can be allocated to OFE whenever the possibility arises to do so. In contrast for vegetables in the irrigated areas, the estimated man-days according to AOAD (1985) were at least 20 man-days (for two seasons in the Jordan Valley) and it can be as high as 10 times for farming in greenhouses. This implies that even for one farm unit (of 30 dunums) in the Jordan Valley, at least two full time workers are required.

The greater reliance on OFI in the rain-fed highlands areas indicates the need for additional employment and income, which can be largely explained by the small size of farms, seasonality and low labour demanding enterprises such as growing fruit and cereals.

Table 10.9 Income Class by Zones (per cent)

Income Class	The Highlands	Jordan Valley	The Eastern
MLFs	30.8	59.5	58.3
- FT Class	12.0	29.8	37.5
- Class I	18.8	29.7	20.8
SLFs			
- Class II	69.2	40.5	41.7
Total	100.0	100.0	100.0

Chi Square: P =.002

The relatively high percentage of RPAs in the irrigated areas in the Jordan Valley and the eastern zone, though they have greater labour absorbtion and income generating capacity, might be explained by the existence of surplus labour with higher levels of education, social considerations largely due to the lower status of the

occupation of farming, and a reflection of the labour market situation. As mentioned in Chapter 2, there was an increase in dependence on seasonal labour and family labour in the late 1970s and early 1980s according to the Agricultural Censuses 1975 and 1983, a trend which continued until the late 1980s. This was facilitated by the availability of cheap foreign labour which made it more beneficial to hire seasonal labour to undertake farming activities while the operators or other FHHs members became free to assume regular OFE with significantly higher wages. At the same time, minor farming activities were carried by FHH members. However, farming even in the irrigated areas cannot provide employment to the rapidly growing rural population and the educated members of the households.

10.2.2.3 The Type of Enterprise

Empirical evidence from many countries indicates that RPAs are less likely to be involved in enterprises with high labour requirements in order to devote more time to OFE. The evidence for the case of Jordan was not conclusive. The type of enterprise was found to be independent of the levels of OFI for all enterprises except for keeping animals where the relationship was found to be statistically significant (Chi.001).

Further light can be shed on these results by the research findings on OFI. A high percentage of the FHHs members who grow fruits under rain-fed conditions were found to be in public sector employment whose annual salaries are distributed all over OFI categories except the largest category. However, professional and businessmen were more likely to grow vegetables, fruits under irrigation or large pome or stone trees farms under rain-fed conditions. They were more likely to be represented in the largest FI and OFI categories.

Animal keepers were less likely to have OFI and if so, they were more likely to be in the low to medium OFI categories as their OFE is more likely to be complementary to their farming activities.

10.2.2.4 Farm Household Labour Input on the Farm

The relationship between the groups of farm man-days of operator and OFI categories was found to be significant. Table 10.10 shows that while only about 8-13% of FHHs whose farm operators have less than a full year of employment in

Table 10.10 Off-farm Income by the Farm Labour of Operators (percent)

Man-days Groups	Off-farm Income Groups None	-1499	-2499 (JD)	-4999	5000-	No. of Cases
- 30	8.3	26.4	16.7	33.3	15.3	72
- 90	10.7	28.5	14.3	28.6	17.9	28
- 270	13.2	13.2	26.2	26.3	21.1	38
> 270	40.7	35.2	5.6	3.7	14.8	54
Overall	18.7	26.5	15.1	22.9	16.7	192

Chi Square: P = .01

farming (<270 man-days) have no OFI, 41% of FHHs whose operators were fully employed on the farm have no OFI. Those who were fully employed on the farm were least represented in the over 1500 JD categories. This is to be expected as the operator himself is not involved in OFE activities and the possibility exists only for others members to be so involved.

The wives' contribution to farm labour was negatively related to OFI levels. The percentages of wives who do not work on the farm was found to be higher in the households with higher OFI categories. Wives seem to be more supportive in the lower OFI groups and their contribution is least in the highest OFI category (Chi.01). A similar relationship was found between the man-days worked on the farm by other members and OFI levels (Chi .01).

10.2.2.5 Place of Residence

Table 10.11 shows that the relationship between the place of residence and OFI categories is highly significant. It is evident from the table that the more

Table 10.11 Off-farm Income by Place of Residence (percent)

Place of Residence	None	Off-farm Income Groups -1499	-2499 (JD)	-4999	5000-	No. of Cases
Village	18.9	34.2	17.4	18.9	10.6	132
Nearby Town	19.4	16.1	12.9	32.2	19.4	31
Urban Centre	17.2	3.4	6.9	31.1	41.4	29
Overall	18.7	26.6	15.1	22.9	16.7	192

Chi Square: P = .001

urbanized the household the more likely it is to be in a higher OFI group. As few as 3.4% of the urban residents were found in the lowest category against 34% of the villagers. It is to be expected that living in the urban centres gives a better chance of obtaining more rewarding OFE. However, costs of living in the rural areas are certainly lower than the urban areas. Skour (et al., 1989) estimated the costs of living in the rural areas to be 80% of their levels in the urban areas.

10.2.2.6 Households Characteristics

The age of the operator and the size of FHH were found to have a rather neutral effect on the levels of OFI of the household. However, the level of OFI was found to be positively related to the level of education of the head of the household. More than a half (57%) of operators with high education and one quarter (23%) of those with secondary education were found in the top category (>JD 5000), whereas 14% and 8% of the elementary educated and illiterates were found in this category

(Chi.00).

The average number of years of education was significantly different for levels of OFI (ANOVA.01). The average size of the household was also higher for the over JD 1500 categories but stopped short of the 0.1 level of significance (ANOVA.11). As might be expected, bigger FHHs were more likely to have more members involved in economic activities off- and on the farm. Of the FHHs with five members or less, 38% were found to be wholly dependent on FI whereas only 16% of households of more than 5 members were found to be so but the distribution of FHHs size groups seems to be independent of the levels of OFI.

10.3 FARM INCOME BY OFF-FARM INCOME

Table 10.12 shows that while 61% of SLFs were in the lowest FI category, only 12% of MLFs were in this category (Chi.01). Class I farms were well placed in the farm income categories. None were found to have less than JD 500, only 20% in the less than JD 1500 categories and they were most represented in the highest FI category while class II were least represented. Unlike class I, more than half (54%) of full time FHHs were found in the lowest two FI categories. This is another indication that class I is the main pillar of the farm sector and a good part of the

Table 10.12 Farm Income by Off-farm Income classes (percent)

Income Class	<500	-1499	Farm incom Groups -2499 (JD)	-4999	>5000	No.of Cases
MLFs	11.8	23.7	25.0	23.7	15.8	76
-FT Class	25.7	28.6	14.3	20.0	11.4	35
-Class I	0.0	19.5	34.2	26.8	19.5	41
SLFs						
-ClassII	60.7	23.1	6.8	3.4	6.0	116
Overall	41.5	23.3	14.0	11.4	9.8	193

Chi Square: P = .001

operators of FT class were actually practising marginal farming in the rain-fed areas.

Table 10.13 presents a cross-tabulation of FI with OFI which indicates that households in the lowest farm income group were most likely to have OFI, but for

Table 10.13 Off-farm Income by Farm Income (percent)

Farm Income Groups (JD)	Off-farm Income Groups					Overall
	None	-1499	-2499	-4999	5000-	
- 500	12.7	24.1	17.7	34.2	11.3	41.2
500 -1499	22.2	24.5	8.9	24.4	20.0	23.4
1500-4999	24.5	36.6	16.3	12.2	10.4	25.5
5000-	21.1	15.8	15.8	0.0	47.3	9.9
Overall	18.7	26.6	15.1	22.9	16.7	100.0

Chi Square: P = .01

other FI groups, there was little difference. Households in the lowest FI group were also less likely to be in the highest OFI category. Nonetheless almost two thirds of them were able to earn more than JD 2500. This suggests that the OFI is an important source of income for the farm households and apparently it is necessitated by the low FI which is not enough to secure the bare needs of the low FI households. Households with the highest FI were the most likely to have the highest OFI. As explained earlier, professional and businessmen were more likely to operate large farms depending on hired labour and to generate larger FI while they also generate larger incomes from OFE. Farm households in the middle FI categories (JD 1500-4999) were least represented in the two largest OFI categories. This might be explained by the finding that the operators of such farms were largely occupied by farming activities in the irrigated areas.

The data in Tables 10.1 and 10.7 are combined together in Table 10.14 which shows that household' income is clearly influenced and enhanced by the presence of OFI. The question may arise, who benefits from OFE or who is the main beneficiary,

Table 10.14 Farm and Off-farm Income by the Operated Area (percent)

Farm Size Groups	FI <500	OFI None	FI -1499	OFI -1499	FI -2499	OFI -2499	FI >2500	OFI >2500	No of Cases
				(JD)					
4- 20	75.8	9.1	13.6	28.8	9.1	22.7	1.5	40.4	66
21- 50	27.5	23.5	41.2	25.5	17.6	7.8	13.7	43.1	51
51-100	33.3	21.2	27.3	33.3	21.2	12.1	18.2	33.3	33
100-	11.6	26.2	14.0	19.0	11.6	14.3	62.8	40.5	42
Overall	41.5	18.7	23.3	26.6	14.0	15.1	21.2	39.7	192

the poor or the better off ? Although there is no clear pattern for the distribution of FI and OFI, it is clear that the poor are markedly better off than would otherwise be the case and the better off are even in a better position. However, as the latter are professional farmers with a higher proportion of marketable output, their contribution is valuable if properly directed to products in short supply. This lack of clear pattern might be attributed to the influence of variables such as the irrigation, the motive of RP and the education level of the head of the household and the adult members.

As expected, OFE is most important for the smallest holding group (4-20 dunums) for all income categories. Furthermore, the significance of OFI is more evident in the largest income category as the percentage of households who have this category of OFI is higher than their counterparts of FI for all farm size groups except the largest one.

These findings might be supported by the finding of a recent survey on household expenditures and incomes in Jordan (DOS 1988) which indicated that the average annual income in 1987 for households with a head with agriculture as main occupation was slightly higher than the national average (JD 3508 vs 3496). Of more significance was the finding that agriculture contributes (on average) only 38% to total income. However, as the average size of household is higher for FHHs, the per capita annual income (JD 410) was 90% of the national average.

These findings together with the finding that class II farmers who derive more than 50% of their income from OFI represent 60% of respondents, support the hypothesis that FHHs are generally more dependent on OFI than FI.

With respect to **pooling income** and apart from the head[5], a quarter of households who have at least one member working off the farm indicated that OFI was not pooled. The rest represents those who pool all their income or part of it. Two points are due here, (a) OFI generated by members other than farm operators may not be taken at its face value as a net contribution to the household, (b) although other members with OFE may not contribute to the FHHs expenses, the FHHs are still better-off as they are relieved of meeting personal expenses of those members.

Single adult members of the households are expected to share the financial responsibility while still residing with the family, if OFE happens to be within commuting distance of the place of residence, a new and more positive alternative to migrating from the rural area. When married, the new trend for them is to live in a separate house, although this trend may be slowing down due to the present (1989-1991) economic and employment difficulties.

Sharing financial responsibility is normally rewarded by a major contribution from the household to the costs of marriage and to a lesser extent to the establishment of the new house. Pooling income therefore, might be looked at as a form of investment to finance the typically high costs of setting up an independent household.

Thus, pooling income may solve some immediate, short run cash shortages for the households, but eventually it is a liability rather than a credit. This might cast some doubt about the desirability of considering the OFI for all members of the households to evaluate the welfare of farm households and farm income.

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[5] It might be recalled that only about 2% of wives were found to have OFE.

10.4 CONCLUSIONS

Farm income was found to vary positively by the size of farm. Low FI was associated with wholly owned farms, elderly operators, monoculture, fruit growing in the rain-fed areas in the highlands and public service occupations.

Only one in ten FHHs was found to depend solely on FI, and one out of five was found with no member with OFE. Pensions and rents were found to be important sources of unearned income. Low OFI was associated with medium-sized farms, tenant status, intensive irrigated farming, higher FHH labour input on the farm, residence in villages and lower education.

Although OFI was significant to all FHHs, those with the least FI were most likely to have OFI, but FHHs with the largest farms were found to have the highest levels of FI and OFI. In one of every four pluriactive FHHs, OFI was not pooled, but while the pooled income might solve some short term cash shortages, the net longer-term contribution is at least questionable.

Considering the average annual income of households in the rural areas (JD 2725), only one out of five farmers was able in 1989 to generate FI around this average. The findings that the FI for 42% of FHHs is about half the poverty level, and for a further 23% FHHs about the poverty level highlights the significance of OFI to the livelihood of FHHs. This was evidenced by the findings of a recent survey (DOS 1988) which indicated that the average annual income in 1987 for households with a head with agriculture as main occupation was slightly higher than the national average and agriculture contributes (on average) 38% only to total income. Thus, OFI does not only contribute to the alleviation of poverty but it bridges the inter-sectoral income disparities. However, the findings suggest that the intra-sectoral income disparities are large and OFI did not help to reduce these inequalities.

It can be concluded that, given the continuing decline in the farm size due to the inheritance system, the rapidly growing population, the gap is bound to be widening between the growing labour force and the potential absorption capacity of the farm resources. Development of water resources, introducing labour-intensive and biological technology and solving marketing though of utmost importance to the future development of agriculture, would have only a relief effect on the structural

unemployment and welfare considerations.

The growing importance of OFI has introduced a new dimension to the criteria of the welfare of the farm households. It is no longer determined solely by the land and its area, quality and access to water for irrigation and improved inputs and technology. Access to OFE and OFI are no less crucial. The rapid disappearance of the old houses in the rural areas and in some cases abandoning the old village sites altogether, and the widespread possession of electric appliances and furniture are some notable outcomes of OFI regardless of the farm resource base.

CHAPTER 11

EXTENSION, ADOPTION OF INNOVATION AND CREDIT

EXTENSION, ADOPTION OF INNOVATION AND CREDIT

Agricultural development is an integral part of general social and economic development. Hence, a great variety of interacting factors have effects on increasing production. Some of these factors are directly related to the farming process such as improved farm supplies and methods of production, marketing, transportation, credit and land tenure. Other factors such as the institutional framework and levels of education are also crucial for sustained development.

The main problems facing the Jordanian agriculture at present which are directly related to agricultural development are in the fields of marketing, extension and research, and agricultural credit. In this chapter, extension, adoption of innovation, ownership of machinery and credit will be examined in relation to RP.

11.1 USE OF EXTENSION SERVICES

The survey results suggest that the use of extension services varies with the broad income classes and the farming system. RPAs were found to have more regular contacts with the public extension agents than the operators of FT farms (Table 11.1).

Operators of class I farms were found to have the highest relative contacts. There was little difference between class I and class II farm operators, but both were significantly different when compared to FT class. However, if the analysis is based on the main income classes, the difference was found to be insignificant.

Contacts with the public extension agents were found not to be influenced by the tenure status of the operator; all were found to be very much alike. Contrary to what is expected, the same can be said about the level of education of the operator.

It may be observed from Table 11.1 that about half (45%) of the operators have never contacted the extension agents. FT farms operators (as mentioned earlier) were least likely to have contacts. Contrary to what is expected, operators in the rain-fed areas were found to have more regular contacts with the extension agents. While one in four of operators in the rain-fed areas were found to have an established

Table 11.1 Income Classes by the Relative Frequencies of Contacts With the Public Extension Agents (percent)

Class	Always	Often	Rarely	Never	No. of Cases
MLFs	15.1	17.8	23.3	43.8	73
- FT Class	3.0	15.2	30.3	51.5	33
- Class I	25.0	20.0	17.5	37.5	40
SLFs					
- ClassII	19.8	22.6	11.7	45.9	111
Overall Sample	17.9	20.7	16.3	45.1	184

Chi Square (a) MLFs/SLFs: P = NS, (b) FT/Class I/Class II P = 0.05

working relationship with the extension agents, less than one in ten were found to be so in the irrigated areas, but they were found to have more occasional contacts (Chi.04). However, the percentages of operators with no contacts in both systems were found to be around the overall average.

These unexpected results can be explained by the observation that types of technical advice available in the rain-fed areas is more basic in nature for cereals, fruit trees and sometimes imperative as in the case of veterinary services. In contrast, the demand in the irrigated areas is for far more advanced technology to meet the requirements of the progressive farmers. High yielding varieties, fertilizers and pest control are in common use, drip irrigation and greenhouses were rapidly adopted by operators during the 1980s. Yet, the extension services are far from catching up with the new technologies. Hence, relevant research such as experiments for new types of seeds, rates and types of fertilizers and pesticides and water management are lagging behind, scant and limited in nature (Sudad 1980; MOP 1986; USAID 1988). As such, they have little to offer which might satisfy the needs of farmers in the irrigated areas.

The weakness of the public research and extension services in the irrigated sub-sector was partly compensated by more contacts with the extension agents of the private sector who seem to be capable of providing more updated technology. This

Table 11.2 Source of New Technology by the Farming System (%)

Farming System	Extension		Other Farmers	Other Sources	No. of Cases
	Public	Private			
Rain-fed	43.5	4.3	44.9	7.3	69
Irrigated	9.4	18.8	62.4	9.4	64
Overall	27.1	11.3	53.3	8.3	133

Chi Square: P = .001

is supported by the findings in Table 11.2 which shows that it is twice as likely for the operator to adopt new technology through the private agents than through the public agents. It might be noted that the private sector services are backed by interest free deals (as perceived by operators) and convenient repayment schedule for technologies such as drip irrigation and greenhouses.

The most important source of improved farming practices was found to be other farmers. This is not unexpected as the benefits of an innovation have to be demonstrated by the early adopters if it is to be adopted by the majority of operators (Hill & Ray 1987). There were significant differences between the operators in the rain-fed and the irrigated areas. Public agents were found to be as important as other farmers in the rain-fed areas. This was not so in the irrigated areas. Although reliance on other farmers was significant in both systems, reliance on other farmers in the irrigated areas was found to be more evident (Chi.01). As they are more dependent on FI, operators in the irrigated areas are more sensitive to the potential risk of improved farming practice and so need reassurance that the new practices will work under the prevailing market conditions.

In summary, the survey results support the hypothesis that RPAs have significantly more regular contacts with the extension agents than the operators of FT farms. Operators in the rain-fed areas were found to have more regular contacts with the public extension services while the operators in the irrigated areas were found to have more regular contacts with the private extension services.

11.2 USE OF IMPROVED METHODS OF PRODUCTION

As mentioned earlier, the farm sector in Jordan is a dual system and is almost made up of two distinct systems. The irrigated sub-sector is highly progressive. The use of improved seed varieties, application of fertilizers and pest control is common to the extent that rationalization of their use is a matter of concern for some governmental agencies.

The rain-fed sub-sector is largely lagging behind, although remarkable improvements (technically wise) can be easily observed in fruit growing and cereal production.

11.2.1 THE IRRIGATED SUB-SECTOR

The use of drip irrigation and greenhouses are perhaps the main indicators to distinguish the most progressive farmers. It is to be noted that those who were found to have greenhouses used drip irrigation as well. Although the percentage of FHHs

Table 11.3 Adopting Modern Methods by the Main Occupation of Operators (%)

Status	Greenhouses	Drip Irrigation	No of Cases
FTFers	21.7	63.0	46
DJHers	42.9	75.0	28
Overall	29.7	67.6	74

Chi Square: P = .10 (for the use of greenhouses).

with drip irrigation technology and greenhouses were consistently higher on RPAs farms than FT income class, the differences were not found to be significant. However, when the analysis is based on the main occupation of the operators (Table 11.3), the relationship with the use of greenhouses was found to be of the .10 level of significance. Therefore, the evidence to support the hypothesis that RPAs are

more likely to be more progressive is not conclusive.

Having greenhouses was found to be independent of the farm size. But the rate of adoption for drip irrigation[1] appeared to be positively related to the size of the farm. While this practice was found in 86% of the over 100 dunums category, 54% of the less than 20 dunums category were found with the practice; the relationship however, stopped short of the 0.10 level of significance (Chi.11). These results suggest that the size of the farm may not be a crucial factor for the adoption of such progressive biological technology.

It was found that there were no significant differences between the area under drip irrigation and the income class of the household. The same applies when the main occupation of the operator is considered.

Class II farm households tended to have fewer greenhouses than MLFs. Three quarters of SLFs had less than 10 houses[2] against 40% for MLFs. None of the SLFs had more than 20 houses while 30% of MLFs were found in these categories. Cultivation in greenhouses is very labour intensive and requirements were found to be almost 10 times that of similar crops grown in open fields (AOAD 1985). Therefore, RPAs are expected to limit such activities, but the crucial point however, that they appear to be more likely to adopt such technology or at least income classes were indifferent in this regard.

It might be worth noting that many respondents expressed their desire to adopt greenhouses and drip irrigation technologies, but they were severely constrained by marketing problems. Should the market prospects improve, the rate of adoption for these innovations would be certainly higher.

In summary, although the RPAs were more likely to use drip irrigation technology and greenhouses, the association was of low significance. Therefore, the evidence to support the hypothesis that RPAs are more likely to be progressive is not

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[1] The use of drip irrigation, apart from quadrupling the production of most vegetables, significantly reduce the need for labour for watering, weeding and water requirement which is very important under the conditions of limited water resources. However, the overall need for labour will be increased due to the increases in production.

[2] The area of the greenhouse is normally 500 square meters.

conclusive. Having greenhouses and using drip irrigation was found to be independent of farm size. There were also no significant differences in the area under drip irrigation between FHH income classes and main occupations of the operator. These results suggest that the size of the farm may not be a crucial factor for the adoption of such progressive biological technology. Hence promoting agricultural production might be feasible within the existing farm structure.

11.2.2 THE RAIN-FED SUB-SECTOR

Growing fruit trees, cereal production and keeping sheep and goats are the main enterprises in the rain-fed areas. **Fruit growing** is popular at present and the use of soil and moisture conservation measures are important indicators[3] of more progressive farming. Organic matter contents is another important factor under highly variable rainfall; it contributes to improving soil structure, fertility and the capacity of the soil to retain moisture. But, as many farms were found to be located in flat areas in many cases which preclude the need for such measures, and the fertility of soil was generally low, the use of fertilizers and manures were utilized to differentiate between progressive and traditional FHHs.

The relationship between the application of fertilizers and income classes was not significant. However, if the main occupation of the operator is considered, the relationship was significant (Chi.05). Table 11.4 shows that 47% of FT operators were found to be applying fertilizers against 30% of DJHers. More than two thirds (69%) of FT operators applied manure to their fruit trees against half (54%) of DJHers but the relationship was of lower significance (Chi.09). Thus, it appears that FT operators are more committed to farming in this type of enterprise. This might be explained by the lack of urgent necessity to take care of fruit trees on the part of the DJHers as fruit trees might survive even under harsh conditions. Public servants were most likely to have trees under rain-fed conditions to generate supplementary income especially in the future.

A positive relationship was observed between the size of the farm and the

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[3] A better and more comprehensive index for examining the degree of advanced fruit trees farming is feasible, but due to time constraints, the need for such an index was not anticipated.

application of fertilizers (Chi.02) and manure, (Chi.00). More than half (54%) and 82% of the households in the over 100 dunums category were found to apply fertilizer and manure respectively against 23% and 43% respectively for households in the lowest farm size category.

Table 11.4 Percentage of Fruit Growers Applying Fertilizer and Manure

Income Class	Fertilizers	Manure	No. of Cases
FTFers	46.9	68.8	64
DJHers	29.8	53.6	84
Overall Sample	37.2	60.1	148

Chi Square (a) Fertilizers: P = .05, (b) Manure: P = .09

Application of fertilizers and manure was practised more frequently in the irrigated areas in the Jordan Valley and the eastern zones. While 60% and 84% were applying fertilizer and manure respectively in the irrigated areas, 27% and 49% were found to be doing so in the rain-fed areas (Chi.01). 84% of those found to apply fertilizer, used manure as well (Chi.01).

The forgoing implies that FT farm households in the irrigated areas and those with larger farms seem to be more dedicated to their farming activities.

As for **cereal production**, the use of high yielding varieties, seed drills, application of fertilizer, herbicides and mechanical harvesting were explored to distinguish between progressive and traditional FHHs. However, the application of fertilizers and herbicides were found to be the most practical indicators[4].

[4] It is worth noting that using the above mentioned criteria was beset with difficulties. Some holders were not buying improved seeds but they produce them by themselves. Holders in the irrigated areas were not using fertilizers because some residues were already in the soil and one of the very objectives of planting cereal is to utilize it. Seed drills, if available at all, need flat and relatively large areas which is not the case for many farms. Mechanical harvesting has the same preconditions as seed drills; besides, many holders were not using it for a very good reason that is they wished to keep the straw for their animals. The timing of sowing the seeds and the use of special implements for tilling and

The survey results indicate that there were no significant differences between the different classes of FHHs and operators and different farm size groups with respect to the use of improved methods in cereal production (including mechanical harvesting). Some, 36% of class II FHHs were found to use fertilizers against 21% for MLFs (23% for class I and 17% for FT class) but the differences were not significant.

Overall, 58% were found to buy improved seeds[5], 8% used seed drills, 28% used fertilizers, 44% used herbicides and 41% used mechanical harvesting. This low rate of adoption of improved practices and inputs might be attributed to the inherent uncertainty in cereal production under rain-fed conditions. Therefore, they are reluctant to use improved inputs even when available. Thus cereal production is unstable and yields are low. If new technology is to be successful, it has to be technically sound and economically feasible within the local conditions and the prevailing small sizes of farms.

Application of fertilizers and herbicides were also found to be independent of farm size. As a result, despite the small scale of production, it is unlikely that production on RP farms is worse or better than on FT farms. This might also add to the credibility of the hypothesis that biological technology is rather neutral to farm size and hence the present farm structure may not be the main obstacle for developing cereal production, an objective with utmost importance to the Jordanian Economy which is worth more thorough study.

Combined with the above finding with respect to the possible neutrality of the farm structure on the adoption of new methods of production, a new strategy for increasing cereal production might be feasible within some form of cooperation, especially for providing machinery.

The public extension agents were active in promoting improved methods of cereal production in the rain-fed areas, which may explain the higher percentage of operators than expected who adopted improved practices in these areas. Although

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land preparation in general are also important factors for promoting cereal production in the context of the short rainy season and long ,dry and hot summer.

[5] Some holders were able to produce their own requirements of improved seeds.

the percentage of operators who were found to adopt new methods of cereal production seems to be increasing as suggested by Arabiat (et al., 1982), Hurani (1988) and Shepley (1988), it is not yet reflected in the annual production. As mentioned in Chapter 2, the area under cereal production decreased substantially in the last two decades which suggest that the problems facing cereal production are not purely technical.

Animal husbandry is largely traditional, and apart from feed mix in the dry season, there was a limited scope in this study to differentiate between progressive and traditional FHHs. Thus these aspects were not explored in the survey. However, FT income class and FTFers were much more likely to have improved breeds of cows but less likely to have improved breeds of goats. High yielding cows are kept for commercial purposes while keeping small number of goats is largely for family consumption, which might explain these differences.

In summary, on one hand, FTFers were significantly more likely to use fertilizers than DJHers for trees, and this was associated with the size of the farm and the availability of water for irrigation but there were no significant differences between income classes. They were also more likely to have improved breeds of cows. Thus, the survey data do not support the hypothesis that RPAs are more progressive. On the other hand, the RPAs appear to be more likely to adopt new technology (fertilizers and herbicides) for cereal production but the evidence does not support the hypothesis that RPAs are more progressive regardless of the size of the farm.

Therefore, the evidence to support the hypothesis that RPAs are more progressive is not conclusive. The results also give a further indication that the size of the farm may not be a crucial factor for the adoption of progressive biological technology. Again, promoting agricultural production may be feasible within the existing farm structure.

11.3 OWNERSHIP OF MACHINES

Apart from ploughing, spraying and to a lesser extent harvesting of cereals, farming activities are carried out by family labour and/or custom work (Duwayri 1985). Although class II FHHs appeared to be less likely to own machinery, the relationship was not significant. 15% of MLFs were found to have at least one tractor against 11% of SLFs. Overall, 13% of households were found to have tractors. As expected, Table 11.5 shows that the larger the farm, the more likely the household to have a tractor (Chi.01).

Table 11.5 Percent of Owners with Tractors by the Operated Area by Income Class

Class	4-20	-50	-100	101-	Overall	No.of Cases
			(dunums)			
MLFs	0.0	0.0	15.8	36.5	15.4	12
SLFs	1.9	6.5	14.3	44.4	11.2	13
Overall	1.5	3.9	15.2	39.5	12.9	25

Chi Square: P = NS (for overall only)

This finding implies that households in general and SLFs in particular do not over-invest in machinery as observed in other parts of the world in the literature review. Apart from tractors, households did not have a wide range of machinery; This is restricted to the ownership of small motorized or hand sprayers. Milking was found to be entirely undertaken by hand[6]. There is also a lack of small scale machinery adapted to the local conditions, as is the case in South Eastern Asian countries, Italy and Cyprus.

Considering the farm size structure, the cost of labour saving machinery would be uneconomical and very high. Besides, machines require space for keeping them,

[6] A number of sheep and goats owners were found to adapt the use of small washing machines, which are normally made of plastics, for extracting butter. This innovation had a great relief effect on women as making butter according to the traditional way is very tedious work.

costs of maintenance are high, securing spare parts locally and regionally is troublesome and, above all, the usage would be only for few weeks a year. Hence, custom work is much more practical and economical. However, being your own master is a strong motive to own a tractor, even though the size of the holding may not warrant it.

Pick-ups are the most popular machinery on the farm, 28% of respondents were found to have at least one vehicle (Table 11.6). Significant difference was observed between income classes. While 41% of the MLFs were found to have pick-ups, only 20% of SLFs had them (Chi.01). FT income class and class I were almost alike in this respect. The same applies when the main occupation of the operator is considered; FTFers being twice as likely to have a pick-up as PTFers.

Table 11.6 Percent of Owners with Pick-ups by the Operated area by Income Class

Income	4-20	-50	-100	101-	Overall*	No. of Cases
		(dunums)				
MLFs	14.3	15.0	52.6	68.0	41.0	32
SLFs	13.2	19.4	21.4	38.9	19.8	23
Overall	13.4	17.6	39.4	55.8	28.4	55

Chi Square: P = .01 (for overall only)

Just like tractors, the larger the farm the more likely the household is to have a pick-up in general and in the irrigated areas and within the MLFs (Chi.01), but the size of the farm was not a significant factor in the rain-fed areas and among SLFs. The possible explanation is that operators in the rain-fed areas have more opportunity to use their vehicles for custom work and for personal transportation as they are closer to the urban centres. The survey data indicates it was twice as likely for pick-ups and three times for tractors to be used for custom work in the rain-fed areas as compared to the irrigated areas. None of the households, except one, in the eastern zone use their tractors or pick-ups for custom work; it might be recalled that they were the most likely to have large farms.

Pick-ups are widely used for transportation for the family members and a means of transportation for OFE. But, more importantly, they are used to secure inputs and to transport output to markets. Thus, they might indicate a higher degree of intensive and commercialized farming.

In summary, apart from tractors and pick-ups, FHHs did not have a wide range of machinery. Although the findings of the research indicate that RPAs were less likely to own machinery, main living farms were significantly more likely to own pick-ups. Thus supplementary living FHHs do not over-invest in machinery as observed in the developed countries.

11.4 USE OF FORMAL CREDIT

Credit is critical where the need for working capital is high and to finance the purchase of modern technology. The formal credit sources charge much lower rates of interest than informal sources. Charges of this latter group normally arise through sales of inputs or equipments and are made indirectly with deferred payment or monopoly over marketing the borrowers' products.

The survey data indicate that there were no significant differences between income classes with respect to the uptake of institutional credit regardless of the basis of classification. Overall, 22% were found to have such credit which includes credit for housing. However, MLFs were more likely to have credit for productive purposes (78%) than class II FHHs (58%) and class I was the most likely to have such a credit (87%) (Chi.01).

Taking institutional credit was found to be influenced by the tenure status of the operators and level of education for the operators. About one third (34%) and 20% of operators with mixed tenure status and owners were found to resort to formal credit against 9% of (share)tenants (Chi.03). This is to be expected as tenants are less creditworthy due to the lack of land which is the most acceptable form of collateral. Without access to institutional credit, they rely on informal credit. Almost one third (29%) and 42% of operators with secondary and high education respectively were found to resort to institutional credit against 16% for illiterate

operators (Chi.03).

For those who resorted to credit, 'no alternative' was the most cited reason in addition to flexible repayment and low interest. The survey data suggest that there were no differences among income classes of households in this regard.

For those who did not resort to credit, 'no need' was cited by 42% of the sample, the most cited reason for RP households and in the highlands. Religion was the second important reason (26%) and most cited by MLFs and more likely to be cited by operators in the highlands. Other reasons mentioned were lack of land for collateral, red tape, dislike of being indebted (mainly for MLFs), risk of land confiscation[7] and no potential return.

The finding that 42% of the sample did not feel the need to borrow suggest that the working capital required for enterprises such as cereal and fruit trees under rain-fed conditions is low and hence they can cope with it using their own resources. It might be recalled that about 90% of households have some source of OFI and about 80% have some form of earned OFI. As they have no fundamental reason for rejecting taking credit, this might indicate also that they may consider taking credit should a promising opportunity arise in the form of new type of enterprise or superior technology over the present practices. This was demonstrated in poultry enterprise for the production of meat and eggs during the 1980s where Jordan has surpassed self-sufficiency, and in the rapid use of greenhouses and drip irrigation which was constrained by the limitations in marketing prospects. The two developments were largely promoted by active agricultural credit policy.

Religion is the second main reason. Fixed rate of interest regardless of the outcome of an enterprise or taking usuary without making any effort by money lenders is prohibited in Islam. However, there are at present financial Islamic banks[8] which are ready to share in a joint venture if they can be convinced that it

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[7] Although, only a land of one farmer was ever confiscated.

[8] Interest, that is *riba,* is prohibited in Islam which refers to the fixed or predetermined return on financial transaction. Islamic banks are required to apply the principles of profit-and-loss sharing in their loan operations. There are two methods of lending, (a) *Mudarabah* where funds are made available to the entrepreneur to be invested in a productive activity in return of predetermined share of profits whereas losses are born exclusively by the lender. (b) *Musharakah* where parties invest in varying proportions and the profits and losses are shared accordingly. Thus, viability and profitability of projects are the criterion rather than the creditworthiness of the borrower (Khan & Mirakhor 1986).

is a rewarding one. It is broadly remains to be seen whether it is a workable approach.

In brief, the survey data did not support the hypothesis that there was significant difference between income classes with respect to the uptake of institutional credit. This behaviour was found to be influenced by the tenure status and level of education of the operators. The more educated and those with mixed tenure status were significantly most likely to use formal credit and (share) tenants and illiterate operators were least likely to do so.

11.5 CONCLUSIONS

The survey results support the hypothesis that RPAs have significantly more regular contacts with the extension agents, but the evidence to support the view that RPAs were more likely to use drip irrigation technology and greenhouses was of low significance. The RPAs appear to be more likely to adopt new technology for cereal production and to use formal credit sources but the evidence does not support the hypothesis that RPAs are more progressive.

Operators with farming as main occupation were significantly more likely to use fertilizers than DJHers for trees, and this was associated with the size of the farm and the availability of water for irrigation but there were no significant differences between income classes. They were also more likely to have improved breeds of cows and to own machinery especially pick-ups which might indicate higher degree of intensive and commercialized farming.

Therefore, the evidence to support the hypothesis that RPAs are more progressive for certain farming activities was not conclusive. The results give also an indication that the size of the farm may not be a crucial factor for the adoption of such progressive biological technology and hence promoting agricultural production may be feasible within the existing farm structure.

CHAPTER 12

MOTIVES, ATTITUDES AND OUTLOOK

MOTIVES, ATTITUDES AND OUTLOOK

Although farm operators are basically motivated by economic considerations, other factors related to the social system, values and future aspirations have played a major role in promoting RP. This chapter is an attempt to bring the foregoing findings into the social context which would further the understanding of the role of RP in future socio-economic developments in the rural areas.

The past experience of RP, motives, social values and mobility of the land and future outlook will be examined.

12.1 DURATION OF PLURIACTIVITY AND WORK HISTORY

The survey results indicate that RP is an established practice by holders as the average length of involvement in RP was found to be 10.8 years. More than half (54%) of farm operators were found to be DJHers with main off-farm occupation, of which one in four were originally farmers who undertook OFE and the rest entered into farming from other sectors.

Nearly two thirds of operators with OFE, were found to be pluriactive since more than 10 years of which about half for more than 20 years (Table 12.1). On average, they were DJHers for 14.6 years. On the other hand farming as part time is a more recent practice as more than two thirds were DJHers for less than ten

Table 12.1 Years of Involvement by the Status of the Pluriactive Operators (%)

	Years of Rural pluriactivity							
Status	1-5	6-10	11-20	> 20	Cases	%	Mean	SE
PT Farming	36.3	32.5	22.1	9.1	77	74	9.5	0.8
OFE	14.8	22.2	33.4	29.6	27	26	14.6	1.6
Overall	30.7	29.8	25.1	14.4	104	100	10.8	0.8

years, but numerically, they are more important as they represent 74% of the pluriactive operators. On average, PTFers were pluriactive for 9.5 years.

From Table B.7 in Appendix B which summarizes the work history of the holders in the sample[1], it can be concluded that PTFing was the least likely route to FTFing as only 11% have taken it whereas 14% have changed from FTFing to PTFing. Therefore, PTFing was not a transitional stage either for entering or phasing out of farming and hence it is an option in its own right. The most likely process was to move directly from non-farm occupation to PTFing (33%) or to FTFing by 18%. Generational shift and early retirement were important factors in this process. Only 17.5% of operators have never had OFE and 6.7% were always PTFers. These findings suggest holders are quite mobile in their occupational behaviour, as the degrees of involvement were changing according to circumstances. It appears that farming might be looked at as a buffer zone which level off the labour potential of the holder. Therefore, under the conditions of the economic recession in the late 1980s, farming would provide at least partial employment to the unemployed labour force of the farm household which means that pluriactivity is more likely to slow down for the time being.

12.2 MOTIVES FOR PLURIACTIVITY

The survey results reveal a variety of push and pull motives for pluriactivity. Farmers who sought OFE have different and more manifested set of reasons than an entrant to farming from other sectors with a range of overlapping motives or it was simply as a result of sudden inheritance of land. Motives for pluriactivity have also changed over time. Taking OFE by farmers pre 1970s was largely motivated by push factors related to long standing necessity, marginality of farm resources at their disposal and the backwardness of technology employed in production. Pull factors

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[1] Of those with OFE, 89% were found to be always farming and the rest entered into farming as FTFers before they finally settled into DJHing.

Of the PTFers, 88% of them have never been FTFers and the rest started as FTFers, but they quit farming altogether, and later on re-entered farming as PTFers.

Of the FTFers, 38% have never been involved in OFE. 38% have non-farm occupation before. 11% have entered into FTFing through PTFing. 13% started FTFers, moved to PTFing but they return to FTFing.

played an important role in the last two decades especially for the young and educated generations with high expectation of income as OFE was easily accessible even for the illiterate operators during this period. The availability of good roads, transportation services have accelerated RP.

12.2.1 MOTIVES FOR OFF-FARM EMPLOYMENT

Income was a dominant motive for OFE. All operators in this group mentioned the need of supplementary income to support their families. Seasonality was mentioned by 45% and small farm by 15%. It might be recalled that at least 40% of farms had less than 30 dunums in 1983 which is far below the margin of viability (Table 9.3). This is not unexpected, as 82% of operators with OFE were found in the highlands where holdings are mainly small. Two thirds were found in the rain-fed areas were the growing season is short and the work load is concentrated in limited peak periods for planting, weeding or pruning and harvesting. Operators, therefore are expected to be largely underemployed. It might be recalled that types of OFE were largely regular and seasonal OFE was quite limited.

With the involvement in OFE, farming ceased to be the prime source of income as 74% of them were found to be in class II FHHs and by definition, they were more dependent on OFI. Some operators were continuing farming activities for social consideration or even as a hobby regardless of FI. With the ownership of land, which is a precious asset, DJHers felt more secure.

12.2.2 MOTIVES FOR PART TIME FARMING

Table 12.2 indicates that income was also an important consideration for farming as a sideline activity. Four out of five (79%) mentioned income as one of their motives but not necessarily the prime one[2]. This might be supported by the finding that 91% of them derive less than 50% of their income from farming (68% derive < 25%).

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[2] It may be worth noting that holders were not asked to assign priority to their objectives for farming on the assumption that it was unlikely to get reliable answers from a wide spectrum of holders.

Income motivation for some PTFers was not necessarily to have an immediate disposable net income. What seems to be more important was to cover the costs of developing the land and the working capital. As one holder has explained, as long as returns and expenditures are even, farming will be maintained. They were ready not only to be satisfied with low return to their labour but farming *per se* did not seem be the focal issue.

Table 12.2 Motives Cited for Part Time Farming (percent)

Variable	Percent of Cases Citing this Motive
Supplementary Income	79.2
Inheritance	44.2
Capital Investment	27.3
Hobby	20.8
To live in the rural area	14.3
Work after retirement	9.1
Others	16.7
No.of Cases	77

Although FHHs with young heads with occupations other than business and professional appeared to give more weight to the income motive, nonetheless, survey results suggest that there were no significant differences among operators by age, occupation (see Table B.8 in Appendix B). Furthermore, the income motive seems to be positively influenced by the size of the holding but the difference was not significant.

Inheritance was another important motive as it was mentioned by 44% of PTFers and it is likely to be even more important in the future. This suggests that the generational shift is, and will continue to be a primary factor in promoting pluriactivity. As the elderly operators pass away, their educated children who may have been already employed off the farm, are not expected to give up their regular and secure jobs to the uncertainty of farm income, unless FI is at least equivalent to

OFI which is very unlikely to be the case. Instead, the more likely scenario is to farm the land on a part time basis to earn income in the form of cash or food. This might be supported by the finding that this motive was mentioned by 62% of public servants against 48% of the self employed, but none of the labourers and only 15% of professionals and businessmen (Chi..01). It might also be supported by the finding that this motive was negatively associated with the age of the head of the household as Table B.8 in Appendix B shows (Chi.01). The size of the holding appears to have negative effect in this regard but the differences were not significant.

Table 12.2 shows that capital investment in land and in farming was mentioned by more than one quarter (27%). Hobby was mentioned by 21% of PTFers. Capital investment and hobby motives are largely mentioned by professionals and businessmen, but much less by self employed and by few public servants (Chi.01) as their income is typically low which leave nothing or a small share for saving or investment. Capital seems to be positively associated with age (Chi.07). Hobby motive was more likely to be mentioned by professionals and businessmen with small to medium size farms. For others, as expected it cannot be part of their survival strategy.

Among other considerations were living in the rural area to enjoy life and produce fresh food which was mentioned by 14% and to keep the farm as a source of employment after retirement which was mentioned by 9%. It is to be noted that 12% of PTFers had an experience in farming as they were originally FTFers. As Table 12.5 indicates, more than one third of DJHers (36%) felt that farming has social implication which might be in the form of obligation as an act of respect to the late father, or as it carries more social appreciation.

Reasons offered for preferring public service employment give an indication of what the respondents felt they would lack should they be fully employed on the farm. Security and regularity of the employment made it more appealing for operators, since, it was mentioned by 81% of operators with public job. Health insurance was mentioned by 44%, an important factor for large households with plenty of children. Pension was mentioned explicitly by 30%, but it is also implied in the security factor.

Other factor mentioned by 21% were the soft work load, short working days and good working conditions which made it easier to combine it with farming.

Whereas 23% said simply that there were no other alternative. Other factors include the provision of almost tax-free consumer and electric goods and better social status. It is to be noted that other household members' employment in the public sector is not considered here. Should any member be so employed, then other family members would be eligible to receive some of these consumer and health services.

The foregoing points are indicative of the precarious life of the FHHs. Lack of social security, crop and health insurance are critical factors to people on the farm. This however, is not to suggest that such securities are easy to adopt as implementing such measures are beset with great financial and administrative difficulties. But, they have to be understood and addressed to the best of the abilities of the concerned authorities to alleviate them until the time come to overcome these difficulties.

12.3 ASSESSMENT AND MEASURES TO COPE WITH PLURIACTIVITY

Pluriactivity was not considered to be a heavy burden to the vast majority of operators. Indeed, two thirds (67%) did not feel any strain at all to their normal life. Some experienced some stress (16%) and similar percentage considered pluriactivity as burdensome.

These findings suggest that the man-days required to accomplish the farming activities (in the typically small farms) are low[3] enough to be coped with by the pluriactive (typically large) FHHs with minimum difficulties.

As pluriactivity does not seem to be a disrupting factor to the life of the majority of DJHers, adaptation did not raise serious problems to the pluriactive households. Family assistance was possible for 62% of the households where the holder himself is a DJHer. This was facilitated by the limited demand for assistance in terms of work load, type of work and period of time. It might be recalled that taking care of animals, milking and processing butter and white cheese were almost exclusively the responsibilities of the wives and to a limited extent for some activities of the able children. Weeding and harvesting are also largely carried out by other

[3] It was estimated that the annual requirements of man-days per dunum for growing fruits under rain-fed conditions are 5-8, cereals 1.5-2.7 and 20-25 for vegetables under irrigation (for two seasons) (AGRAR 1986; AOAD 1985).

members of the FHHs, especially children. It might be recalled also that other members of the FHHs cooperated more in the rain-fed areas, where the required assistance is more likely to be for shorter periods. Indeed, many looked at this kind of activity as a source of enjoyment rather than a cause of stress.

Hiring labour was equally important. Again, it might be recalled that such a need was limited to an average of 59 man days of casual work in the rain-fed areas where fruit trees and cereals are dominant, thus the costs involved were relatively low, whereas, DJHers were more dependent on hiring labour in the irrigated areas.

Work on the farm outside the OFE working time is important for the civil and military servants but it was also mentioned by others. Overall, it was mentioned by 53% including the self-employed, businessmen and the waged workers. Some self-employed and businessmen indicated that they perform or monitor their farm work early in the morning, a more pleasant time in the hot and dry areas. Bearing in mind the low man-day requirement for crops such as fruit trees and cereals, the short working day[4] is a clear advantage for the public servants in addition to making use of annual leave which was mentioned by 27%. Nearly half the sample (48%) were found to have flexible jobs, which makes it easier for them to devote some time to farming, but this was to a large extent managerial while the physical work is carried out by hired labour.

Tilling is the main mechanized activity in the farm. However, custom work is the normal way to till the land and for the application of herbicides, insecticides and pesticides as only 11% were found to have tractors.

Thus, it appears that the most labour demanding activities are mechanized or passed over to hired labour, leaving the casual work such as milking (normally small number of animals), planting, weeding and harvesting to be accomplished by other members of the household whose labour potential would otherwise be idle due to economic, physical or social considerations. As observed in many countries, this demonstrates more efficient use of the farm labour force as compared to full time farming.

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[4] A normal working day is for 6 hours for six days a week.

12.4 ATTITUDES TOWARDS LAND AND FARMING

As Table 12.3 shows, operators were significantly different in the values attached to land and farming. As expected, source of living was mentioned by 36% of FT operators in addition to 32% who found it difficult to assign priority to the social value over source of living or vice versa. But, only 29% of DJHers looked rather seriously to farming as a source of income. In contrast, 38% consider farming or land as a form of investment against 12% of FT operators which might have an implication on land mobility in the future, and also it indicates an interest to have

Table 12.3 Value Attached to Land by the Main Occupation of the Holder (Percent)

Class	Social	Living	Social /Living	Busin -ess	Capital	Resid -ence	Total
FTFers	14.7	36.0	32.0	8.0	4.0	5.3	100
DJHers	21.9	14.6	14.5	19.8	17.7	11.5	100
Overall	18.7	24.0	22.2	14.6	11.7	8.8	100

Chi Square: P = .01

some form of income or employment for the future especially after retirement. Land was found to be more important as a place of residence for DJHers (Chi.01).

With the future of agriculture development in view, attitudes towards farming were perhaps more positive as 56% of operators in the sample considered farming as technically superior to that of a decade ago, but 42% has considered the present situation as better in every aspect. Only one in four (27%), considered the present state of farming as worse. This negative attitude was more likely to be expressed by the elderly and least educated operators. This might be explained by the observation that under the past conditions, there were no purchased inputs, no family labour shortages for planting, weeding and harvesting, tilling by animals was more suitable

under the low rainfall conditions[5], hence variable costs of farming was limited if there were any at all. With the low expectations of the household from the production point of view as well as standards of living, it is not surprising that elderly operators do long for the old days of simple life and traditional farming.

The survey results did not support any significant differences among income classes, but if the main occupation of the holder is considered, DJHers were found to have more positive attitudes. The differences, however were of low significance (Chi.10).

Although many operators were deeply concerned about their financial positions, 84% express their satisfaction about their present condition[6]. Operators of FT farms were least satisfied as 70% were found to be satisfied against 90% and 87% for class I and class II respectively (Chi.02). Satisfaction appeared to be independent of the age and education of the holder.

12.5 MOBILITY OF THE LAND

It might be recalled that farm structure in Jordan is dominated by small farms (see Table 9.3) as 40% of farms or more were less than 30 dunums. This is to be expected as inheritance was found to be the main route to ownership of land. Two thirds (63%) were found to own their land exclusively through inheritance, in addition to 14% who owned part of the land through this process. About one in four (23%) bought their land and only 13% have ever sold part of their land. These findings suggest that land mobility is quite low.

It appears from the survey results that land mobility is low regardless of income classes and the main occupation of the operators which suggests that great

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[5] The widely used implements for tilling land, especially for cereal production are not suitable for the shallow soil under low rainfall conditions. However, more suitable implements which are more conducive to conserve soil and moisture are increasingly available and in use.

[6] Satisfaction might be attributed to the deeply-seated religious belief which says "the human being has the duty to do his best to earn living and to improve his conditions, but he should be satisfied regardless of the outcome of his efforts" as this is left to the almighty God to be decided.

value is attached to the land *per se*[7] whether farmed or not and regardless of FI. This strong attachment might be enhanced by the devaluation of the Jordanian Dinar and the economic crisis which was facing the country at the time of the survey. Land, which has appreciated greatly during the 1970s and early 1980s, has proved to be, as

Table 12.4 Means of Acquiring Land by Income classes (percent)

Class	Inheritance	Buying	Both	No. of Cases
MLFs	50.8	33.3	15.9	63
- FT Class	57.7	26.9	15.4	26
- Class I	45.9	37.8	16.3	37
SLFs				
- Class II	69.8	17.4	12.8	109
Overall	62.7	23.3	14.0	172

Chi Square (a) MLFs/SLFS: P = .03, (b) FT/Class I/Class II: P = .09

ever, the safest way to maintain the value of savings and to provide maximum protection against high rates of inflation.

With respect to acquiring land, there were significant differences between income classes as Table 12.4 shows. Class II FHHs were found to be more likely to acquire their land through inheritance (70%) than MLFs where 51% were found to own their land through this process (Chi.02). Class I farms were the least likely to be so (46%). They were also the most likely to buy land for farming (38%) and class II were least likely to do so but the differences between classes were of lower significance (Chi.06). If the main occupation of the holder is to be considered, the differences fell to the 0.10 level of significance.

Against this background and with the high prices of land due to limited supply, climbing the ladder of farming was achieved only by 15% of the land owners in the

[7] Highly sentimental terms were used by holders to express their feelings to land such as land is life and death, our soul and mother, source of honour, dignity, respect and identity, priceless and our security.

sample. Significant differences were found between FHHs in this respect. MLFs (especially class I) and FTFers were significantly more likely to climb the ladder (Chi.03). This is a further indication of the low mobility of land and aspiration to own a land was not a motive for RP.

12.6 FUTURE OUTLOOK

Apart from full time FHHs who have no OFI, only 30% of the rest of the sample said that farming is capable of generating enough income to support the farm households.

Table 12.5 Main Reasons for Lack of Interest to Expand Farming Activities by the Main Occupation of the Holder (percent)

Class	No Family Labour	High Cost of Inputs	Low market Prospects	No Time/ Interest	Others	Total
Farmers	28.1	23.4	18.8	4.7	25.0	100
DJHers	19.3	21.7	7.2	45.8	6.0	100
Overall	23.1	22.4	12.2	27.9	14.4	100

Chi Square: P = .01

Pooled ownership of the land was considered to be a serious obstacle to develop the land. However, 37% of operators with pooled ownership were found to be working cooperatively with other partners which might partly alleviate the problem of the smallness of the farm. This behaviour was not influenced by the income class of the FHHs or the main occupation of the holder. This might also open the door for promoting group farming especially for cereal production which is in short supply and where increasing the scale of farming has a clearer advantage. Less than 6% of respondents have plans, though not definite ones, to quit farming. Only 23% have plans, though not definite either, to expand farming. As Table 12.5 shows lack of

family labour and high input costs were mentioned by 23% and 22% respectively. This suggest the present pattern of farming is likely to persist. However, there was significant difference between FT farmers and DJHers. While lack of family labour was the most important reason for the former (28%), lack of time or interest was the most important reason expressed by DJHers (46%) and class II as well (40%). If labour is to be hired, and land to be rented, positive return under the traditional technology is a remote possibility. The high percentage of DJHers who lack interest or time for farming may be interpreted as meaning that they are more interested in keeping the land rather than farming it.

Other reasons which were mentioned by FTFers include shortage of water, shortage of land for rent and rough land, but were hardly mentioned by DJHers who were also less concerned about marketing prospects as higher percentage of the produce is intended for personal consumption (Chi.01).

The future of land is determined by the religious law as it will be divided between heirs and practically, the holders have little power, if any, to alter this process[8]. One in four (27%) said that their sons are interested in continuing farming. Others were not sure or they were relatively young had nothing to say about the future. However, the attachment to the land was expressed very strongly and the mere ownership of the land provide them with the sense of pride, hope and security.

12.7 CONCLUSIONS

The majority of DJHers were pluriactive for more than five years which suggest a stable pattern of employment. Supplementing income was the most important motive for RP especially those who were originally farmers. Other main reasons were seasonality, small farms, inheritance, hobby or living in the rural area. Lack of social security, low mobility and capital investment of land were also critical factors. Pull factors played an important role as regular OFE was easily accessible even for illiterate holders during the greater part of the last two decades which was

[8] In theory, and while the owner is still alive, he can transfer the title to a certain heir, but few might have ever done that, as this is widely considered to be unfair, religiously and socially unacceptable.

further facilitated by the availability of an extensive transport system.

Pluriactivity does not seem to be a disrupting factor to the life of the majority of DJHers. The pluriactive were found to have more positive attitudes towards modern technologies but they were less likely to expand farming activities as market prospects are not favourable and they are more dependent on OFI. The future of land is determined by the religious law and operators cannot alter this process and only one quarter said that their sons are interested in continuing farming.

CHAPTER 13

A FARM HOUSEHOLD TYPOLOGY

A FARM HOUSEHOLD TYPOLOGY

The farm sector is gradually being integrated in the overall economy with the socio-economic development in Jordan since the 1950s. Consequently, farming has undergone a wide range of changes. New types of organization of farming have emerged alongside the traditional type of family farming which better reflect the place of farming economically and socially on the agenda of the FHHs.

The research findings suggest that FHHs were quite heterogeneous in their socio-economic characteristics. Reducing these complexities through classification might further the understanding of the state, problems and prospects of the rural population so that policies and development programs relevant to each category can be developed. FHHs were grouped in the previous sections on the basis of degree of dependence on OFI and the main occupation of the operators. Examining their potential for development adds another dimension to the findings and might enhance the utility of any policy implications.

13.1 METHODOLOGY

The methodology is essentially made up of two steps:

First, a number of characteristics of the FHHs pertinent to RP were considered in order to assign cases into groups on the basis of similarities with respect to market orientation, the degree of family labour involvement on the farm and the relative dependence on FI and OFI.

Second, the types of farm households so categorized were empirically validated through cross-tabulation to test the significance of associations or differences between variables in order to profile different categories of FHHs. This also helped to evaluate to what extent these characteristics were logically consistent and compatible with research findings in other parts of the world.

Given the data limitations as a number of the key variables were in categorical form, making use of the advanced statistical analysis such as cluster analysis was

fraught with difficulties. Therefore, an attempt was made to classify cases subjectively into groups with the maximum possible homogeneity. Thereafter, as suggested by Everitt (1981), discriminant analysis was utilized to evaluate the tightness and homogeneity of groups[1].

Although an element of arbitrariness in such classification is inevitable, a trade-off was imperative and might be supported by the following lines of reasoning:
First, the very concept of grouping or clustering is a subjective matter (Kendall 1980) especially in social studies, which means that a perfect approach is practically non-existent.
Second, the fact that respondents or their close relatives were interviewed in their own environments by the researcher who happened to have a long experience in these environments helped to arrive to a more objective classification.
Third, the classification was attempted with the aim of making policy implications better articulated, which might contribute to the objectives of the research work.

13.2 TYPE OF FARM HOUSEHOLD; PORTRAYAL AND OVERLAPPING

Reviewing the findings of the research work and data of individual cases, two broad categories of farm households emerged as Figure 13.1 shows. These types were portrayed as follows:
(a) the professionals (54%), who are more dependent and more integrated with the national economy through the externally produced inputs and output markets. This type was found to be made up of two sub-groups:

(i) the business-like FHHs (19%), which is defined as those who organize their farming activities on business lines. It was hypothesised that FHHs of this type and other FHHs members are not directly or physically involved in the farming activities, their involvement being largely in managerial duties and that they would depend on hired labour. FI is typically high but they have also sources of gainful OFI.

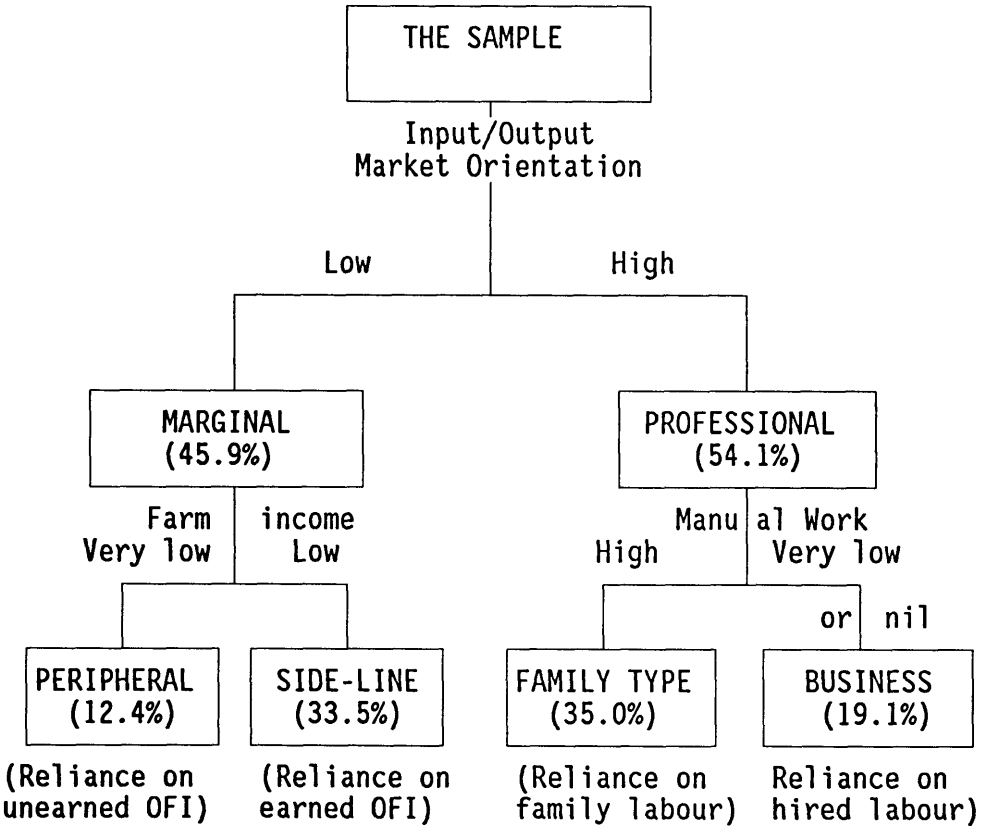
[1] See Appendix C.2 for statistical notes on the use of cluster and discriminate analysis.

(ii) the family type (35%) defined as those whose labour (at least the holder's) was the main force carrying out their farming activities, and farming is the main source of livelihood.

(b) the marginal types of FHHs (46%) are much less integrated in the national economy and as such they are less dependent on input and product markets. This type was made up of two sub-groups:

(i) the side-line type of FHHs (34%) is highly dependent on earned OFI. They have at least one member with regular OFE and FI being a supplementary income. They are involved in their limited farming activity, and they hire limited amount of labour.

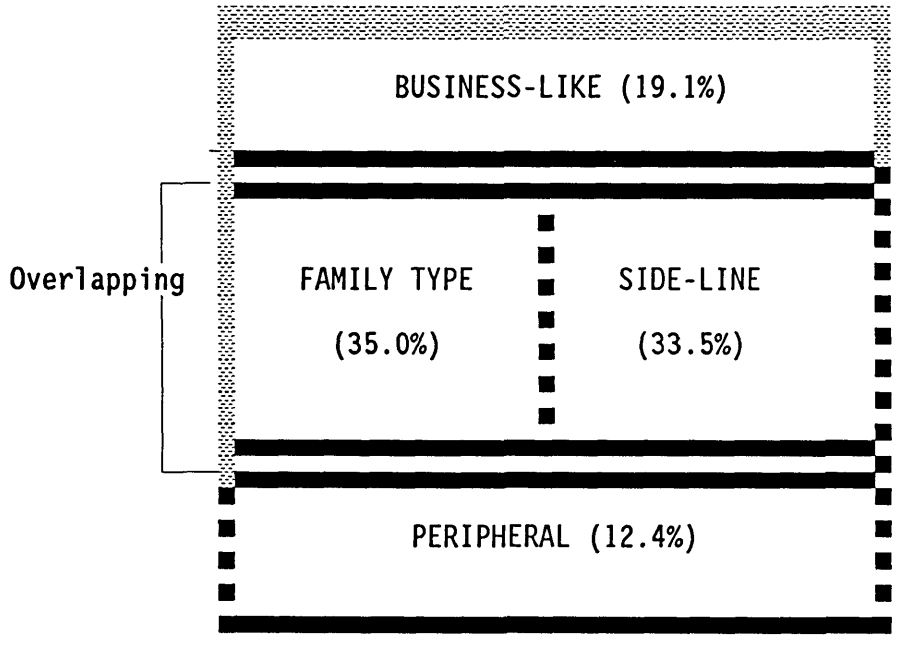
Figure 13.1 Classification of Types of Farm Households by Key Variables



(ii) the peripheral type of FHHs (12.4%) is similar to the side-line type, but with low profile of farm and off-farm activities and they are more dependent on unearned OFI.

However, delineating well-defined boundaries between types has proved to be impractical as overlapping between groups was found to be unavoidable as the diagram in Figure 2 shows. The two extremes business-like and peripheral types were found to overlap with the side-line and family farming types who have some overlapping too. Therefore, it was not possible for all cases to be fitted ideally in a specific category. Scrutiny through cross-tabulation, discriminate analysis and review of problematic cases has helped to arrive to a more proper classification according to the best judgment of the researcher. In spite of these precautions, the possibility of misclassification of few cases do exist, but since this possibility was largely confined to the overlapping types, the significance of each type would be hardly affected.

Figure 13.2 Distribution of Types of Farm Households



13.3 VARIATION OF TYPE OF FARM HOUSEHOLD BY MAIN VARIABLES

13.3.1 FARM SIZE, TENANCY AND USE OF MODERN TECHNOLOGY

Table 13.1 shows that FHHs in the business-like type are the least represented in the smallest size group and most represented in the largest group. The position of the peripheral type is just the opposite and is indicative of the extreme marginality of their farming activities. Through the continuum of types (as in the table) the proportions are in ascending order in the smallest group and in descending order in

Table 13.1 Farm Size Distribution of Types of Farm Households (percent)

Size Groups (dunums)	Business	Family	Side-line	Peripheral	Overall
4- 20	10.8	16.2	50.8	79.1	34.5
21- 50	18.9	41.2	23.1	4.2	26.3
51-100	13.5	23.5	13.8	12.5	17.0
Over 100	56.8	19.1	12.3	4.2	22.2
Total	100.0	100.0	100.0	100.0	100.0

Chi Square: P = .001

the largest one. In spite of the inadequacy of farm size as a criterion of the farming activities, generally, the marginality of farming is negatively associated with the size of the farm. The presence of some business and family types in the smallest groups might be explained by the fact that some enterprises such as poultry and intensive vegetable production in greenhouses do not require large farms. Family type were most represented in the medium sizes. This is to be expected because dependence on family labour put restrictions on the expansion of farming to achieve a degree of economic viability, as they accept lower returns to labour relative to hired workers. Their ability to adjust to economic realities demonstrates the strength of this type to withstand frequent economic changes, which the business type cannot.

Table B.10 in Appendix B shows that the mean of operated areas by type of

farming were significantly different. The means were 336, 91, 47, and 24 dunums respectively (ANOVA.01). The figures for the owned land were 513, 74, 72, 52 dunums. This indicates that only the family type cultivate all their land which suggest either that the family type were most efficient in using their land resources as they are more dependent on FI, or that they have a tendency to rent and sharecrop land, or that land may be of better quality as they were supposed to be more selective over time in this respect.

Table 13.2 shows that professional types were much more involved in land tenancy while the vast majority of the marginal types were owner-occupiers only.

Table 13.2 Tenure Status by Type of Farm Household (percent)

Tenure Status	Business	Family	Side-line	Peripheral	Overall
Owner-occupier	54.1	41.2	80.0	91.6	62.9
Tenant	18.9	14.7	6.2	4.2	11.3
Mixed Tenure	27.0	44.1	13.8	4.2	25.8
Total	100.0	100.0	100.0	100.0	100.0

Chi Square: P = .001

Family type FHHs were found to be most involved in renting (29%) and sharecropping (37%). This is as expected as they are more dependent on FI and expanding farming through buying is financially prohibitive due to high values of land.

Business types were found to be involved almost exclusively in renting in land as they have more control over the supply of inputs, type of enterprise and in selecting the marketing channels. Their motives for expansion were largely to realize the benefits of the economies of scale through more efficient use of their labour and equipment, specialization and to spread their fixed costs. Only four of the business type were found to sharecrop land of which three were renting land as well.

Although 44% of the FHHs of the business type were found to use the greenhouse technology, against 22% and 20% of the family type and side line, but the

relationship stopped short of the 0.1 level of significance (Chi.11). The differences among the mean number of greenhouses[2] (15, 8, 6 respectively) were of low significance (ANOVA.08). This might be explained by the small number of cases in this sub-sample. The proportions for the use of drip irrigation were 93%, 51% and 60% for business, family and side-line types respectively (Chi.002). Similarly, the mean areas under this technology were found to be significantly different, being 188, 32 and 46 dunums (ANOVA.04).

Business type were also the most likely to have tractors (30%) and pick-ups (51%). The proportions were 13% and 34% for the family type, 8% and 20% for the side-line. It is to be noted that none of the peripheral type were found with any of these attributes and assets except one amateur holder who used domestic water for drip irrigation of his fruit trees. The marginal types did not over-invest in machinery as observed in other countries.

Although the peripheral type were found to have the least contacts with the extension agents of the MOA, there were no significant differences between types of farming in this regard. It might be recalled that the progressive farmers have more regular contacts with the extension agents of the private sector as they are the more likely source of up-to-date new technologies. These figures indicate that the business type is more progressive, but the side-line has also a role to play in diffusion of modern technologies especially in the rain-fed areas where such modernization is badly needed.

13.3.2 THE TYPE AND NUMBER OF ENTERPRISE AND MARKET ORIENTATION

There were significant differences between the types of FHH and the type and number of enterprises (Chi.001). Farm households in the business type of farming were found to be most represented in the production of vegetables and cereals while the peripherals were most represented in the fruit trees enterprise under rain-fed conditions (Table 13.3). Side-line farms were least represented in the vegetable

[2] The typical size of greenhouse is 500 square meters which is equivalent to 0.5 dunum.

Table 13.3 Percent of Farm households with selected Enterprises

Type of Crop	Business	Family	Side-line	Peripheral	Overall
Vegetables	73.0	64.7	32.3	8.3	48.5
Dry Fruits	32.4	48.5	83.1	91.7	62.4
Cereals	48.6	76.5	52.3	25.0	56.7
Raising Animals	18.9	79.4	52.3	8.3	50.0

Chi Square: P = .001

enterprise and most represented in the fruit enterprise which has low labour requirement. They were also well represented in cereals and raising animals, although with much smaller area or numbers of animals as Table B.10 in Appendix B indicates. However, the figures suggest that whenever the possibility arise such as availability of family labour and land with good potential, they do have enterprises with high labour requirements. This suggest that they could play a positive role in promoting cereal and animal production.

Family type were found to be well placed in all enterprises. This is as expected as they tend to have general farming, an important element in their survival strategy, and in their desire to achieve relative independence of market forces. This was evident as they were most represented among farms with three enterprises and over while business type were more represented in the one or two enterprises farms which suggest that they tend to be specialized. Vegetable growing is the principal enterprise and cereal enterprise is a precautionary measure against the spread of diseases.

Peripheral types were most represented in the one enterprise group which is an indication of mono-culture rather than specialization to minimise labour demand, whereas the side-line type was well represented in the one to three enterprises range. If side-lines have more than one enterprise, this will be in much lower scale than the family type as Table B.10 in appendix B indicates.

These associations were supported by comparing the mean number of enterprises by type which were found to be 2 and 2.2 for the business and side-lines, 1.3 for the peripheral but 3.0 for the family type (ANOVA.01).

Professional types were found to be much more market oriented. Business type were market oriented for vegetables fruits, olives and cereals but to a lesser extent for animal products. It was observed that some of the business type keeps animals largely for the benefit of their permanent labourers in addition to housing and small areas to produce vegetables. This is an incentive to motivate workers to be more committed to the farm, and hence their productivity would be improved. Family types were most market oriented for vegetables and fruits and animal products but much less for cereals and olives.

Side-liners were less market oriented for vegetables, fruits and cereals and much less for olives and animal products. The peripherals were least market oriented except for cereals, where about 45% consume less than 25% of their produce.

These findings indicate that the business type is virtually integrated into the economy, and the family type are securing part of their food requirements to guard against the unfavourable market conditions. Production of the marginals is more oriented to personal consumption, although the marketed share of the side liners is not insignificant, and the decline expected in the OFI due to the present economic recession will motivate them to market an increasing share of their produce.

13.3.3 HOUSEHOLDS CHARACTERISTICS

Types of FHHs were found to be associated with the socio-demographic characteristics of farm operators. Of the operators of the business type, 44% were found to be less than 45 years of age against 18% of the family type. Similarly, the proportions for the side-line and peripheral were 49% and 29%. About half (52% and 46%) of the family and peripheral types were more than 55 years old (Chi.06).

Only 5% of the operators of the business type farms but 46% of the family type were found to be illiterate. Furthermore, 32% of the business but 1.5% of the family were found to have post secondary education. The proportions for the side-line type and the peripheral types for illiteracy were 18% and 46% and for high education 15% and 12% (Chi.01).

Of the peripheral and side-line types, 38% and 18% were found to have a household with less than five members. The peripheral type was also the least

represented among those with over 10 members (12%) while the percentages for other types were about 50% (Chi.01).

Half of the peripheral type have less than three dependants, against less than 20% for other types. In contrast 55%, 57%, and 35% for the side-line, business and family types have more than six dependants(Chi.008).

Table 13.4 Means of Households Characteristics by Types of Farm Households
(Standard errors in brackets)

Variable	Business	Family	Side-line	Peripheral	Overall
Age (yrs)	45.1 (1.7)	53.3 (1.4)	47.7 (1.4)	51.7 (3.0)	49.6 (0.9)
Educate(yrs)	9.4 (0.9)	2.8 (0.4)	6.8 (0.7)	4.5 (1.2)	5.6 (0.4)
FHH Size(no.)	10.4 (1.0)	10.9 (0.7)	9.1 (0.5)	6.5 (0.6)	9.6 (0.4)
Dependants(no)	7.4 (0.9)	5.3 (0.3)	6.8 (0.5)	4.3 (0.4)	6.1 (0.3)

ANOVA<.O1

There were also significant differences between the means of age, years of education, size of FHH and number of dependants by farm type. Table 13.4 is a summary of these FHHs characteristics. Business and side-line operators were found to be younger, more educated. They have above average number of FHHs and dependants. Family and peripheral types are aged, much less educated, and have below average number of dependants. Family type were found to be the largest and most represented in the extended type of family.

13.3.4 VARIATION BY FARM LABOUR

13.3.4.1 Household Farm Labour

Table 13.5 shows that about three out of four of the operators of business and family types spent more than three months per annum on their farms against one in five of the side-liners and none of the peripheral types. In contrast, 63% and 96% of

the side-line and peripheral types work less than one month.

Operators of the business-like type were not involved in physical farming activities. They either follow up their farming activities while undertaking regular

Table 13.5 Farm Labour of Operators by Type of Farm Household (percent)

Man-days	Business	Family	Side-line	Peripheral	Overall
Under 30	18.9	4.4	63.1	95.8	38.1
30 - 89	8.1	19.1	16.9	4.2	14.5
90 - 269	29.7	22.1	18.5	0.0	19.6
Over 270	43.3	54.4	1.5	0.0	27.8
Total	100.0	100.0	100.0	100.0	100.0

Chi Square: P = .001

off-farm work or they themselves act as full-time managers to secure casual labour and inputs and to be responsible for marketing and keeping records and accounts. Those who follow up their farming, they do so through foremen, other members of the household or rely almost totally on custom work in the case of cereal production under rain-fed conditions.

Table 13.6 shows that wives were least likely to work on the farm in the business-like farms, and most likely to work and to offer significant contribution on family type farms (Chi.01). Similarly was the contribution of other members of FHHs. This might be explained by necessity to depend on regular labour and by the tendency of the business type FHHs to reside away from the village; only 40% of them were found to reside in the village while 90% of the family type and about 64% of the marginal types did so (Chi.01). Of the side-line and peripheral types, 45% and 71% of wives respectively contribute nothing to the farm work (and similarly other members). Any contribution was usually of less than 30 days and virtually none beyond six months. This might be attributed to the type of enterprise, largely fruit trees or cereals under rain-fed conditions where the labour requirements are low or

mechanization (for cereals) is feasible. Table B.9 in Appendix B shows that the differences between mean numbers of males and females working on the farm by FHH type were highly significant. Business types have the fewest (1.24 for males and .22 for females), the peripheral type ranked second and the family type have the most on average (2.26 and 1.71 respectively) (ANOVA.001).

Table 13.6 Farm Labour Input of Wives by Type of Farm Household (per cent)

Man-days Groups	Business	Family	Side-line	Peripheral	Overall
None	91.9	20.6	44.6	70.8	48.5
Under 30	2.7	13.2	43.1	25.0	22.7
30-180	5.4	39.7	9.2	4.2	18.5
Over 180	0.0	26.5	3.1	0.0	10.3
Total	100.0	100.0	100.0	100.0	100.0

Chi Square: P = .001

13.3.4.2 Hired Labour

As Table 13.7 shows, all FHHs of the business type were found to hire casual or regular labour or both, except one farmer whose cereal production was fully mechanized. Other types were largely dependent on casual labour. About one in four of the family type relied solely on the household labour while about one third of the marginal types did not hire labour at all.

There were also highly significant differences in the numbers and per dunum means of man-days of hired labour between types (Table B.10 in Appendix B). The means were 2649 and 354 for business and family types against 125 and 47 man-days for the side-line and peripheral types respectively. The means per dunum were 18.7, 6.9, 3.6 and 2.4 respectively. If hobby farming is excluded from the peripherals, the mean would be much lower. This might be largely attributed to the less labour demanding types of enterprises. These figures suggest that the professional types

Table 13.7 Hired Labour by Type of Farm Household (percent)

Hired Labour	Business	Family	Side-line	Peripheral	Overall
None	2.7	23.5	36.9	25.0	24.2
Casual	18.9	53.0	49.3	70.8	47.4
Casual & Regular	78.4	23.5	13.8	4.2	28.4
Total	100.0	100.0	100.0	100.0	100.0

Chi Square: P = .001

create much more employment opportunities in the rural areas. Hence they have more potential to reduce underemployment especially under the present economic crises and with the rapid decline of foreign labour working in the farm sector.

13.3.5 SOURCES OF INCOME

Table 13.8 indicates that there were significant differences in the distribution of FI categories among FHH types. While 51% of FHHs with business-like farming were found with more than JD 2500, 31% of the family type were found in these categories against 1.5% only of the side-line type and none of the peripheral type. Family type were least represented in the lowest FI category and well distributed and represented in the medium categories. This is as expected as FI is the main income for this type.

Side-line type were concentrated (92%) in the under JD 1500 categories with the greater part in the lowest category suggesting the supplementary nature of FI to this group. Peripheral type were found to be almost confined to the under JD 500 category and none were found beyond the JD 1500 level of income. Although the data is cross-sectional, nonetheless it gives a strong indication of the significance of farming to each type.

By definition, OFI was most significant to marginal types who were well represented in the medium OFI categories (Chi.001). Although the professional

Table 13.8 Farm Income by Type of Farm Household (percent)

Farm Income	Business	Family	Side-line	Peripheral	Overall
Under 500	18.9	11.8	66.1	95.7	41.5
501 -1499	18.9	29.4	26.2	4.3	23.3
1500-2499	10.8	27.9	6.2	0.0	14.0
2500-4999	21.6	20.6	0.0	0.0	11.4
Over 5000	29.8	10.3	1.5	0.0	9.8
Total	100.0	100.0	100.0	100.0	100.0

Chi Square: P = .0001

types are expected to depend on FI, only one third (32%) of the business type, and one fourth (26%) of the family type were found to have no OFI. Moreover, 49% of the business type were found to be in the largest OFI category . 40% of the family type were found in the less than JD 1500 which further indicate the supplementary nature of OFI. These findings suggest the importance of OFI for the FHHs regardless of the basis of classification.

More than half (54%) of the FHHs with business-like farming were mainly dependent on OFI. As expected, family type were least represented in class II farms. FHHs in the peripheral type were found to be largely dependent on OFI but 21% were mainly dependent on low FI, some of which were elderly operators with no sources of earned OFI. The vulnerability of such group can only be addressed through the social welfare authorities.

13.3.6 ATTITUDES AND WAYS OF ACQUIRING LAND

Of the business, family and side liners, 70%, 58% and 56% consider farming at present as technically more advanced against 41% of the peripheral type (largely hobby farmers) (Chi.02). Forty three per cent, 30%, 12% and 4% by type respectively were planning to expand their farming activities (Chi.01). These figures suggest that most of the peripheral holders have negative attitudes about the present and

pessimistic outlook for the future. This is to be expected as the operators of this type tend to be relatively old.

Table 13.9 shows that inheritance was the main route for acquiring the land for the marginal types. 92% and 83% of the FHHs in the side-line and peripheral types respectively acquired their land wholly or partly through inheritance. In contrast, 53% of the business-like types did so. Family type were in between (71%). Business FHHs were most likely to buy (47%) or rent land (41%) and family type (29%) ranked second in both aspects (Table B.10 in Appendix B).

Table 13.9 Ways of Acquiring Land by Type of Farm Household (percent)

Acquiring Land	Business	Family	Side-line	Peripheral	Overall
Inheritance	36.6	55.2	78.7	73.9	62.7
Buying	46.7	29.3	8.2	17.4	23.3
Both	16.7	15.5	13.1	8.7	14.0
Total	100.0	100.0	100.0	100.0	100.0

Chi Square: P = .001

There were no significant differences among types with respect to previous selling or intention to sell or buy land. These figures are further indicative that land mobility is low whichever the basis of classifying the FHHs.

Land was considered to be socially valuable by 17%, 49%, 46% and 39% for business, family, side-line and peripheral types respectively. The proportions of those who considered it as a form of investment were 53%, 5%, 28% and 28% respectively. As expected family types were most attached to the land and only the majority of the business type operators were least critical about the social value of the land, which suggests that an increase in this category would increase land mobility.

These findings suggest that the prospects for expanding farming activities and increasing production lie largely in promoting tenancy and encouraging the professional types.

13.3.7 REGIONAL VARIATION

Table 13.10 shows that the business type of farming was found to be well represented in the eastern zone (67%) where the average operated area is highest, ground water is available, land mobility is highest as there was no tradition for farming and hence attachment to the land is the weakest in this zone. It might be added that, due to the very low rainfall, the necessity to dig for ground water, high

Table 13.10 Type of Farm Household by Zone (percent)

Zone	Business	Family	Side-line	Peripheral	Total
Highlands	9.8	30.8	42.1	17.3	100.0
Jordan Valley	21.6	59.5	18.9	0.0	100.0
Eastern	66.7	20.8	8.3	4.2	100.0
Overall	19.1	35.1	33.5	12.4	100.0

Chi Square: P = .001

costs involved and lack of experience in irrigated farming have made the cultivation of land in this zone a challenging option for which few were ready to take a risk.

Family types were found to be most represented in the Jordan valley (60%) where farming has a long tradition, water for irrigation is available and the climate allow for more than one crop a year, thus year round employment is feasible. The relative remoteness from urban centres and limited local OFE opportunities are further reasons for the predominance of this type in this region as farming was the main source of income and employment.

Highlands have the longest tradition in farming, but it is basically rain-fed farming. The limited potential for FI and seasonality of the fruit trees and cereal production have made this area very vulnerable to the pull factors which originated from the proximity to the main urban centres, access to higher education and the growing OFE opportunities especially in the service and public sectors. The family

type was gradually replaced by the side-line type of farming or farming activities were relegated to the periphery of the goals and interests of the FHHs just to keep things going.

Almost one third of FHHs (31%) in the highlands were of the family type while about 40% were farming as a side line activity. Few (10%) were found to practise farming as a business largely under irrigation or poultry production. Half and 38% of the FHHs of the peripheral type were found in the northern and middle parts of the country which are preferred areas for residence after retirement, where OFE is more accessible if the pensioners are not too old and still fit.

The type of farming was found to be strongly influenced by the availability of water for irrigation, 76% and 56% of the business and family types were found in the irrigated areas, while the proportions for side-line and peripheral farming were 17% and 8% (Chi.01). This is to be expected, for with the typically small farms, making a living out of farming is highly unlikely in the rain-fed areas.

13.4 CONCLUSIONS; PROFILING TYPE OF FARM HOUSEHOLDS

The findings presented in this chapter provide evidence which (a) supports the hypotheses of the diversity of types of FHHs, (b) indicates that the attempted typology of FHHs is empirically founded, (c) suggests that these types are significantly different in their socio-economic characteristics (presented below) and hence (d) with the inter-relationships of these variates, the FHHs organise their farming activities in different ways.

Farm households in the business type were found to have the highest FI. They either have no OFI or the highest and are more likely to be dependent on OFI. More than two in five were FT managers, with almost no family labour contribution and the highest relative and absolute dependence on hired labour. They were most likely to be in the eastern zone and in the irrigated areas. They had the largest farms, owned area, areas under irrigation. They were more specialized in vegetables and cereals. They were most progressive and they are most likely to use improved technology and to have machines. More than half were owner occupiers, and it was least likely for their land to be inherited. They were most market oriented. They were

the youngest and most educated and they had above average family size.

Farm households of the family type were found to rank second in FI. They were more dependent on FI with a supplementary low OFI. More than 50% were FT farmers, they had the highest family labour contribution and ranked second in using hired labour. They had medium sized farms and were least likely to be owner occupier and most likely to sharecrop or rent land. They were more likely to be in the irrigated areas. They were market oriented but more likely to have general farming with emphasis on vegetables. They were most likely to have animals. They were less progressive, less likely to use improved technology and they ranked second in having machines. They were the oldest and least educated and they had the largest household size.

Farm households of the side-line type were found to be most dependent on medium OFI with a supplementary low FI. They spent limited time on farming with no or limited family labour contribution and limited hired labour. They were most likely to be in the highlands in the rain-fed areas. They had small farms, and they were more likely to have fruit trees and cereals. They were more likely to use improved technology but less likely to have machines. The vast majority were owner occupiers, and it was most likely for their land to be inherited. They were much less market oriented. They were relatively young and more educated and they had less than average family size.

Farm households of the peripheral type were found to be more dependent on medium OFI with the lowest FI. They were the least likely to work on the farm and to rely on hired labour. They were most likely to be in the highlands in the rain-fed areas. They had the smallest farms, and they were likely to have fruit trees and cereals. Almost none were found with greenhouses and drip irrigation, or to have machines. Almost all were owner occupiers, and it was usual for their land to be inherited. They were least market oriented. They were relatively old and less likely to be educated and they had the smallest average family size.

Table 13.11 Main Characteristics by Type of Farm Household

Variable	Business	Family	Side-line	Peripheral
FI	****	***	**	*
OFI	****	**	***	***
ClassII/SLFs	**	*	****	***
FMDs of Operator	***	****	**	*
Family labour	0	****	**	*
Hired labour	****	***	**	*
Age	*	****	**	***
Education	****	*	***	**
Household size	***	****	**	*
Market Orient.	****	***	**	*
Farm size	****	***	**	*
Enterprise(no)	**	***	**	*
Land Irrigated	****	***	**	*
Machinery	***	**	*	0
Drip Irrigation	****	**	***	0
Greenhouses	****	**	**	0
Rent/Share	***	****	**	0
Land Inherited	*	**	****	***
Keep Animals	*	****	**	0
Main Enterprises	Vegetables Cereals	General Farming	Fruits Cereals	Fruits

High ***** High-medium *** Low-medium ** Low * (Almost) Nil 0

PART III

CHAPTER 14

SYNTHESIS, CONCLUSIONS AND POLICY IMPLICATIONS

SYNTHESIS, CONCLUSIONS AND POLICY IMPLICATIONS

14.1 SYNTHESIS AND CONCLUSIONS

The preceding chapters examined some aspects of rural pluriactivity (RP) in Jordan based on primary and secondary data. The main objectives of this study were to explore and to assess the importance of RP across the various socio-economic and ecological conditions and to analyze the characteristics of the pluriactive FHHs, their farms, labour force, economic activities on and off the farm, sources of income and their relative importance and their motives for RP, attitudes and future outlook. An attempt was made to classify FHHs into different types based on their market orientation, use of family labour and the extent of dependence on FI and OFI.

Chapter 1 was an introduction to the issues of RP generally and in Jordan and set out the objectives of the research.

Chapter 2 reviewed the state of the physical and human agricultural resources and the agricultural policies in Jordan which explain the underlying factors behind the growing importance of RP as a rational response by FHHs to the socio-economic conditions over the last few decades.

Chapter 3 presented a literature review on RP, largely in the developed countries. Although information on RP in the developing countries in South and Southeast Asia is increasingly available, there is an almost total absence of information on other regions including the Middle East. This study is a step in the direction of filling this gap as Jordan, apart from the Arab peninsula, represents to some extent the agricultural conditions in the Middle East.

Chapter 4 outlined broad hypotheses and sub-hypotheses. These formed a basic analytical framework and were tested using the findings from empirical data presented in Chapters 6 through 13. Chapter 5 addressed methods of data collection.

This chapter synthesizes the salient research findings, draws conclusions and points to policy implications in the general framework of agricultural and rural development efforts of Jordan and suggests future areas for research.

(1) The Incidence of Rural Pluriactivity and its Spatial Distribution.

The survey data supports the hypothesis that the incidence of RP among FHHs or farm operators is high regardless of the definitions and basis of classification, and it extends across the socio-economic and ecological conditions. If RP is to be defined broadly to cover the FHHs, 81.4% of the FHHs were pluriactive as at least one member was involved in off-farm employment. Alternatively, if RP is to be defined narrowly, 54% of farm operators had been found with a main off-farm occupation. Only 17% of operators have never had OFE. 70% of the DJHers had been pluriactive for more than five years which suggests a stable pattern of employment. Comparing these findings with the results of the Agricultural Censuses 1975 and 1983 suggests an increase in the percentage of DJHers across the different governorates. These findings partly support the hypothesis that RP on the individual and on the aggregate levels is pervasive and a permanent feature of the agrarian structure.

(2) Rural Pluriactivity and Farm Household Characteristics

The survey data provides evidence that distribution of income classes was associated with the type and size of FHHs. Class I FHHs were found to have the largest size of FHHs and the highest percentage of the extended household type for the overall sample and for farming under irrigation. Under the present unfavourable economic conditions, family labour accepts lower return to their labour than hired labour. This helps to attain a degree of economic viability and motivates FHHs members to live together to minimise costs of production and living.

Class II farm operators and dual job holders and their wives were found to be significantly younger and more educated than full time farmers and this was

particularly evident in the irrigated areas. Other members did not exhibit this age relationship due to the widespread uptake of education services, a prerequisite for making a living under the limited agricultural and local resource base.

(3) Rural Pluriactivity and Economic Activities

Participation in economic activities was generally low due to high education enrolment and low female participation. However, it varied significantly by income classes. Highest participation ratio was found on class I farms, especially on irrigated farms, and lowest on full time farms. Class I had a significantly higher mean number of family workers on the farm and the lowest number of dependants; class II ranked second.

Less than one third of farm operators were found to be involved in year round employment in farming activities. Their involvement was positively related to the farm size, availability of water for irrigation, vegetable production, farm income, size of FHHs and to the wives' and other members' contribution. In addition, young and more educated full time and class I farm operators in the irrigated areas were the most likely to hire labour in substantial numbers.

Involvement in OFE was more likely to be in the rain-fed areas, in salaried or waged and regular jobs, outside the agricultural sector and in the tertiary sector. The findings support the sub-hypothesis that the type of employment is influenced by income classes and governorates. Public administration was a major employer for all FHH members especially class II; self employment and business ranked second and farm-related jobs ranked third. Casual work was most likely to be associated with class I. Farm operators were more likely to work locally than other members. More than half of the pluriactive operators were commuting to their jobs, largely less than 20 km; public servants were found to travel the longest distance. However, regional differences and proximity to urban centres were found to have insignificant influence on the distribution of RP.

(4) Rural Pluriactivity and the Agricultural potential and Cropping Patterns

Unlike the trend in the developed countries, the results of the agricultural censuses and the survey data suggest that the land ownership pattern is increasingly dominated by small units. The agricultural area in Jordan is situated in three zones which vary in farm structure and agro-climatic conditions and potential. Most favourable conditions are found in the irrigated areas in the Eastern and Jordan Valley zones while the lowest are found in the rain-fed highlands.

The findings support the hypothesis that RP is associated with a limited resource base i.e., small farms and rain-fed farming in the mountainous areas. They also support the sub-hypotheses that class II FHHs have less intensive production pattern than main living FHHs, fewer enterprises and fewer number of livestock and they were least market oriented. Class II were most likely to be growing fruit trees under rain-fed conditions which normally replaces cereals on hilly land and this type of farming is accompanied by soil conservation measures. As such, class II were most represented in environment-friendly activities.

Main living FHHs were found to be more diversified in production, but vegetable growing, especially for full time farms, was found to be the principal enterprise which was virtually entirely market oriented. Full time farms had higher than average areas under drip irrigation and greenhouses and the highest number of dairy cows. Class I FHHs were most represented in cereal production and market orientated animal production. Fruit production was the least market oriented enterprise except for class I where most of the production was directed to the market.

Class I FHHs were found to be the mainstay of dry farming, but full time farming was found to be more (or equally) important in the irrigated areas. Tenancy was found to be most practised by class I and full time class and more prevalent in the largest holding size groups. This has improved the farm structure, but the operated areas were generally small and fragmented. The share of Class I in the operated area was above average while class II farms were interestingly slightly under represented.

The foregoing findings suggest that the allocation of labour and land resources between competing uses generally demonstrates a rational behaviour on the

part of FHHs and the differences between them are largely a reflection of the resource endowment and the pursuit of maximising their well-being.

(5) Sources of Income and their Relative Importance

The survey data provide evidence that the majority of FHHs derive the greater part of their income from gainful OFE. 60% of FHHs were found to be in class II and by definition they were more dependent on earned OFI. More than 80% of FHHs was found with at least one member with OFE. If all sources of OFI are to be considered, only one FHH out of ten was found to depend solely on FI. Pensions and rent were found to be the most important sources of unearned income.

Low OFI was found to be associated with medium size farms, tenant status, intensive irrigated farming, higher FHH labour input on the farm, residence in villages and lower education. Low FI was associated with small, wholly owned farms, elderly operators, mono-culturing, fruit growing in the rain-fed areas in the highlands and public services occupation.

Only about 20% of operators were able in 1989 to generate FI around the average annual income in the rural areas[1]. FI for 40% of FHHs was about half the poverty level, and for further 23% was about the poverty level. This highlights the significance of OFI to the livelihood of FHHs. However, those with the least FI were most likely to have OFI, but FHHs with the largest farms were found to have both highest FI and OFI.

These findings support the hypotheses that the greater part of the pluriactive FHHs' income are derived from OFE which is in line with data from many countries including highly industrialized countries. In principal and as suggested in the literature review, members of FHHs allocate their time subjectively on the basis of the marginal returns of farming and wage rates of OFE. But this does not rule out other considerations such as, *inter alia*, stability of income and social security.

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[1] The average annual income of households in the rural areas was 2725 JD in 1987 according to DOS (1988).

(6) Rural Pluriactivity and Improved Farming Practices

The survey results support the hypothesis that the pluriactive operators have significantly more regular contacts with the extension agents than the operators of full time farms. However, evidence on whether RPAs are greater users of improved farming practices is not conclusive and the survey data did not support the hypothesis that there is a significant difference between income classes with respect to resorting to institutional credit. The RPAs appear to be more likely to use drip irrigation technology and greenhouses but the association was of low significance. They also appear to be more likely to adopt new technology (fertilizers and herbicides) for cereal production but the evidence was not enough to support the hypothesis that RPAs are more progressive in this respect. There were no significant differences between income classes with respect to the use of fertilizers for fruit trees, but full time FHHs were more likely to have improved breeds of cows.

Apart from having tractors and pick-ups, households did not have a wide range of machinery. The findings of the research indicates that class II were less likely to own machinery but the relationship was only significant for owning pick-ups. Therefore, it seems that supplementary living FHHs do not overinvest in machinery as observed in other parts of the world. Pick-up use is more a reflection of the need for RPAs to have greater personal mobility than of any agricultural practices requiring them.

Contradictory results were found if the analysis is based on the main occupation of the operator. Therefore, the evidence to support the hypothesis that RPAs are more likely to be progressive is not conclusive. The adoption of greenhouses, drip irrigation for vegetables and fertilizers and herbicides technologies, was found to be independent of farm size. Hence increasing agricultural production through promoting biological technology might be feasible within the existing farm structure.

(7) Motives, Land Mobility, Attitudes and Future Outlook

The majority of DJHers were pluriactive for more than five years which suggest a stable pattern of employment. Supplementing income was the most important motive for RP especially for those who were originally farmers. Other main reasons were seasonality, small farms, inheritance, hobby or living in the rural area.

Lack of social security, low mobility and the capital investment of land were also critical factors. Pull factors played an important role as regular OFE was easily accessible even for illiterate holders during the greater part of the last two decades. This was further facilitated by the availability of an extensive transport system.

Pluriactivity does not seem to be a disrupting factor to the life of the majority of DJHers. RPAs were found to have more positive attitudes towards modern technologies but they were less likely to expand farming activities as market prospects are not favourable and they are more dependent on OFI. The future of land ownership is determined by the religious law and operators cannot alter this process. Only one quarter said that their sons are interested in continuing farming.

These findings suggest an almost "built in" system which is likely to perpetuate RP in the foreseeable future. The elements of such a system include factors such as: a limited resource base which is increasingly accentuated by the inheritance system, low income generating and employment capacities, the ease with which farming can be combined with regular OFE, social attachment to the land and high income expectations of the educated members. Data from many countries provide evidence for the importance of some of these factors (in addition to pull factors) in promoting RP, but the compound effect of these factors is perhaps unique for the case of Jordan.

(8) Types of Farm Households: the Organization of Farming

Data from many countries indicate that FHHs vary in their socio-economic characteristics. The findings of this study support this supposition. Reducing this heterogeneity through developing typologies was attempted by many researchers in the DCs (as mentioned in the Annex to Chapter 3) and the key variables employed

were dictated by the purpose of the classification. Therefore, the relative peculiarity[2] of the case of Jordan has called for a set of discriminating variables relevant to the diversity of the socio-economic and ecological conditions. The inter-relationships of these variates are conducive to varied ways of organising farming activities which has led to developing the typology mentioned below. It was felt that (together with the classification based on OFI) it will add another dimension to the findings and further the understanding of the potentiality of FHHs in the development effort and in turn will be conducive to better articulated policy implications.

An attempt was made to classify FHHs into groups on the bases of their market orientation, relative dependence on FI and OFI and involvement in farming activities. Two broad categories of farming systems emerged: (a) professional types of farming made up of two sub-groups, business-like farming and family farming, and (b) marginal types of farming made up of side line farming and peripheral farming.

Households in the business type were found to be more likely to have the highest FI and OFI. Their involvement in farming was largely managerial with almost no family labour contribution and highest dependence on hired labour. They were most likely to be in the eastern zone. More than half were owner occupiers, and least likely for their land to be inherited. They had the largest farms, owned area, areas under irrigation. Their principal enterprises were vegetables, cereals or (relatively) large scale fruits and were the most market oriented. They were most likely to use improved technology and to have machines. They were the youngest, most educated and they had above average family size.

Households in the family type were found to rank second in FI with a supplementary low OFI. More than 50% of heads were FTFers, they had highest family labour contribution but they also ranked second in using hired labour. They were more likely to be in the irrigated areas, to have medium sized farms, least likely to be owner occupier and most likely to be wholly tenants. They were market oriented and more likely to have animals and to diversify their farming activities with vegetables as a principal enterprise. They were less likely to use improved technology but they ranked second in having machines. They were the oldest, least educated and

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[2] Differences are evident in some aspects such as the agrarian structure, the resource base, the agricultural finance and marketing systems and social attachment to the land.

they had the largest household size.

Households in the side-line type were found to be most dependent on medium OFI with a supplementary low FI. Their family labour input on the farm and hired labour were limited. They were most likely to be in the highlands in the rain-fed areas. They had small farms, and they were more likely to have fruit trees and cereals and to use improved technology but less likely to have machines. The vast majority were owner occupiers, and it was most likely for their land to be inherited. They were much less market oriented. They were relatively young and more educated and they had less than average family size.

Households in the peripheral type were found to be more dependent on medium OFI with the lowest FI. They are similar to the sideline group but they were less active in farming activities as they were relatively old and less likely to be educated and they had the smallest average family size.

These findings support the hypothesis that the FHHs are heterogeneous in their socio-economic characteristics. Hence there are different types of FHHs with varied ways of organising their farming which would fit into different policy situations, the significance of which will be discussed in a later part of this chapter.

14.2 POLICY IMPLICATIONS

Rural pluriactivity has important implications, for agricultural, economic and social policy in view of the high percentage of farm households involved. At present, there is no distinction in the Government policies between full time farmers and the pluriactive operators. Although broad Government policy[3] towards the agricultural sector as stated in Chapter 2 is basically production-oriented, it would serve (with other sub-sectoral policies) as a general guideline for policy implications of rural pluriactivity to examine whether it conforms with the objectives of these policies. Other policy implications relevant to the socio-economic conditions of Jordan will also be examined for possible future roles for RP which are not yet a part of the present policy.

(1) The Agrarian Structure

Jordan is a land-scarce country as far as agricultural production is concerned. This situation has made land an object of speculation, and expanding farm areas by buying has become financially prohibitive. In addition, social attachment to the land is strong, consequently land mobility is low. It follows that such an agrarian structure with many undersized holdings could not provide sufficient income for most FHHs for a decent standard of living by Jordanian standards. Profound farm restructuring which might alter the present situation to approach the threshold of economic viability is not feasible socially and politically. In the present times of economic recession with rising rates of unemployment, RP has a positive contribution to make by providing partial employment and by reducing hardships and income disparity in problem areas. Hence, there is a strong case for a continuing broad distribution of

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[3] The broad policy objectives for the development of the agricultural sector can be summarized as follows: (a) to conserve the basic agricultural resources and to protect the national environment. (b) to improve the incomes of farmers, promote their investment in farming and to generate employment opportunities to encourage farmers and labourers to remain in their farms and villages. (c) to increase agricultural production to meet the domestic demand of the rapidly growing population, to achieve improved food security, and to minimize the deficit in the agricultural balance of trade (MOA 1985, MOP 1981,1986).

land resources to preserve social cohesion. The positive effects of broad access to land might outweigh the assumed negative aspects of lower efficiency and could serve better the long term interest of the country.

This however, does not rule out taking corrective measures to promote more productive and responsible land use by all land users including the pluriactives . Private ownership of land provides owners with the freedom to utilize it, but the scarcity of the agricultural land calls for social responsibility to preserve the land for future generations. Thus, fiscal, legal and other measures are required to restrain land speculation, absenteeism, abandonment and fragmentation of land, regulate tenancy and land division and to attain proper farm layout and minimum sizes. Under such circumstances, inefficient forms of RP would be deterred and better land use can be achieved.

(2) The Agricultural Production

Drawing from the literature review, it was found in many countries that, in general and from the macroeconomic point of view, the efficiency of land and capital resources use is lower on pluriactive farms. The findings of this study in Jordan are not in line with this opinion, though there are insufficient data to fully test all criteria. On the one hand, the pluriactive farms had less intensive and less diversified production patterns. On the other hand, the pluriactive operators appear in some ways to be more progressive; they were found to be more regular users of extension service, appear to be more likely to use formal credit, drip irrigation technology and greenhouses, to apply fertilizers and herbicides for cereal production, they have no fewer tractors than their full time counterparts and do not overinvest in machinery. In addition, the results suggest that the size of the farm may not be a crucial factor for the adoption of such progressive biological technology and hence promoting agricultural production would be feasible within the existing farm structure. On balance, these findings suggest that there is no reason to expect that productivity in the pluriactive farms is lower than their counterparts.

The pluriactive occupy an important share of the agricultural area and hence they will have to be accounted for in agricultural policies especially related to

promoting production. The role of RP is vital in the marginal land in the rain-fed mountainous areas which occupy almost two thirds of the agricultural land. Production of fruits of individual farms may be small but the aggregate supply of production cover most of the internal demand. For cereal production and red meat, any amount produced is to be encouraged however small regardless of the status of the operator. However, the need for further research on this topic is dealt with later in this section.

(3) Income Objectives

Supplementing FI is an important policy objective. The survey provides evidence that the vast majority of FHHs derive the greater part of their income from gainful OFE. FI for about two thirds of farm operators was usually less or about the poverty level. Only one out of five operators was able in 1989 to generate FI around the average annual income in the **rural** areas (80% of the national average[4]). Insufficient income was cited as motive for RP by the vast majority of the pluriactive operators. The survey findings suggest that OFI was significant to all FHHs, especially for those in the lowest FI categories. This was partly supported by a recent study (DOS 1988b) which indicated that the average annual income in 1987 for FHHs was slightly higher than the national average but significantly higher than the rural average and agriculture contributes (on average) 38% only to total income. Thus, OFI does not only contribute to the alleviation of poverty but it also bridges the inter-sectoral income disparities. Although the survey findings do not support the sub-hypothesis that OFI helps in reducing income inequalities within the farm sector, nevertheless, low farm income FHHs were certainly made better off by their OFI.

The growing importance of OFI has introduced a new dimension to the criteria of the welfare of the large farm households with oversupply of unemployed and underemployed young and educated members. It is no longer determined solely by the land and its size, quality and access to water for irrigation, improved inputs

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[4] In 1987, the national average was JD 3496 and the average for FHHs with agriculture as the main occupation of the head of the family was 3508 JD and the average in the rural areas was JD 2725 (DOS 1988).

and technology and economic efficiency and productivity. Access to OFE and OFI is no less crucial. In this light, rationalizing the use of FHHs' human resources and diversification of economic activities and sources of income to maintain a long term position of economic stability suggest that RP is a logical and viable adaptation to the socio-political and economical realities as an alternative to viable farming. This conforms with the stated objectives of the Government of raising the income and standards of living of farmers which, given the agrarian structure and limited resource base, cannot be realistically achieved by alternative ways. The widespread improvement in housing and general standards of living are some notable outcomes of OFI regardless of the farm base.

(4) Broad Rural Development Strategy; A Diversified Economy

Two issues are prominent for a strategy of rural development in Jordan. On one hand, agricultural development is seen by the Jordanian government as a priority to provide employment, to increase production, self sufficiency and to reduce trade deficit, of which food is a major contributor. On the other hand, the capacity of the agricultural sector to provide employment and to generate reasonable income to improve the welfare of FHHs is severely limited. Thus, these realities will have to be recognized in planning rural development programs and the need to create OFE is crucial. A sectoral approach based on agricultural policy oriented towards production cannot by itself provide a remedy to rural unemployment and income problems. Similarly, experience of other countries has shown that arbitrary industrialization without due regard to regional potentiality is perhaps more damaging as scarce resources may be misplaced or wasted.

Therefore, concerted efforts to promote a mix of agricultural development, services and rural industries to absorb the oversupply of FHH labour are imperative. Agricultural development calls for better farm, land and water resource management, new technology in the rain-fed areas adapted to the socio-ecological limitations which is technically sound and economically feasible. Policies to promote production such as price liberalization and schemes for crop insurance might help in promoting crops in short supply. Rural industries need to be indigenous and to be located where they

provide a core for further development. Among the critical issues are the type of industry with respect to size, labour intensity, use of local raw materials, forward and backward linkages (especially with respect to the agricultural sector), human resources and training needs, services and transportation.

In this process, RP contributes in providing cheap labour to the infant industries, while at the same time the OFI so generated will enhance the local demand for farm and non-farm products. The multiplier effect will promote economic activities and create further OFE opportunities. Rural development, however, would not come from providing physical services and development projects alone, but it also requires institutional and human resource development and promotion of efficient local organizations.

(5) Implications for Employment

Structural underemployment in the farm sector is evident on small farms, especially under rain-fed conditions. RP provide flexible and more efficient use of labour including elderly and female family labour where opportunity cost might be (approaching) zero and where the social considerations put limits on the involvement of such members in activities off the farm. Class II farm operators and dual job holders and their wives were found to be significantly younger and more educated than full time farmers. These characteristics enhance their competitiveness in the labour market and would have positive effects on the economic development (agricultural, industrial..), thus leading to more effective use of the abundant and un- or underemployed farm family labour.

Given the low potential in agriculture in the rain-fed areas and the limited capacity of the public sector to continue to act as a major employer, the need for creating more productive OFE to absorb the relatively young educated and perhaps cheap labour through balanced industrial and services development in the rural areas is evident. Thus, there is a need for incentives to promote small to medium, labour intensive industries such as food processing which utilize local raw materials. However, where the potential for initiating such economic activities is limited, labour mobility should be increased through education, training and improvements in

transportation.

Farm households do not only form a supply of labour; some are employers of labour which contribute in creating OFE for other FHHs. Young and more educated full time and class I FHHs in the irrigated areas were found to be the most likely to hire labour in substantial numbers. This however calls for a system of social and health security[5] to cover both farm operators and permanent labour. Lack of such a system is one of the main cited motives which pushes FHH members outside the agricultural sector even in situations where labour requirements are high. Such security might reduce the precarious nature of farming as an occupation and would in turn curb unjustified forms of RP motivated by the lack of security. Hence, inefficient land use would be contained.

Rural pluriactivity acts as an employment buffer. Therefore, under the conditions of the economic recession in the late 1980s, farming would provide at least partial employment to the unemployed labour force of the farm household.

(6) Maintaining Rural Population

The problem of rural decline is one of development and economic diversification. Stabilizing rural population helps in better spatial distribution of the population and creates a labour market for rural services and industries. Therefor, securing OFE opportunities plays an instrumental role in maintaining the rural population especially in the marginal agricultural areas; a characteristic of most of the rural areas in the rain-fed highlands. In some areas, RP has successfully contributed to the solution of low farm income problems and open and disguised unemployment in agriculturally marginal areas.

The revival of the rural areas in Jordan is an indication that RP has a positive effect in maintaining rural population[6]. This has many social benefits as it reduces migration and pressure on urban areas, which are already facing congestion and

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[5] Security arrangements may also include some form of crop insurance.

[6] The heads of village councils in the rain-fed areas who were interviewed in the survey have almost unanimously asserted that OFE is the backbone of the village economies and most of them estimated the contribution of OFI to total income to be as high as 90%.

shortage of services, while preserving the socio-cultural values of the society. The widespread conservative attitude towards the ownership and attachment to the land, though agriculturally it might have negative effects on economic efficiency of farming, has positive socio-political implications in terms of having common interest and responsibility for the welfare of the local society. These implications conform with the national policies of maintaining the rural population and the limited natural resource, especially if we consider that the greater part of the land is hilly and land use is limited to growing fruit trees with little value for any alternative productive use. As a by product, land which otherwise would have been abandoned may be retained in agriculture and contributes to furthering production objectives.

(7) Implications for Extension services

The pluriactive farms account for a significant share of the agricultural land, roughly proportional to their numerical importance. Class I was over represented but surprisingly class II farms were only slightly under represented. This suggests that the pluriactive occupy an important share of the agricultural area and hence they will have to be reckoned with in agricultural policies especially with respect to extension services. The pluriactive, their wives and other members in general are more educated. There is some evidence that pluriactive operators have more progressive attitudes towards agricultural development at least in some sub-sectors. These characteristics imply that they would be more receptive to new methods of production.

The pluriactive may lack the experience or the knowledge of improved practices to promote (land) productivity. New methods and training should be tailored to the needs of different types and classes of farm operators to adjust and adapt their production according to their limited resources. Providing practical information is required for activities such as work simplification, efficient labour use, proper cropping pattern, farm and water management, use of small machinery and possible cooperative work arrangements. Advice would also cover quitting farming if alternative productive use is feasible e.g., through renting out the land and group farming. Such advice is not at present a feature of Jordan's agriculture extension

services and should be developed.

(8) Implications for the Environment

Rural pluriactivity plays a constructive role by promoting more ecologically friendly agricultural production through less intensive land use, less tendency to use chemicals (which is raising real concern in Jordan) and putting marginal land under trees.

Cropping pattern in the highlands in Jordan is constrained by the natural conditions, thus intensive farming or animal keeping is not feasible. Growing fruit is the alternative use. With small farms, limited labour requirement in a short time and low returns, RP is a necessity. Otherwise, land will be abandoned, production, though small, will be forgone and the potential for cultivation and environment conditions will deteriorate and soil may be eroded. The tendency of the pluriactive , especially Class II, to farm land (largely marginal) under fruit trees in the rain-fed areas normally replacing cereals on hilly land and accompanied by soil conservation measures, is a significant contribution to environment-friendly activities. Such land account for two thirds of the agricultural land. Hobby farming has made a major contribution which serves as a demonstration. Environmentally beneficial activities have contributed to beautifying the rural areas, gradually inducing the urban dwellers to reside in the rural areas, especially those with rural origin or living in the outskirts of the main urban areas. This factor has contributed in reversing migration from rural areas. An improved countryside would also help in promoting local tourism activities, which so far hardly exist.

14.3 THE SIGNIFICANCE OF THE DIVERSITY OF FARM HOUSEHOLDS

The FHHs were found to be heterogeneous in their socio-economic characteristics. The different types of FHHs mentioned earlier in this chapter might fit into different policy measures. All types were found to be involved in gainful OFE with side-line type, by definition, having the greatest involvement.

RP has a broad socio-economic role, but for agricultural production-oriented and capital intensive projects, the business-like is the most active, dynamic and cost effective. Consequently, policy measure aimed at large scale cereal production, milk, eggs and poultry production are best targeted at this group. For a small country, exports of agricultural products is of utmost importance especially for surplus crops. The business-type operators are the most likely to produce and to handle exports-oriented products. This type is also significant in bringing entrepreneurship to the rural areas and as such they should be induced to initiate non-farm activities in the rural areas by incentives and proper fiscal policy.

The family-type is significant both from the production point of view and the social point of view. They can play an important role in the highly labour intensive types of production such as under greenhouses and for highly labour demanding vegetables. They have also an important role to play in preserving social values and the rural life. In times of economic recession, theyhave a major contribution in sustaining agricultural production as they depend largely on family labour, thus they can adjust to lower returns to their resources especially their own labour.

Given the low land mobility, a significant characteristic of the professional types is their tendency to rent additional land which is the practical option for achieving more efficient scales of farming. At present, renting faces many legal constraints. Hence, there is an apparent need for the introduction of effective measures to promote tenancy to make abandoned and misused land more available, especially for cereal production.

A further contribution of these types is their tendency to create employment opportunities in the rural areas which helps in reducing the growing unemployment problems especially with the rapid decline of foreign labour working in the farm sector.

A very significant contribution of the marginal types might be in promoting environmental activities and conserving agricultural resources, an objective of the agricultural policy. Therefore, technical assistance and subsidies for land development should be available to them without discrimination in line with the government regulations in soil conservation measures. In addition, the side-line type was active in adopting new technology and therefore, they can play an instrumental role in diffusing new technologies in the rain-fed areas if such methods can be developed and adapted to the local economic-ecological conditions. Their relatively high income enhance the effective demand which promotes non-farm activities.

The results of this exploratory work in Jordan follow in broad terms patterns found in some other countries and generally support the hypotheses developed from the literature. However, there are some particular characteristics of Jordan which make RP of special significance there.

14.4 PROPOSED FURTHER RESEARCH

The following are some areas where more research might contribute to socio-economic development efforts in the increasingly pluralistic rural areas:

(a) data from many parts of the world suggest that the efficiency of land and capital resources use is lower on pluriactive farms (especially class II and regarding the intensity of factor use from the macroeconomic viewpoint). There is not sufficient data in this study to test whether this was the case in Jordan. Promoting agricultural production is critical in a land and water scarce country with high food deficit and shortage of foreign currency. If the pluriactive are shown to be less efficient in this respect where agricultural potential is favourable, there may be grounds to discourage RP in such circumstances despite the advantages it holds such as for employment, social structure and innovation. Thus, the need for further investigation on the possible impact on farm efficiency and food production if more FHH labour is channelled into RP is evident. The central question is whether a significant difference exist between full time and pluriactive classes in land, labour and capital productivity.

(b) increasing cereal production is an important policy objective. Decrease in the cultivated area is a major reason behind the steady decline. The income potential is quite limited and does not seem to be a worthwhile venture. Group farming and land use consolidation scheme (and genuine cooperative societies) might encourage owners working off the farm to use their land for cereals especially by making the right types of machinery more available. A study is required to investigate whether such an idea might appeal to land owners and under what conditions, to explore other types of enterprises and to propose pilot projects in promising areas.

(c) the agricultural area in Jordan is situated in three zones which vary in farm structure and agro-climatic conditions and potential. Most favourable conditions are found in the irrigated areas in the Eastern and Jordan Valley zones while the lowest are found in the rain-fed highlands. The use of the farm area to measure the labour potential and economic viability does not reflect these wide variations. Thus, proper criteria such as SMDs and SGMs are required. Attempt was made in this study to initiate an SMD approach but this important task has remained to be implemented.

Having such criteria would help in redefining farmers which might include minimum sales, minimum SMDs or SGMs. This should relieve the Department of Statistics from collecting data from extremely marginal farms, and the time saved might be better invested in collecting data about sources of income and time spent on various economic activities by members of the FHHs. Farm households should be classified into main and supplementary as they do differ in their characteristics and different types of FHHs might fit into different policy measures. At present, statistics differentiate only between farm operators with main farming or non-farming occupation. Standard man-days (SMDs) and/or SGMs would provide more objective criteria which reflect the labour requirement according to circumstances or income-generating capacity for the diversity of enterprises and would provide more workable bases for comparing or assessing the economic viability and potential employment of the various conditions in the different zones. However, such system will have to be updated in accordance with development in technology, farmers' skills and the threshold of economic viability.

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APPENDICES

APPENDIX A

Figure A.1
MAP OF JORDAN

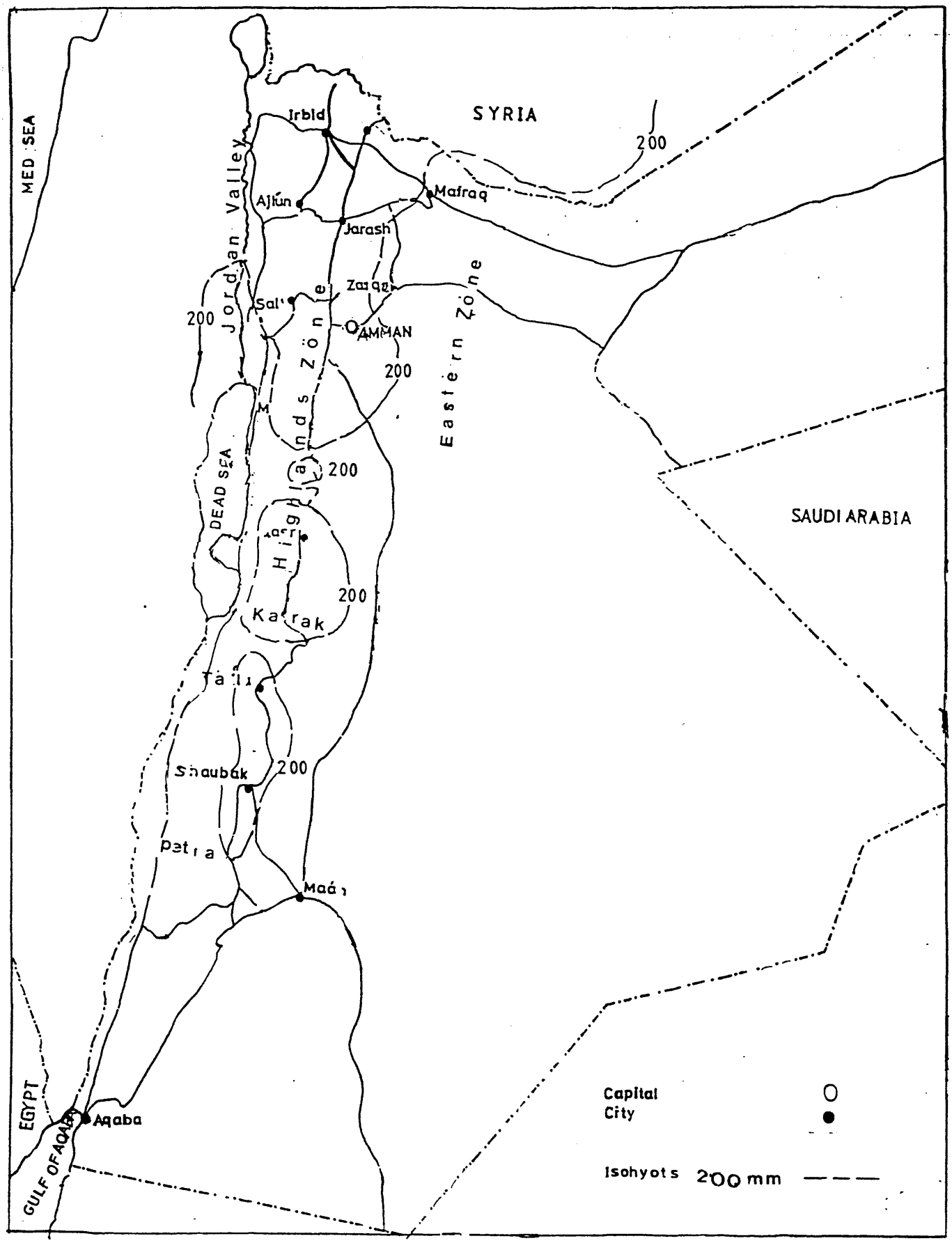

Figure A.2 List of Terms Used in the Literature to Describe Forms of Rural Pluriactivity

Allotment Gardens
Amateur Gardener
Auxiliary Farming
Backyard Farming
Bimodal System
Commuters
Double Employment
Dual Employment Pattern of Farming
Dual Income Farming
Dual Job Holding
Dual Occupation
Gainful Occupation of Farm Families
Gentleman Farmer
Homesteads (or Rural Homesteads)
Hobby Farming
Off Farm Employment
One Cow Farm/ing/er
Mixed Agricultural and Non-agricultural Households
Mixed Farming System
Mixed Households
Mixed Income Farming
Mixed Occupation
Mixed Rural Economies
Multiple Job Holding
Multi-income Farming
Non-farm Employment
Non-farm Income
Leisure Time Farming
Part Time Farming
Peasant-craftsmen
Peasant-employees
Peasant-worker
Pluriactive Farm Families
Rural Non-farm Employment
Rural Off-farm Employment
Rural Pluriactivity
Small Garden Plots
Spare-time Farms
Supplementary Income Farming
Workmen's Allotment
Worker-peasant

Appendix B

Table B.1 The Relative Share of Sectors in GDP,1954-1988
(at factor costs and current prices)

Period	Agriculture	Industry	Services
1954*	29.8	11.3	58.9
1964	25.1	13.4	61.4
1968	11.7	19.8	68.5
1972	14.6	16.6	68.8
1976	9.9	23.6	66.5
1980	7.8	31.5	60.7
1984	7.5	31.3	61.2
1988**	9.7	25.3	65.0

Sources :* Aresvik 1976.
: Calculated from CBOJ 1984, 1990**.

Table B.2 Food Imports and Exports (million JD)
(percent of total exports or imports in brackets)

Year	Food Exports	Food Imports	Trade Deficit	Food Exports /Imports Ratio
1973	4.65 (33.2)	30.81 (28.5)	26.60	15.09
1976	16.38 (33.1)	81.73 (24.0)	65.35	20.04
1980	23.50 (17.9)	118.79 (16.6)	95.29	19.78
1984	41.76 (16.0)	184.32 (17.2)	142.56	22.66
1988*	30.01 (9.2)	172.91 (16.9)	142.90	17.36*

Source: Data from CBOJ 1984, 1990.

Table B.3 Jordanian Labour Force by Sector (per cent)

Sector	1961	1975#	1979	1982##	1987###
Agriculture	33.5	18.0	11.5	8.3	7.4
Industrial	20.8	20.0	22.2	22.7	22.7
Services	44.7	62.0	66.3	69.0	69.9
Total	100.0	100.0	100.0	100.0	100.0
Total no.	217840	328000	405274	431825	509344

Sources : MOP 1986, # Momani 1987, ## MOL 1985, ### MOL 1987

Table B.4 Distribution of Villages and Study Areas by the Annual Rainfall, Topography, Proximity to Urban Centres and Number of Respondents.

Governorate /District	Village *	Rainfall **	Topography ***	Proximity	Number**** Interviewed
Rain-fed areas					
Amman/Amman	Iraq Alameir	3	2	2/1	9 (6)
	Manja	1	1	1/2	5 (2)
Amman/Madaba	Ma'ein	2	1	1/2	8
Zarqa	Um Rumaneh	2	2	2/1	9
Balqa	Um Jozeh	3	2	1/1	8
	Gal'ad	2	2	2/1	4
Irbid/Irbid	Alkhreibeh	2	1	1/1	6
	Almansourah	2	2	2/1	6
	I'zmal	3	1	2/1	9
Irbid /Ajloun	Samta	3	2	2/1	5
	Afana	3	2	2/1	6
Irbid /Jarash	Der Elliat	2	2	1/2	8
Mafraq	Nadera	1	2	2/2	6
	Um Buteimeh	1	2	2/2	6
Karak	Alsmakeih	1	1	1/2	7
	Rakein	2	1	2/1	9
Tafeilah	Buseira	2	2	1/1	8 (1)
	Alqadesia	1	2	2/2	7
Subtotal					126
Irrigated Areas					
Mafraq Area (10 villages)			1	2/1	(19)
Balqa Area (4 villages)			1	1/1	(12)
Jordan Valley(8 villages)			1	1/2	(37)
Subtotal					68
Grand Total					194

* Annual rainfall code: < 300 = 1, 300-400 = 2, > 400 = 3.
** Topography Code: Low to medium slope = 1, high slope = 2.
*** Proximity to urban centres:
first number for the nearest urban centre; < 10 km=1, > 10 km = 2, second number for main urban centre(governorate or district centre); < 25 km = 1, > 25 km =2.
**** Figures in brackets are holdings under irrigation totalling 75 respondents (39%).

Sources: MOA, Jordan * Department of Economics and Planning,
, * MOA/Highlands Development Project.

Table B.5 Distribution of Income Classes by Governorate

Class	Amman	Zarqa	Balqa	Irbid	Mafraq	Karak	Tafila
MLFs	59.1	0.0	47.6	37.7	45.2	43.8	6.7
-FT farms	22.7	0.0	28.6	13.6	25.8	12.5	6.7
-Class I	36.4	0.0	19.0	23.7	19.4	31.3	0.0
SLFs							
-ClassII	40.9	100.0	52.4	62.7	54.8	56.2	93.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Cases	22	9	42	59	31	16	15

Chi Square: MLFs/SLFs P = .006

Table B.6 Distribution of Income Classes by Region (%)

Income Class	North	Middle	East	South	Jordan Valley
MLFs	21.1	43.7	63.1	25.8	59.4
- FT Farms	9.6	18.2	36.8	9.7	29.7
- Class I	11.5	25.5	26.3	16.1	29.7
SLFs(Class II)	78.9	56.3	36.9	74.2	40.6
Total	100.0	100.0	100.0	100.0	100.0
No of Cases	52	55	19	31	37

Chi Square: MLFs/SLFs P = .001
: FT class/class I/class II P = .004

Table B.7 Work History of the Operators (Percent)

FFF (17.5)	FFP (2.1)	FPP(10.3)
NNF (5.2)	NFF (8.8)	NFP (1.5)
FNF (3.6)	FNP (4.6)	FPF (6.2)
NNP (9.3)	NPP(19.1)	NPF (4.1)
PFF (0.5)	PPF (0.5)	PPP (6.7)

(a) **F** stands for full time farming. **P** stands for pluriactivity. **N** stands for no farming activities.
(b) First letter (e.g FFF) denotes distant past, second letter denotes recent past and third letter for the present (at the time of the survey). Time periods were found to be no less than three years.
(c) Off farm employees represented 13.9% of the overall sample and part time farmers represented 39.5%.

Table B.8 Motives Cited for Pluriactivity by Key Variables (%)

Variable	Income	Inherit	Capital	Hobby	No.of Cases
Overall	79.2	44.2	27.3	20.8	77
By Occupation		**	**	**	
Professionals/ Businessmen	65.0	15.0	80.0	55.0	20
Public Servants	85.3	61.8	2.9	8.8	34
Self employed	81.0	47.6	19.0	9.5	21
Labourers	100.0	0.0	0.0	0.0	2
By Age		**	#		
-34	86.7	73.3	6.7	6.7	15
-44	79.2	58.3	20.8	20.8	24
-54	82.6	26.1	34.8	17.4	23
55-	67.7	20.0	46.7	40.0	15
By Holding (dunum)					
- 20	71.8	51.3	17.9	17.9	39
- 50	75.0	43.8	43.8	37.5	16
-100	90.0	40.8	20.0	10.0	10
101-	100.0	25.0	41.7	16.7	12

Chi Square : **P = .00 # P = .10

Table B.9 Means of On-farm labour Force by Types of Farming (Standard errors between brackets)

Type of Farming	Male	Female	Overall
Business	1.24 (.15)	0.22 (.12)	1.46 (.18)
Family	2.26 (.15)	1.71 (.15)	3.97 (.20)
Side-line	1.72 (.12)	0.88 (.11)	2.60 (.19)
Peripheral	1.33 (.16)	0.37 (.12)	1.71 (.19)

ANOVA: P = .000

Table B.10 Means of Farm Characteristics by Types of Farming
(Standard errors between brackets)

Variable	Business	Family	Side-line	Peripheral	Overall
Owned area	513(121.5)	74(12.2)	72(13.9)	52(16.2)	334(25.6)#
Holding	336 (82.9)	90(22.6)	47 (8.8)	24 (7.0)	115(19.5)
Rent-in	215 (55.5)	107(75.8)	93(19.8)	0 (0.0)	145(43.6)#
Sharecrop	348(149.3)	59(11.7)	44(17.7)	0 (0.0)	86(21.4)#
N.Parcels	2.9 (0.6)	2.8 (0.6)	1.7 (0.1)	1.3 (0.1)	2.2 (0.2)
N.Enterprise	2.0 (0.1)	3.0 (0.1)	2.2 (0.1)	1.3 (0.1)	2.3 (.01)
TMD Hired	2649 (455)	354(89.0)	125(35.7)	47(18.5)	677 (116)
TMD/dunum	18.7 (3.0)	6.9 (2.1)	3.6 (1.1)	2.4 (1.2)	7.5 (1.1)
Dry Farming	327(100.6)	65 (7.6)	45 (7.8)	24 (7.3)	87(16.4)#
Irrig Farm*	199 (48.3)	79(37.5)	35(13.7)	10 (0.0)	114(25.7)#
Veg. area	144 (35.7)	28 (4.8)	18 (7.6)	2.5 (1.5)	59(11.8)#
Dry fruit	38 (8.0)	16 (3.1)	18 (3.1)	12 (3.1)	18 (2.0)#
Cereals	358(112.4)	51 (8.1)	49(11.4)	51(17.1)	100(21.7)#
No.Sheep*	253(203.0)	72(16.1)	26(10.1)	0 (0.0)	77(23.0)#
No.Goats*	5 (1.6)	26 (5.8)	5 (1.4)	13(12.1)	16 (1.9)#

1. ANOVA: All variables P = .000 except fruit trees under rain-fed farming P = .004 , no. of sheep and goats P = .02 , and no. of planted parcels, cultivated area under irrigation P = .09 , only rent-in not significant.
2. # Only if applicable.
3. Areas in dunums.
* (TMD) stands for total man-days, (Irrig) for irrigation

APPENDIX C

C.1 STATISTICAL NOTES: TESTS OF SIGNIFICANCE

C.1.1 TESTS OF INDEPENDENCE

(a) As many variables in the research project were measured on nominal or ordinal scales, Chi square was often used for testing significance of independence between variables as there is usually no clear alternative to this test for categorized data (Siegel, 1988).

(b) As the size of the sample was relatively large, the use of Chi square was considered to be valid whenever the number of expected frequencies was equal to or more than five cases in 80 percent of cells provided that the degrees of freedom were more than one. Otherwise, categories were adjusted to fulfil these requirements. However, with one degree of freedom, the test was considered to be valid whenever the number of expected frequencies were be five cases or more (e.g Siegel 1988; Armitage & Berry 1987). The SPSS basic manual (1988a) noted that the minimum of five expected frequencies in each cell is probably too stringent and can be relaxed.

It is to be noted that fulfilling these requirements was found to be crucial whenever the levels of significance were at the margins. Otherwise, regrouping cases did not alter the significance of association, but the degree of association was often affected as they approached the margins.

(c) Chi square was performed on **frequencies** and not on percentages or any other transformed form of data (Siegel, 1988).

(d) The actual levels of probability of the significance of associations were stated rather than using the cut-off points such as $p < 0.1$, 0.05 or 0.01 as this better reflects the levels of confidence especially at the margins (Cousens & Marshall, 1987). Thus, the symbol (Chi .02) denotes that the association is significant at the $P = .02$ level.

C.1.2 TESTS RELATED TO MEANS

(a) t test and univariate ANOVA were used to test the differences between means for the numerical variables measured on interval scales.

(b) Distribution of values of some of variables, notably those related to areas such as the size of holdings and land ownership, were found to be skewed as mentioned in the text. Downei & Heath (1974) noted that the t.test is robust and it is not affected by severe violations of assumptions of homogeneity of variance and normality of distribution if the two samples were randomly selected, independent and were larger than 25 observations, which was the case for the sample used in this study.

Cases were also categorized for cross tabulation and Chi square was used to test the significance of associations between groups. These tests were supportive to the results of ANOVA tests.

(c) The actual levels of probability of significance were used for the reasons already mentioned above. Thus, the symbol (ANOVA .02) denotes that difference between means is significant at the P =.02 level.

C.2 STATISTICAL NOTES: USE OF ADVANCED METHODS OF STATISTICAL ANALYSIS

Advanced statistical methods such as discriminant and cluster analysis entail the use of numerical variables measured at interval levels or of dummy (dichotomous) variables (SPSS+, Advanced Statistics 1989; SAS Statistical Guide 1985).

An attempt was made to modify some variables into dummy form whenever possible or to use the mid points of the intervals of variables such as income and man-days to explore the use of cluster, discriminant and factorial analyses to reduce the complexity of the survey data through classifying cases into types of FHHs, and to identify key underlying factors which might help in differentiating the characteristics of the these types. Standardized values for variables were employed.

C.2.1 CLUSTER ANALYSIS

An attempt was made to use cluster analysis to classify cases into homogeneous groups, using a number of variables relevant to RP and to the purpose of categorization. The predictor variables include mainly farm and off farm-income and employment by all members of FHHs, market orientation,type of enterprise, farm size, irrigation, use of modern technology, hired labour, age and education of operators.

The agglomerative hierarchial techniques available in the SPSS V3.0 were used to measure distances or similarities between cases to be combined in clusters. These include the single and complete linkages, average linkages between and within groups, centroid and Ward's methods. These have proved to be impractical. Clusters so produced were inconsistent. Everitt (1981) concluded that only clusters produced by all or by the majority of the methods used should be accepted.

No method produced clusters with a reasonable distribution of cases except the complete linkage method. Clusters produced by this method were found to be a collection of cases with nothing in common of any value either to the organization of farming or for any possible policy implication. Forcing categorical data into numerical form might partially explain this result. The shortcoming of the complete linkage method in that it measures the distance between two clusters as the distance between their furthest cases, and thus it does not use the information about all pairs of distances. This might be another contributing factor (SPSS, 1988b). Everitt (1981) noted that many authors argue that the validity of clusters should be judged qualitatively, by subjective evaluation and by interpretability.

C.2.2 DISCRIMINANT ANALYSIS

Discriminant analysis assigns cases to previously established groups in order to derive the classification rule. In cluster analysis, this priori grouping is not required, as neither group membership nor the number of groups are known (Everitt 1981; SPSS 1988b).

With the classification of cases into types of farm households as explained in Chapter 13, it has become possible to use the type of FHHs as a discriminant groups. Reviewing the literature, Everitt (1981) suggested the use of this method to evaluate the tightness and homogeneity of groups or categories of different objects. Also, this method could help in identifying variables which are most significant in determining differences between types, thus providing guidance for future studies. It is to be remembered that some of the main variables were originally in categorical form and results would only be taken as indicative.

A large number of variables (from the survey data) which were thought to have a bearing on the types of farming were used in the analysis using the minimization of Wilk's lambda for stepwise variable selection. Although variables are interrelated, this method allows as a first step to analyze the difference among groups by examining univariate statistics. Table C.1 presents the Wilk's Lambda and the significance tests for the equality of group means for each variable. From the table, operators engagement on the farm, reliance on farm income, number of FHH engaged in farming and total hired man-days of labour are the variables whose means are the most significantly different for types of farm household. Thus, it appears that most variables do provide good means of discriminating among farm types as suggested in Chapter 13.

A further step is to analyze the variables simultaneously to incorporate their interrelationships to arrive to a single index. That is, a linear combination of the independent variables is formed and it serves as the basis for assigning cases to groups. The process of predicting group membership is conceptually similar to predicting an individual Y score from his score on the X variable ($Y = a + bX$). The score of each case is computed by multiplying the coefficients by the values of each variables for each case. The probability of group membership is based on the relationship of the predicted score (of an individual) to the group means. Table C.2 presents the contribution of variables in the discriminant functions. Total man-days of hired labour, operators' labour and off-far income appear to be the variables with the largest standardized coefficients.

Table C.1 Wilk's Lambda[1] and Levels of Significance

Variable	Wilk's Lambda	Significance
Farm Size	.62498	.0000
Tenure status	.84613	.0000
Area under Vegetables	.79137	.0000
Availability of Irrigation	.75078	.0000
Drip Irrigation	.93184	.0000
Number of Enterprises	.71133	.0000
Area under Fruits	.79267	.0000
Having Animals	.72801	.0000
Purchased Inputs	.71848	.0000
Having Tractor	.93328	.0000
Use of Extension Services	.96941	.1415
Rate Farming (technically)	.97812	.1885
Farm Income	.78982	.0000
Off-farm Income	.82688	.0000
Reliance on Farm Income	.58518	.0000
Higher dependence on OFI	.63503	.0000
Indebtedness	.97583	.2314
Uptake of Credit	.97799	.2717
Operators' Farm Labour	.55195	.0000
Operator spend > 50% of his time on farm	.63503	.0000
Other Members' Farm Labour	.71063	.0000
No. of FHH Engaged on Farm	.69424	.0000
No. employed off-farm	.98414	.4277
Total Hired Labour (MDs)	.62489	.0000
Age of Operator	.92583	.0036
Education of Operators(yrs)	.79034	.0000
Size of FHH	.92833	.0045
Place of Residence	.84391	.0000

* Survey Data.

An additional way to assess the contribution of variables is to examine the correlation (Pearson Coefficient) between the values of the discriminant functions and the values of the variables. Table C.3 presents these correlations and variables with large coefficients for a particular function are grouped together and indicated with asterisks. They confirm the above mentioned results and make the functions more interpretable.

[1] Wilk's Lambda (U-statistic) is the ratio of the within-groups sum of squares to the total sum of squares when variables are considered individually. Large values indicate that group means do not appear to be different (SPSS 1988b).

Table C.2 Standardized Canonical Discriminant Function Coefficients[2]

Variable	Function 1	Function 2
Tenure	.25241	-.08228
Area under Vegetables	.11717	-.32661
Drip Irrigation	-.15701	.39931
Number of Enterprises	.28792	-.02961
Having Animals	.26141	-.15680
Purchased Inputs	.31317	.18909
Having Tractor	-.18584	.02037
Use of Extension Services	-.16800	.03038
Off-farm Income	.54182	.54820
Reliance on Farm Income	.38885	.17621
Higher dependence on OFI	-.30176	-.35374
Indebtedness	.23615	-.19718
Uptake of Credit	.04841	-.29169
Operators' Farm Labour	.48337	.16463
Other Members' Farm Labour	.24222	-.42938
No. of FHH Engaged on Farm	.37870	.08796
No. employed off-farm	-.06070	.20075
Total Hired Labour (MDs)	-.55576	.88923
Age of Operator	.20305	-.20876
Education of Operators(yrs)	-.14946	-.04152

* Survey Data.
** The actual signs of the coefficients are arbitrary.

A large number of variables (indicated with asterisks in Table C.3) were found to be highly significant in discriminating among farm households. The most significant variables were related to reliance on farm income, operators' farm labour input, total hired man-days of labour, drip irrigation, area under vegetables and availability of water for irrigation.

[2] For Tables C.2 and C.3, only the first two functions are presented out of three as they account for 96% of the total between-groups variability. The significance levels associated with these functions (Chi.0001) indicate that they contribute substantially to group differences.

Table C.3 Pooled-within-groups Correlations between Discriminating Variables and Canonical Discriminant Functions.

Variable	Function 1	Function 2
Reliance on Farm Income	.44724*	.21844
Operators' Farm Labour	.42440*	.38678
Operator spend > 50% of his time on farm	-.37137*	-.35856
Other Members' Farm Labour	.35265*	-.09089
No. of FHH Engaged on Farm	.33318*	-.23313
Tenure	.21910*	.13909
Rate farming (technically)	.08598*	.04533
Total Hired Labour (MDs)	-.05026	.58858*
Drip Irrigation	.06843	.45421*
Area under Vegetables	-.02224	.39111*
Availability of Irrigation	.13419	.38951*
Farm Size	-.01053	.32338*
Purchased Inputs	.26708	.31015*
Farm Income	.07491	.30607*
Off-farm Income	-.16125	.26160*
Area under Fruits	-.14446	-.23581*

* Survey Data.
** The actual signs of the coefficients are arbitrary.

Table C.4 is a summary of the most successful classification results. These results indicate that types of FHHs are quite homogeneous as the percentage of the grouped cases correctly classified were 87%. Business-like and family types were found to be relatively distinct clusters as 91% were correctly classified to professional groups, though some cases were problematic as they had some of the main characteristics of professional FHHs such as investment in modern technology and hiring labourers, but their farms were initiated by hobby motives or capital gains and farm income is subsidiary at best. Other types were less distinct with more overlapping within the marginal types which were found to be more heterogeneous, however, 81% were correctly classified and most of the rest of cases were misclassified to the other marginal group. However, arriving at well-defined multiple groups with specific socio-economic characteristics is not possible in the real world.

Table C.4 Classification Results for Types of Farms Households

Actual Group	No. of Cases	Predicted Group Membership 1	2	3	4	Total
1. Business-like	37	86.5	0.0	8.1	5.4	100
2. Family	68	0.0	94.1	4.4	1.5	100
3. Side-line	65	3.1	1.5	80.0	15.4	100
4. Peripheral	24	4.2	4.2	8.3	83.3	100

Percent of 'grouped' cases correctly classified: 86.6%

C.2.3 FACTORIAL ANALYSIS (FA)

As correlation among variables might be attributed to sharing common factors, FA is used to identify the underlying dimensions or factors. Every factor is made up of a set of variables which characterize the factor. A small number of interpretable factors might provide explanations and new insights into a complex phenomenon such as pluriactivity.

C.2.3.1 Analyzed variables

(a) variables related to FHH characteristics such as age and education level of the operator and number of the FHHs.
(b) variables related to farm characteristics such as the size of holding, availability of water, type and number of enterprises and ownership of machinery.
(c) farm labour; family labour (operator, wife and others) and hired labour.
(d) household OFI, (reliance on) FI and pluriactivity.
(e) market integration i.e resorting to credit, purchased inputs, and indebtedness.
(f) technical orientation i.e the use of drip irrigation and greenhouses, contacts with the extension agents.
(g) socio-cultural aspects such as land mobility and inheritance and the social value attached to the land and land tenure.

C.2.3.2 Factor Analysis Procedures (SPSS, 1988b).

(a) computing a correlation matrix which allows to identify variables most related to pluriactivity.
(b) factor extraction: an estimate of factors were obtained from 32 correlated variables through principal components (PC) analysis. Nine PCs/factors (uncorrelated variables) were extracted which successively explain smaller portions of the total sample variance. The cumulative variance explained by the PCs /factors were 67% of the total variance. As variables were standardized with a mean of zero and variance of one, only factors that account for variance (eigenvalues) greater than one are included as factors with variance less than 1 are no better than single variables. The first three factors explained about 40% of the total variance. When the maximum likelihood solution was used, although the number of factors remained the same, as it is determined by the PCs solution, the total variance explained by the nine factors dropped to 55%.
(c) factors were rotated to make them more interpretable and the Virmax method were used to minimise the number of variables that have high loadings on a factor.

C.2.3.3 Results (Virmax Rotation)

Significant factor loadings from the Virmax rotation are presented in Table C.5:

Table C.5 Variables with Large Factor Loading (>.5 or as indicated)

Factor	Principal Components	Maximum Likelihood
1	use of drip irrigation	use of drip irrigation
	use of greenhouses	use of greenhouses
	growing rain-fed trees*	growing rain-fed trees*
		FMDs /operators
		irrigated farming
2	size of holding	size of holding
	total hired FMDs	total hired FMDs
	farm income(.42)	area under vegetable
3	no.of enterprises	no.of enterprises
	raising animals	raising animals
	wives farm MDs(.44)	farm FHH labour(no.)
	village residence	
4	reliance on FI	FHH members farm MDs
	OFI*	farm FHH labour (no.)
	dual job holding*	operators Farm MDs(.43)
5	size of household	OFI*
	other members farm MDs	FHH with OFE (no.)*
	farm FHH labour (no.)	reliance on FI(.42)
6	age of operator*	growing rain-fed trees*
	years of operators'	inheriting land*
	education.	FMDs /operator (.41)*
	dual job holding	purchased inputs*
7	tenancy*	age of operator
	inheriting land	operators education (yrs)*
	attaching social	
	value to the land	dual job holding*
8	credit	FI
	indebtedness	
	expand farming	
9	contacts with	size of FHH
	extension agents	indebtedness(.42)
	purchased inputs	
	expand farming (.45)	

(*) Indicates negative correlation
F/MDs stands for farm man-days

C.2.3.4 Interpretations

The factors might be considered as depicting characteristics by which types of farm households can be described:

1 2 business-like farming (progressive and market oriented).
3 4 5 family type (high dependence on family labour and FI).
6 side-line farming (OFE and farming in marginal areas)
7 peripheral (aged, uneducated and low farming profile).
8 9 professional (market oriented farming).

The coefficients in Table C.6 can be interpreted as either of the following;

(a) Correlation coefficients represent factor loading, e.g., factor 1 is the factor with the largest loading for operators' farm man-days (.64) i.e correlation between the variables and factors.
(b) If the coefficients are squared, i.e factor 1 accounts for 38% of the variance of operators man-days.

As can be seen from the factor matrices, and by squaring the correlation coefficients, factor 2 contributes directly to the variance of dual job holding and off-farm income by .21 whereas factor 5 contributes .25 to the number farm households with off-farm employment.

Table C.6 Correlation Between Variables and Factors, Maximum Likelihood Solution (>.3) (Factor Matrix)

Variables	Factors								
	1	2	3	4	5	6	7	8	9
HFMDs	+.64			-.40					
WFMDs		+.54							
FHHFE		+.55				+.43		-.38	
FI	+.55					+.46			
FHHOFE					+.49				
DJHOLD		-.46	-.39						
OFI		-.46			+.64				

HFMDs stands for farm labour input of operators.
WFMDs stands for farm labour input of wives.
FHHOFE stands for members of FHH engaged in farming activities
FI stands for farm income
FHHOFE stands for number of FHH with off-farm employment
DJHOLD stands for dual job holding by the operators
OFI stands for off-farm income.

APPENDIX D

THE QUESTIONNAIRE[3]

1. Farm Household Information

1.1 Farm operator name, village, governorate, main occupation and place of residence.

1.2 Household structure, age, education levels and type of employment for each member and place of work (where applicable).

1.3 Members of the family not residing with the FHH; students, working and others.

2. Farm Information

2.1 The Farm Holding in the year ending June 30, 1989
(a) area owned (b) cultivable (c) cultivated (d) area rented out (e) area rented in (g) area sharecropped (f) operated area (h) irrigated area, (i)rain-fed area (j) no. of plots

2.2 Farming activities:

(i) vegetables: (a) type, (b) area, (c) irrigation method by area,
(d) green houses: number if any.

(ii) cereals: (a) type, (b) area (c) use of improved seeds, seed drill mechanical harvester, chemical fertilizer and herbicides (yes/no)

(iii) fruits: (a) type (b) area (c) use of manure and chemical fertilizer (yes/no)

2.3 Ownership of animals (no): (a) cows (local, improved) (b) sheep, (c) goats (local, improved), (d) poultry(no.), (e) Other animals.

2.4 What percentage of your produce do you sell (by type)?
(a) 0 (b) < 25% (c) 25-49% (d) 50-74% (e) > 75%.

[3] This condensed form is English translation, questions were asked where they were applicable.

3. Employment

3.1 How many days did you spend in farming activities in the last year ? (a) < 30 (b) 30-90 (c) 90-180 (d) 180-270 (e) > 270

3.2 Would you tell us your career history (by type of occupation, period and location).

3.3 Was OFE available to you? no/yes, if yes what type/s ?

3.4 Do you commute to your OFE ? How many km is one way trip?

4.1 Motives for Rural Pluriactivity; Having OFE.

4.1.1 When and why did you decide to work off your farm ?
(a) to supplement income (b) small size of farm (c) seasonality
(d) availability of OFE (e) others.

4.1.2 If public services are preferred, what are the reasons?
(a) secure (b) regular (c) pension/social security (d) access to consumer markets (e) health insurance (f) less heavy work load (g) short working day (h) social status (i) other reasons.

4.2 Motives for Rural Pluriactivity; part time farming.

4.2.1 When did you decide to undertake farming activities as part time ?
why ? (a) inherited the land (b) land is good investment; security (c) living in the countryside (d) low costs of living (e) hobby (f) source of income (g) employment after retirement (h) others.

4.3 Have you been a member in a farm family ? Do you have background in farming ?

5. Type of Adjustment

5.1 What type of adjustments have been made in farming and OFE to cope with your pluriactivity ? (a) getting help from other family members (b) work after working hours and in week ends (c) using paid leave (d) hired labour (e) adopting less labour intensive type of farming (f) no adjustment (g) others

5.2 How the family members feel about pluriactivity ? (a) strong conflict (b) some (c) none (d) complementary.

6. Farm Labour

6.1 Did you hire labour ?
if yes, (a) regular no./period (b) casual, number of man-days

6.2 what was the contribution in farm labour of (i) your wife (ii) other members (iii) members not residing with the FHH (separately) ?
(a) < 30 (b) 30-90 (c) 90-180 (d) 180-270 (e) > 270.

7. Adoption of Innovations

7.1 Have you changed your farming methods ? no why ?
If yes, what were these changes in the last five years?

7.2 If at all, how did you learn about the new technology ?
(a) media (b) pamphlets (c) extension agent:MOA/private (d) Other farmers

7.3 Have you ever sought advice from MOA extension agents ?
(a) never (b) rarely (c) often (d) always

8. Machinery

8.1 What type of machines do you have (by type and number).

8.2 Do you use them for custom work ?
why do you think you need to have a tractor/pick up ?

9. Farm Income

9.1 Do you have other sources of income other than FI ? no/yes.

9.2 What are these sources ? (a) OFI (b) pension (c) remittances (d) rent (e) others.

9.3 What are the main sources of income ?

9.4 What is the percentage of the FI ? (a) nil or loss (b) < 25 % (c) 25-50 % (d) 51-75 % (e) > 75 %.

9.5 Can the family rely on FI ? yes/ no why ?

9.6 Farm and off farm income for the last year (ending june 30, 1989) ?
(a) nil or loss (b) < 500 (c) 500-1000 (d) 1000-2000 (e) 2000-5000
(f) > 5000

9.7 Do the FHH pool their income (a) totally (b) partly.

9.8 Type of support/purpose by the household income to the members of the family(in kind/financial)

10. Sources of finance

10.1 What are your sources of finance for farming ?
(a) personal (b) ACC/JCO (c) banks (d) commission agents (e) family members (f) friends

10.2 Why do (or do not) you prefer institutional sources of credit ?

10.3 Are you indebted ? no/Yes why (a) social (b) economic.

11. General

11.1 When did you acquire your land ?

11.2 What was the area (a) purchased (b) inherited.

11.3 Do you have partners in the land? do you farm in your own share or do you work with other partners?

11.4 Is ownership important to you ? no/yes why ?

11.5 Have you ever sold any part of your land ? no/yes why ?
Are you intending in the near future to sell part of your land ?
all the land why ?
Are you intending to buy a new land ? if no why ? if yes for what purpose ?.

11.6 How do you see the future of your land ?

11.7 Are you satisfied with the present situation ?

11.8 Do you have any plan to alter the present situation (i) quit farming and take OFE (ii) quit OFE (a) to expand farming by purchasing land or renting land (b) reduce the operated area (to maintain the present level.