

Strategies for Construction and Maintenance of Rural Roads in Cameroon

by

Veronica Fofang

BA: Economics and Political Science (1994)
Wellesley College

Submitted to the Department of Urban Studies and Planning
in Partial Fulfillment of the Requirements for the Degree of
Master in City Planning

at the

© Massachusetts Institute of Technology

June 1996

1996 Massachusetts Institute of Technology
All rights reserved

Signature of Author: _____
Department of Urban Studies and Planning
May, 1996

Certified by: _____
Paul Smoke
Associate Professor, Department of Urban Studies and Planning
Thesis Supervisor

Accepted by: _____
Mark Schuster
Associate Professor, Department of Urban Studies and Planning
Chair, MCP Program

MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

JUL 02 1996 Rotch

LIBRARIES

ABSTRACT

The construction and maintenance of rural roads in developing countries have heavily depended on the use of equipment-based methods. However, the lack of spare parts, the shortage of skilled operators and mechanics, and the reliance on petrol and diesel are major limitations. Because major inputs have to be imported, equipment-based methods have placed a major burden on the limited foreign exchange reserves of developing countries. An additional problem is the lack of adequate maintenance, which results in a rapid deterioration of the rural road networks. A review of the experiences of several African countries demonstrates that labor-based methods can be efficient and cost effective.

Based on recent research in Cameroon, this thesis analyzes strategies for construction and maintenance of rural roads and proposes a plan of action for experimenting with the labor-based method. The use of the labor-based method has not been strongly supported in Cameroon, although before independence certain regions of the country constructed and maintained their rural roads through that method. I compare the labor-based and equipment-based methods to show how the country can benefit using the labor-based method.

I also examine various models for implementing the labor-based method by comparing the force account, large scale contractor and small-scale contractors. Small-scale contractors are defended as the most feasible option to expand the labor-based method, but the precise approach is dependent on the government's institutional strategy. I propose a model for Cameroon and suggest procedures and steps for implementation of the proposed model.

ACKNOWLEDGMENTS

This study is the product of the efforts of many persons. The guidance, support, and constant inquiries of my advisor Professor Paul Smoke were indispensable throughout this endeavor. I am also thankful for guidance during the initial stages from Professor Ralph Gakenheimer and Mr. Jean Noel Guillousou. They have provided me the tools and institutional approach necessary to understand this topic. I am also grateful to Professor Aixa Cintron of the Department of Urban Studies and Planning for her exceptional consideration and interest. In addition I also thank her for going through my various drafts and giving the necessary impetus to develop the analyses present.

Many generous people during my visit to Cameroon went to great lengths to provide me with forgotten reports and useful data and experiences on rural roads in Cameroon. I would also like to thank Mr. Kedi, Sindeu, Tachoungou, Apará, Janot, Fon Ayong, Peyechu, Tchouplaou, Ayissi for their experience they shared during the process of this thesis.

My brothers Gana, Nyonga, Emmanuel, sister in-law Ann, Sama and Nah, mother Angela, cousins, brothers and sisters back home, and deceased father, my friends Adhiambo Odaga, Ms Mba-kalu, Vicky Kwakwa, Jonathan Abrams and Neville Reed have provided the essential motivation during these two years to undertake this thesis to completion.

TABLE OF CONTENTS

ABSTRACT	2
ACKNOWLEDGMENTS	3
TABLE OF CONTENTS	4
ACRONYMS	5
I. INTRODUCTION.....	6
1.1. RURAL ROAD CONSTRUCTION AND MAINTENANCE IN SUB-SAHARAN AFRICA.....	7
1.2. HOW THE LABOR-BASED METHOD CAN BE APPLIED TO CAMEROON	11
1.3. RESEARCH METHODOLOGY AND PROCEDURE	12
1.4. THE STRUCTURE OF THE THESIS	13
2. THE CAMEROON CONTEXT	15
2.1. INSTITUTIONAL AND POLICY ENVIRONMENT	20
2.2. POLICY MAKING AND PLANNING	25
2.3. FINANCING	26
THE MANAGEMENT OF RURAL ROADS	29
3.1. INTRODUCTION	29
3.2. MANAGEMENT STRUCTURE	29
3.3. MODELS FOR CONSTRUCTION AND MAINTENANCE.....	31
4. AN OVERVIEW OF THE LABOR-BASED METHOD	41
4.1. METHODS FOR IMPLEMENTATION.....	42
4.1.1. <i>Force account</i>	42
4.1.2. <i>Large-scale contractors</i>	47
4.1.3. <i>Small scale contractors</i>	49
4.2. SELECTING AN APPROPRIATE MODEL	58
5. PROPOSED MODEL FOR CAMEROON.....	62
5.1. INSTITUTIONAL REFORMS	63
5.2. PROCEDURES AND STEPS FOR LABOR-BASED METHOD IMPLEMENTATION	67
5.3. CONCLUSION	70
APPENDIX 1.....	72
APPENDIX 2.....	74
BIBLIOGRAPHY.....	79

ACRONYMS USED

AGETIP	Agence d'exécution des travaux d'intérêt public contre le sous-emploi
ASIST	Advisory Support, Information Services and Training
CDC	Cameroon Development Corporation
CNCC	Cameroon Shipper's Council
DDF	District Development Fund
DGCR	Directorate-General of Rural Roads Construction
DGTC	Directorate of Large Works of Cameroon
DRIMP	District Road Improvement and Maintenance Program
DRP	Department of Feeder Roads
FEICOM	Fonds Special d'Équipement et d'Intervention Intercommunale
FNCV	Fondo Nacional de Caminos Vecinales
IDA	International Development Association
ILO	International Labor Organization
IMF	International Monetary Fund
LABOGENIE	Laboratoire National de Genie Civil
MATGENIE	Parc National de Materiel de Genie Civil
MINAGRI	Ministere de l'Agriculture
MINEDINO	Mission de Developpement du Nord Ouest
MINEQ	Ministry of Equipment
MINP	Ministry of Public Works
MINT	Ministry of Transport
MINTPT(DR)	Direction de l'Entretien Routier
MRP	Minor Roads Programs
NFRRMP	National Feeder Road Rehabilitation and Maintenance Programme
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
RARP	Rural Access Road Program
SECP	Special Employment Creation Program
SMEs	Small and Medium Scale Enterprises
SODECAO	Societe de Developpement du Cacao
SODECOTON	Societe de Developpement du Cotton
TSP	Transport Sector Project
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
USAID	United State Agency for International Development
VARBAU	Village Access Roads and Bridges Assistance Unit

CHAPTER 1

Introduction

Although Cameroon has sufficient resources and land to support its growing population, its limited infrastructure development is increasing pressure on land resources in the Far North, West and Northwest provinces (World Bank, 1989). Without sufficiently extensive rural road networks, it is hard to integrate regions economically.

Cameroon's existing rural roads are inadequate and poorly maintained. This has been a major obstacle to rural trucking, raising the cost of transporting goods and services. The major causes of this situation identified in the literature include: (1) misdirected investment, i.e., under-investing in the rural roads; (2) chronic lack of maintenance; (3) inefficient public sector agencies; (4) an inadequate regulatory framework and administrative failure; and (5) lack of definition of the function and financial responsibility between the national and the local government, and between community organizations and private firms (Harral 1988, Riverson et al. 1991, Riverson and Carapetis 1991, and Heggie 1995)

The performance of the rural transport sector in Cameroon is hampered by the overlapping responsibilities of specialized parastatals¹, such as the Societe de Developpement du Cacao (SODECAO (i.e., cocoa and coffee)) and the Societe de Developpement du Cotton (SODECOTON (i.e., cotton)). These institutions construct and maintain roads only in main export crops growing areas. The rest of the rural roads were constructed by the Ministry of Public Works and are barely maintained.

¹ These are public-private agencies found in Cameroon.

The parastatals focused on road rehabilitation but not on effective long-term maintenance. Since 1989, the dismantling of some of the larger parastatals has threatened the sustainability even of areas with better rural roads.

In this thesis, I argue that if rural road construction and maintenance issues are not addressed, Cameroon will risk losing considerable capital assets which are very expensive to produce and maintain, especially during a period of local currency devaluation. The equipment-based method (EB²) appears inappropriate to construct and maintain rural roads in Cameroon due to lack of spare parts, the shortage of skilled operators and mechanics and scarcity of diesel. The deteriorating economic conditions, an abundant supply of cheap labor and a crippling scarcity of foreign exchange suggest that a labor-based approach (LB) is more appropriate to develop a rural road network. I will examine the use of the LB method as an alternative for the construction and maintenance of rural roads. The next section provides an overview of the construction and maintenance of rural roads in Sub-Saharan Africa.

1.1. Rural Road Construction and Maintenance in Sub-Saharan Africa

Constraints:

Most infrastructure building and maintenance programs in developing countries have involved capital intensive programs. However, the lack of spare parts, the shortage of skilled operators and mechanics and the reliance on petrol and diesel are major limitations of this strategy. The result is that equipment-based construction

² Equipment-based method depends more on equipment and less on labor. According to interview sources during the oil boom sufficient resources were available for equipment-based method to be implemented on roads projects but after the oil boom, the country found it difficult to purchase or maintain the equipment -- thus leading to poor maintenance.

methods place a major burden on the limited foreign reserves of developing countries, as a large part of the resources used have to be imported and paid for in foreign exchange. The lack of adequate maintenance results in a rapid deterioration of the rural road networks.

Opportunities:

In the 1960s, organizations such as the World Bank , the International Labor Organization and the United Nations Development Program embarked on a project addressing road construction technology for developing countries. This program assessed how the LB method could be technically and economically competitive compared to an equipment-based method (ILO, 1986). Although the program originally focused on construction, by the mid -1980's it had broadened its base to cover road maintenance, small-scale irrigation and rural transportation. Its main objective was to ensure the continued identification and implementation of the most appropriate technologies -- labor, equipment or a combination of both. Much experience with the combined method has been gained from several African countries, such as Benin, Botswana, Chad, Malawi, Ghana and Kenya (See Box 1).

A comprehensive study sponsored by the Sub-Saharan Africa Transport Program of the World Bank examined policy issues related to the management, rehabilitation and maintenance of rural road infrastructure in Sub-Saharan Africa (Riverson et al. 1991). The report concludes that LB should be systematically promoted for work in this area. It also argues that developing institutional capabilities for long term rural maintenance involves local funding administered by a local organization with technical advice from the central government.

Box 1**A successful Labor-based method in Kenya**

The success story of the Rural Access Road Program (RARP) has been highlighted as an example of implementing the labor-based methods. At the initial stage, the government wanted to set up 74 construction units in 26 districts, 8 of which were to be financed by the World Bank. However, at the end 45 construction units were established and 8 financed by the World Bank. Each unit undertook labor-based construction with equipment provided only for hauling of gravel. Each unit was headed by an inspector and employed approximately 250 casual laborers, who were divided among seven sub-units (one administrative, two earthwork, two drainage, one graveling and one quarry). The senior inspectors were in charge of four units, who then report to the Rural Access Roads Engineer in Headquarters. The organization proved effective and cost efficient. The District Engineer was responsible for road maintenance. Routine maintenance was executed using lengthman system with local people acting as contractors. Each contractor was paid the equivalent of 3 days a week of casual labor with the consent of the overseer who ensure that all maintenance work needed has been performed. The Ministry has developed productivity standards for the contractors so as to avoid discrepancies.

J.J. Veen, 1980. The rural access roads programme: Appropriate echnology in Kenya

Gaviria et al. (1991) also emphasizes the importance of rural road networks and their potential for stimulating the growth of Nigerian agriculture during the period from 1970 to 1988. Their report claims that local involvement in planning rural road activities has led to an effective rehabilitation and maintenance scheme. Heggie (1995) similarly argues that the local communities should be encouraged to undertake most of the work on a self-help basis and outside financial support should be confined to meeting the costs of buying materials (See Box. 2).

The currently growing interest in the labor-based (LB) method for rural road provision emphasizes the relations between community participation and maintenance. This approach is particularly suitable where foreign exchange is at a premium and labor is abundant and underutilized. In such cases, it makes sound economic sense to use the LB method to develop rural road networks (Allal and Edmonds, 1977), provided the right incentives can be put into place

Box 2**A self -help Approach**

The self-help Approach in Afghanistan provides a good example of how communities organize themselves in groups and donate their services free or for the provision of food. The motive here is not to generate employment but to develop the rural roads. In the rural areas of Afghanistan, the villagers organized themselves to build and maintain their roads. The initiation, planning and execution of the roads projects comes from the bottom up with close involvement of the villages at all stages. The motivation of a self-help program usually comes is a desire for access to the national transport system. The villagers are aware of the economic benefits arising from a good transportation system. In the case of Afghanistan, the farmers have farm surplus to export from their areas, but the means of transportation is poor. Similarly, the villagers finds it difficult to attract and keep a good school teacher with the poor roads. Thus the basis of self-help comes as a result of economic and social concerns from the villagers. Furthermore the use of the self-help programs requires mutual respect between the leader and the villagers. Thus it is hard to base on the usual criteria of labor discipline and financial incentive. This means that the style of management is based on leadership and sympathy rather than "commercial" method. Thus the construction process has to be discussed in greater detailed in order to convince the villagers that the method advocated is meant for their advantage (Edmonds and Howe, 1981)

Despite the support for the LB method, few governments initially showed any interest in implementing it for their rural roads. Most government officials and engineers held the common idea that the LB method is a "primitive" alternative that uses no equipment. In fact the International Labor Organization (ILO) and World Bank did not propose building developing countries' roads without using equipment; instead, they encouraged the use of the most cost effective combination of labor and equipment for road rehabilitation and maintenance. In most countries, this can be translated as using labor and light equipment, such as tractors, trailers, and hand tools (cutlass, pick-axes, etc.).

Although the misconceptions about the LB method have been clarified, some developing countries still resist adopting it. Why is this so? Part of the reason may be that a large proportion of engineers and decision makers for various other reasons (for example, political liability or other vested interest in maintaining the status quo)

choose not to consider the LB model. Further, local sustainability and social questions such as employment creation have seldom been considered seriously in the context of executive decisions about program implementation. Finally, there is a lack of unequivocal evidence on the cost-effectiveness, quality and speed of a well-managed LB method (World Bank, Coukis, 1993, de Veen 1984, Beenhakker et al. 1987).

In spite of these issues, interest in the LB method continues. The ILO is attempting to develop the LB method further by (i) providing contractors with training and thus subsidizing the contractors' cost of adopting this new technology and (ii) introducing a payment system to increase worker productivity.

1.2. How the Labor-Based Method can be applied to Cameroon

The ILO and World Bank provide advice and assistance to the governments of developing countries on the most effective means to construct and maintain rural road networks. They have established a large number of LB projects in Sub-Saharan Africa (Riverson et al. 1991). In countries such as Cameroon, with little or no experience with the use of LB methods, program development usually begins with a pilot project. The major objectives of such a pilot project are to:

- develop the managerial, organizational and administrative frameworks at the local level which will be able to continue applying the LB method after the pilot project period.
- assemble sufficient data on costs and productivity to allow a rational choice for the appropriate technology to be made -- heavy or light equipment.

- train a cadre of managerial and supervisory personnel to be conversant in the application of LB method.

After a demonstration of the pilot project, the aim is for a typical project to develop into a full-scale program. Eventually, some of the technical assistance or standard setting rules may be integrated into a government ministry. The ministry would then determine whether the LB method is an appropriate method for constructing and maintaining rural roads in Cameroon.

Face to face interviews with key government figures suggest that many obstacles would have to be overcome before the LB method can be accepted as a viable alternative. Political commitment at the highest level is needed. Further, it will be necessary to create an educational awareness amongst planners to reflect the merits of the LB method.

1.3. Research Methodology and Procedure

In order to examine the above issues, I undertook an in-depth case study of Cameroon. Data for the study are derived from several different sources; comparative historical data were obtained from published reports at the Ministries of Transport, Planning and Finance. In addition, I conducted face-to-face interviews with government officials in January of 1995 including those who deal with road projects³. My field work coincided with the municipal election process in Cameroon. Finally, I undertook a comparative analysis, in which I compare the EB and LB methods. On the basis of this analysis I propose a plan of action for experimenting with the LB methods for rural road construction and maintenance.

³ See appendix 1 for list of personnel interviewed and appendix 2 for lists of questions.

This thesis will also provide a background for further study of the outstanding issues of rural roads policy that will support construction and routine maintenance. For example, it may be possible in the future to use a geographic information system (GIS) for rural roads planning and management.

1.4. The Structure of the thesis

The thesis is divided in five sections. Following the introductory chapter, chapter two looks at the political economy of Cameroon in the context of rural roads. The chapter examines the institutional environment by highlighting the policy that controls the planning, financing, construction and maintenance of rural roads. The institutional issues affecting the success of rural roads are similar to those relevant for other economic reforms efforts, such as accountability of public finance, inadequate design standards and lack of participation of the locals.

Chapter three describes the management of rural roads. This varies considerably throughout Cameroon as there is no single ministry with responsibility for these projects. Earlier, in the English colonial administration, a structure existed in which main roads were managed by the public works ministry and the rest of the network was commonly assigned to local councils and traditional authorities under a ministry responsible for local government. In the French colonial administration, on the other hand, all the road networks were undertaken by the central government. However, after independence, emphasis on improvement of the living conditions of the rural poor resulted in a greater fragmentation of responsibility rather than a clear

definition of functions. This chapter explores these issues and further describe the models that are used for construction and maintenance of rural roads.

Chapter four gives an overview of the LB method with the various approaches for implementation, drawing examples from other countries. The study looks at the implementation of various models, such as force account operations, small contractors and large contractors. The chapter further examines the advantages and disadvantages of these approaches. Finally it examines the various institutional and technical advantages of equipment-based versus labor-based methods

Chapter five proposes a model for Cameroon. The application of any of the models will require institutional reforms. Coupled with these institutional reforms there needs to be a period for experimenting with a series of pilot projects in order to fully learn how to implement the model. This chapter further identifies procedures and steps for implementation of the proposed model.

CHAPTER II

The Cameroon Context

Cameroon is a country sustained by abundant natural resources (tropical forest, petroleum, bauxite, natural gas, fertile agricultural land and a largely favorable climate). It also exports petroleum, cocoa and coffee. However, several structural problems have developed in recent years. The agricultural sector, which is the traditional growth sector, has been neglected and thus has a low rate of productivity growth due to poor roads, as much as due to mismanagement of resources (World Bank 1995). The neglect of rural roads has deep roots in the poor economic situation of Cameroon. Since 1985, there has been a sharp decline in the economic performance. GDP per capital declined by 6.3% per year from 1985 to 1993 and a decline of 6.0% in private consumption per capita. Cumulatively, this represents a drop in average per capita consumption of over 40% in eight years with an unemployment rate of 24.6% of the active population. The decline in economic situation can be also be attributed to a highly unfavorable external factors, notably the drop in export prices, declines in petroleum exports and revenue and a high level of foreign debt service. In the road sector, this situation and mismanagement of funds underlies the failure of the various combinations of manual, equipment, contract and force account road maintenance policies that have been undertaken over the past thirty-five years.

Cameroon's population is approximately 12 million; it is widely dispersed with a population density of 4.4 inhabitants per km² in the East Province and 95

inhabitants per km² in the West. Littoral and North-West have a density of over 70 inhabitants per km². These figures reflect the variations between the sparsely populated areas, and the areas where the population pressure has an impact on the natural environment. The sparseness of the population in most of the areas is marked by a low volume of traffic flow due to the lack of transport infrastructure or maintenance.

Approximately 92% of passenger transport (expressed in passenger/km) and 76 % of goods transports (expressed in ton/km) occurs on the road network. Rail transports carry 24% of goods. According to interview data, these figures are appropriate as transportation flows have shifted from the rural areas to the urban area, and urban traffic has developed much more rapidly than air and cargo traffic.

The Cameroon road networks are divided into two categories: classified and unclassified networks. At present, the classified networks comprise 33,000 km of roads, 3,000 km of which are tarred. This includes 370 km of urban roads, 30,000 km of earth road including 11,500 km of rural roads, which are all maintained by the budget of the Ministry of Equipment. The classified network can be described as follows: national highways, provincial, division and rural roads. The unclassified network consists mainly of rural roads which have not yet been taken over by the Ministry of Equipment, approximately 31,000 km. Table 1 provides the breakdown of the networks, according to the nature of their surface and the category of the road.

Table 1.

Breakdown of Road Networks, 1994

Nature of Surface	Tarred roads (km)	Earth roads (km)	Total
National highways	2,141	5,100	7,241
Provincial roads	280	5,561	5,841
Divisional roads	112	7,963	8,075
Rural roads	26	11,513	11,539
Urban roads	369	0	369
TOTAL	2,928	30,137	33,065

Source: Interview data from Ministry of Equipment (MINEQ) and BCEOM. Programme d'entretien et d'amélioration des pistes rurales de desserte et de collecte dans la zone de production de café et de cacao. Decembre 1994.

Cameroon, for the past years, has placed more emphasis on the construction and rehabilitation of the tarred roads. There are no resources earmarked for the rehabilitation and maintenance of the earth roads. A 1993 a survey conducted by the Ministry of Public Works indicated that only 4% of the earth roads were in good condition, and 10% were in very bad condition. It is important to emphasize that economic and institutional mismanagement have drastically contributed to the deterioration of all of the roads⁴. Interview data suggest that the current quality of roads in Cameroon is dismal, especially in the inter-urban and rural areas.

There was a time when rural roads were well maintained in some parts of Cameroon. Before independence⁵, both the Francophone and the Anglophone Cameroon constructed and maintained rural roads separately. In the Francophone provinces all the rural road projects were initiated by the central government, which used the equipment based method. In the Anglophone region (North and South West Provinces) the rural road projects were initiated by the population, through a self-help program, using the labor intensive method.

⁴ According to interview sources, since road funds are not earmarked or targeted and there is no prioritization of where funds should be used, the money can always be used for different purposes (such as political campaigns)

⁵ Cameroon gained independence in 1960; before independence Cameroon was colonized by the French and the British.

During the late 1950s, in the Anglophone region, the Ministry of Agriculture created a Ministry of Community Development, and rural roads were regarded as one of the priorities. This initiation was influenced by United States Agency for International Development (USAID). Under the auspices of USAID two units were formed in the North and South West provinces, called the “Local Authority Rural Road Maintenance and Farm to Market Roads”. These local organizations helped to build rural roads by encouraging voluntary participation; payment was made by food aid. A community development pool was also created that provided technical assistance for the construction and maintenance of rural roads. As most of the export crops were found in the South West provinces, most of the rural roads were built by private industries, such as the Cameroon Development Agencies and Palmol. In these areas there were no government policies concerning the construction of the rural roads; their main purpose was to link the rural roads to their various plantation sites and urban areas.

After independence, roads deteriorated rapidly. As the rural administrative system collapsed, several regions declared independence, and the expatriate leadership left. However, in late 1970, an equipment pool was initiated by the national government. The public could rent equipment from this independent pool for the construction and maintenance of rural roads. The lack of financing to maintain the equipment pool led to its demise. Despite the strong participation of the rural people in sustaining the equipment pool, the rural economy collapsed (because of poor infrastructure links, poor harvests etc.) and the support of rural road maintenance became difficult.

In order to rescue the rural economy, an NGO sponsored by the Canadian government created “Council Union Equipment Pools” to replace the existing equipment pool which was considered highly inefficient because of mismanagement.⁶ But lack of training and management led to the collapse of this organization as well, and the remaining equipment was then liquidated.

Faced with extreme road deterioration, most rural enterprises pulled out of remote areas, although some continued to maintain rural roads crucial to them on their own account. For example, religious missions continued to play a key role in maintaining the remote rural roads. Further economic shock however, such as the devaluation in the late 1980s, reduced most of the rural people’s savings, and this undermined the ability to finance the country’s road maintenance from the private sector. As economic conditions worsened in the late 1980s, many of the larger parastatals dismantled their commitment to the self-maintenance of roads. Further, lack of finances deprived the Ministry of Agriculture and the private sector of the financial, logistic, and technical capacity to maintain the roads bringing rural road infrastructure to a standstill.

While it is difficult to document the state of rural roads completely, available evidence suggests that most of the colonial roads have been lost. There remain, in numerous villages and access farms, tracks which are generally poorly maintained and often lack basic structures such as culverts. These villages and farms have become inaccessible to vehicular traffic, especially during the rainy season. In most

⁶ Interview sources from the Ministry of Public Works and a retired worker from the Community Development Agency in Bamenda.

scenarios, the construction and maintenance of these access tracks is the sole responsibility of the villages, not the government.

2.1 Institutional and Policy Environment

The country's poor economic situation and the poor level of financing call for a strong commitment by the government to undertake policy reforms which will rationalize the rural road networks and make use of the country's vast resources. This section examines the institutional environment by highlighting the policy making and planning, and financing of construction and maintenance of rural roads. I will argue that the institutional issues affecting the success of rural roads may be a reflection of broader issues permeating the entire economy, such as accountability, inadequate design standards and lack of participation by the locals. Most of the discussion is based on interviews with officials who deal with road projects.

There are several ministries and private companies that are involved in the construction and maintenance of rural roads, as shown in table 2. The public transport sector is managed by three governmental institutions. The Ministry of Public Works (MINTP), with about 6,700 employees, is responsible for road maintenance. The Ministry of Transport (MINT), with approximately 880 employees, initiates and supervises transport regulations. Besides roads, the MINT also oversees the Shippers' Council (CNCC), which controls the distribution of Cameroon's maritime traffic under the United Nations Conference on Trade and Development's (UNCTAD) Code of Conduct; in addition, it negotiates liner tariffs and represents Cameroonian shippers' interests.

Table 2 Ministries and Private Companies involve in rural road projects

<u>Institutions</u>	<u>Functions</u>
Ministry of public works (MINTP)	responsible for road maintenance
Direction de l'Entretien Routier (DR) --MINTPT	responsible for road construction and maintenance --classified roads
Ministere de l'Agriculture (MINAGRI)	responsible for rural roads
Ministry of Transport (MINT)	initiates and supervises transport regulations
Director of Large Works of Cameroon (DGTC)	reports to the Prime Minister
Parc National de Material de Genie Civil (MATGENIE)	handles equipment pool for road maintenance
Ministere de Equipment (MINEQ)et Direction des Routes	use to handle equipment for road projects
Laboratoire National de Genie Civil(LABOGENIE)	controls norms and standards of road and building construction not currently in existence
Cameroon Development Corporation	a public corporation that engages in the production of coffee and tea
Fonds Special d'Equipment et d'Intervention Intercommunale (FEICOM)	collects local revenues from agricultural produces, taxes etc. and donates equipment for rural road projects
Mission de Development du Nord Ouest (MINDENO)	rural development corporation - responsible for rural development projects
Societe de Developpement du Cotton (SODECOTON)	a public corporation that engages in the production of cotton
Societe de Development du Cacao (SODECAO)	a public corporation that engages in the production of cacao

The Directorate of Large Works of Cameroon (DGTC), with about 150 employees, reports to the Prime Minister. This Ministry prepares and supervises large works, including roads. It also procures contracts of at least US \$100,000 for all ministries, and of about US \$365,000 for the private sector. Under the Ministry of Transport, MATGENIE (Parc National de Materiel de Genie Civil), has approximately 400 employees and handles the equipment pool for road maintenance. LABOGENIE (Laboratoire National de Genie Civil) with about 530 employees, controls the norms and standards of road and building construction, and carries out research. According to interview sources none of the above agencies have a particularly good track-record. The general organization of the public transport system is extremely problematic, with no coordination, accountability or clearly defined responsibilities.

The construction and maintenance of rural roads involves some of the above ministries, the private sector, and local community groups. The Ministry of Agriculture is in charge of construction and maintenance of rural roads in the export crop areas. In addition, some private agencies (for example, MINEDINO, SODECAO, CDC and FEICOM) work with the Ministry of Agriculture; they construct and maintain rural road projects. Despite the involvement of several agencies in rural roads project, the government has never had a coherent rural roads policy.

In the late 1980s and early in the 1990s, the economy witnessed a steeper decline, which resulted in a 4 to 5 percent negative growth of the GDP. This decline can be attributed to a drop in export prices for export crops, such as cocoa, coffee, and petroleum and to the high level of foreign debts. In early 1994, the government undertook a series of reform measures designed to reverse this trend. In concert with the other CFAF countries it devalued its currency from CFAF 50 per 1FF to 100 CFAF in order to improve basic competitiveness. Backed by an agreement with the International Monetary Fund (IMF) and an Economic Recovery Credit from the International Development Association (IDA), it adopted a new medium-term program to structure reforms designed to re-establish macro-economic equilibrium and growth. This is expected to further liberalize the economy. It is still too early to judge the results of these programs: while exports are responding favorably, the progress of structural reforms is generally slow.

In its overall “Declaration de Strategies et de Relance Economique” of 1989 and subsequent policy documents, the government has placed rural infrastructures under the Ministry of Agriculture as one of its highest priorities. A research interview

with the employees at the Ministry of Public Works and the Ministry of Agriculture indicates that inadequate rural infrastructure is considered one of the major bottlenecks to sustained agricultural growth. In particular, a poor rural road network and inadequate markets have been identified as major constraints on economic growth. The lack of a coherent rural road policy in general and the lack of coordination between the ministries, departments, and the private sector seriously impede the adequate maintenance of rural roads.

Recognizing this problem, the government has launched an institutional reform program, the Transport Sector Project (TSP), under the guidance of the World Bank. The TSP has taken a sector-wide approach and seeks to establish a clear set of priorities within the transport sector for the country as a whole. The TSP will identify key areas in which intervention, restructuring, or rationalization are needed. Finally, the TSP emphasizes the need for pragmatic and feasible performance.

Within the framework of the TSP, the government has defined a new road strategy, which is paying major attention to rural road rehabilitation and has selected about 11,000 km as the highest priority. Of these, 2,162 km will be examined during a first-phase program which is still unspecified. During the second and third phases, 3,838 km and 4,952 km respectively will be examined, with the participation of major private firms and beneficiaries that will be involved in maintenance. As stated in Chapter I, in addition to the feeder road network, there are numerous village and farm access tracks which are generally ill-maintained and often lack minor but basic structures such as culverts. These become inaccessible to vehicular traffic during the

rainy season. The construction and maintenance of these access tracks are the responsibility of the villagers.

Although the institutional TSP changes have been tailored to fit the requirements for rural road construction and maintenance in Cameroon, the role of other ministries has to be reduced. Meanwhile, government organizations which are efficient and technically able must be preserved. Further, if a rural road agency is created it should be given increased autonomy in management, financing, procurement, and human resources.⁷

Local history and the experience of other countries suggest that a number of principles have to be considered in order to have successful rural roads projects. For example, rural road units or departments should be set up under a main agency with an adequate degree of autonomy, as in the case of Zaire, Benin, Ghana, Kenya, Sierra Leone, and Togo. Rural road units may also set up through a Ministry of Local Government, which may delegate day-to-day operations to the local authorities such as in Nigeria, Tanzania, and Zambia. Although local government ministries vary tremendously in their involvement and capabilities for managing rural roads, a successful unit should provide a focal point for policy and planning for rural roads as well as serve as a conduit for funds (Galenson and Calvo, 1995, pg. 4).

Further, a separate funding mechanism has to be set up in order to launch and implement rural road programs on a national scale. In Columbia, a rural roads authority (Fondo Nacional de Caminos Vecinales[FNCV]) was set up under the central

⁷ This paragraph is based on my interview with senior officials at the various ministries (The Director of Public Works, Senior Civil Engineer and Engineers in the Ministry of Transportation and Public Works) that deal with rural roads construction and maintenance.

government but since 1970 has operated as an autonomous rural roads agency. The local government FNCV staff assumes operational responsibility, leaving only policy and overall planning functions to the central government. FNCV has in their control some earmarked revenues from a share in taxes and duties which was matched by a fund collected locally (Riverson et al. 1991). More emphasis has to be placed on the participation of local communities at the planning stage, so as to lead to better road selection and to facilitate maintenance. In addition, there should be long-term commitments, and simple and well established planning procedures to encourage participation and resource mobilization at the local level.

The proposed TSP will represent an opportunity for the government to proceed in the rehabilitation and maintenance of rural roads. Moreover, the impact of TSP has the potential to increase employment by using surplus labor in construction and maintenance road networks as well as promote small and medium size enterprises to bid on roads work contracts. However, a successful TSP will depend crucially on how the government prioritizes and manages its resources and road work activities.

2.2 Policy Making and Planning

Policy making and planning for most African rural roads have been completed by a multiplicity of agencies with a diversity of objectives. As a result, we have observed a lack of continuity and scant attention to sustainability, as is the case with Cameroon. In Cameroon there is basically no consistent policy for the construction and maintenance of rural roads. Too many institutions and too little coordination have been consistently identified as problems in Cameroon (Gaviria, 1991). As described

earlier, the classified rural road network is developed and maintained by the Ministry of Public Works, through 65 regional sub-divisions (each with an average 180 km to maintain), and the unclassified network is in the charge of various development companies (parastatals), local authorities, and local communities. The overlapping responsibilities of these parties have resulted in expensive and inadequate maintenance.

The National Commission of the Coordination of Rural Roads, created in 1984 to resolve the problem, lacks the staff and funds for effective coordination. As a result, rural roads projects have been given little or no importance. All of this suggests the country needs to further strengthen its policy making and planning capabilities and emphasize close coordination between programs and policies for rural roads projects. The planning should pay particular attention to maintenance as well as encourage community participation. The problem in Cameroon is that roads are constructed but not maintained. Therefore, maintenance should be a part and parcel of road building.

2.3 Financing

The financing of rural road is most crucial for construction and maintenance, in order to ensure project sustainability. But the delegation of maintenance for funding and operations to local authorities has not been efficient (Riverson et al. 1991). For example, places like Nigeria and Tanzania have delegated maintenance funding but they have had unsatisfactory results, as local authorities were not able to handle the

process of financing. This is due to inadequate technical or management skills, insufficient human and capital resources, and inconsistent enforcement of policies.

In the case of Cameroon, rural road projects have been funded mostly through the central budget or through special accounts such as oil revenues. However, private-sector agencies, such as SODECOTON and SODECAO, have increasingly become the major direct funders of such projects. The financing through these agencies has been variable. For example, SODECOTON and SODECAO have obtained external credits and mobilized their own funds from crop commercialization with the objective of rehabilitating roads, but they have not shown the same ability to fund and carry out maintenance. On the other hand, there have been interesting exceptions, where substantial resources have been mobilized locally and have been used to maintain a small fraction of rural road projects, such as the Bafut rural communities which I visited. In Bafut, the roads were so bad that the villagers got together with the local governments and donated funds, bought equipment, and worked on the maintenance of a small fraction of their rural roads. Presently, the low level of income and the weakness of local government place major constraints on the financing of rural roads.

Interview sources from the Ministry of Public Works state that most of the funds allocated for rural roads never go to the rural areas. Despite the efforts made by the government, the budgetary allocations for rural road projects are woefully inadequate, both for new projects and for maintenance. The most frequently noted problem is inadequate allocation of resources for maintenance. This is certainly true for rural roads, which allocated approximately Fr CFA 700.000 (US\$ 254) per km in 1992/93.

The overall allocation was approximately Fr CFA 210.000 (US\$ 760 per km in 1991/92 and 1992/93) and this is much higher than in many African countries. Although this should be enough to keep a substantial proportion of the rural road network in a reasonable condition, the reality is that resource allocation never trickles down to the rural areas.⁸

Presently, the treasury lacks funds for government programs such as rural roads, thus it is very difficult for the government to finance rural roads as well as maintain them. Recently, the National Assembly proposed the creation of a road maintenance fund but nothing has been initialized as of yet. A research proposal was launched by the Department of Public Works to increase fuel taxes to subsidize rural roads but this was never implemented. Just as there is no actualized information on road networks and conditions, there is no verifiable account of the extent of vehicle usage of existing rural roads.

The next chapter will explore the management concepts and further describe the models presently used in various countries for construction and maintenance of rural roads. Finally, it will examine the various institutional and technical advantages of labor-based versus equipment-based methods.

⁸ Interview with the Senior Engineer at the Ministry of Public Works 1995.

CHAPTER III

The Management Of Rural Roads

3.1. Introduction

A review of the literature in Chapter two indicates that rural roads are poorly managed and their level of management varies considerably in Cameroon. A structure in which main roads were managed by the public works ministry and the rest of the network was assigned to local councils and traditional authorities supervised by a ministry responsible for local government was common in the English colonial administration. This resulted to more fragmentation of responsibilities rather than a clear definition of functions. This chapter explores these issues and further describe the models that are used for construction and maintenance of rural roads.

3.2. Management structure

In most developing countries the management structure of roads is very complex as and there is little incentive for managers to introduce improvements. For example, at the central government level, the main road network is usually managed in one of these three ways. (i) as part of combined Ministry of Works, Transport and Communication as is the case with Botswana, Uganda, and Tanzania; (ii) as part of a more narrowly focused Ministry of Works or Transport as in Sierra Leone, Zambia, and Zimbabwe; or (iii) under a directly focused Ministry of Roads and Highways as in Ghana (Heggie, 1995). Most of the rural roads are either handled directly through the central road agency or through a separate department of the central road ministry,

as with Ghana. The management of rural roads can be very complicated; for example, in Zimbabwe there exists force account⁹ agency called the District Development Fund (DDF), which manage a large road network on behalf of local councils (the DDF is part of the Ministry of the Local Government), while at the other extreme there may be a few people in the Ministry of Local Government who coordinate activities with local authority road departments, but do very little for them. At the local authority level, the picture becomes even more complicated. There is often no such thing as a road department (new roads often fall under the Development Committee and road maintenance under the Finance Committee) making it difficult to identify who is responsible for what (Heggie, 1995). This confusion and these poor management structures provide managers with little or no incentive to introduce an effective accounting system or a management information system.

According to data derived by personal interviews with the Director and Engineers of Ministry of Public Works, in the case of Cameroon, the management structure is weak or non-existent. There are too many institutions and not enough coordination between them. The current financial accounting system does not provide any information to support the types of management decisions undertaken. There is no cash flow statement account or expenditure account system. Thus, it is very difficult to tell how much is spent on rural roads for construction and maintenance costs. It is even difficult to make a breakdown of costs between overheads, labor, and equipment, regraveling and cleaning of drainage systems or even to know

⁹Force account are public agencies that directly employ labor and own equipment. These public agencies supervise, manage and control their machines. They also supervise, manage and control their labor.

whether any of this has been done. In addition, there has never been a management information system, that could give an accurate account of the basic traffic count and road inventory data.

As the road agencies do not operate efficiently they deliver poor quality services based on their inadequate annual budget allocations. This is clearly shown in the inefficient operation of government equipment pools and lack of interest in labor-based methods by the agencies involved with rural roads. In almost all the cases, the managers are not motivated and are not accountable for any results.

3.3. Models for construction and maintenance

The models for construction and maintenance of rural roads are influenced by different factors: the road design, the site conditions; the availability and motivation of the workers; the quality standards to be applied; the required speed of construction and, finally, the cost of the approaches (Edmonds and de Veen, 1991).

The construction and maintenance of rural roads varies considerably among countries. In most developing countries, the construction and maintenance of rural roads have involved capital-intensive technical programs, with mixed results. It is widely believed that the equipment based model is very productive and can bring high quality results. However, the experience of countries like Malawi, Kenya and Ghana suggest that this not always the case. The extent to which one or the other strategy will work depends, among other things on general economic conditions, so that: in times of economic contraction, a labor-based strategy becomes more attractive; whereas, in times of economic expansion, a more capital-based strategy will be more

appropriate. This does not rule out that a combination of the methods might be desirable and feasible. These alternatives are examined in more detail below.

In the case of Cameroon, the lack of spare parts, the shortage of skilled operators and mechanics, and reliance on petrol and diesel are major limitations. The result is that equipment based (EB) construction methods

Box 3
Equipment-based methods depend more on equipment and less on labor. That is, labor substitution is not technically feasible.

Labor-based methods depend more on human muscles and less on equipment -- more on manual efforts. Equipment substitution is not technically feasible.

place a major burden on the limited foreign reserves of these developing countries, as a large part of the resources used has to be imported and paid for in foreign exchange (ILO 1970). In addition to the heavy investments in the construction of a rural road network, the lack of adequate maintenance results in its rapid deterioration.

The suitability of the labor-based (LB) vs. equipment-based (EB) methods of construction and maintenance will be best determined at the national level. The degree to which LB is appropriate relative to EB is based on the labor market conditions, minimum wage levels, demographic features and cultural constraints affecting the people who participate. This issue will need to be reevaluated at the site-specific planning level, based on additional information, such as terrain, soils, design standards and availability of local labor. A general policy will be helpful in promoting the LB methods. A successful pilot project using the LB methods can also be helpful in making the decision as to whether or not this method is appropriate at a national scale.

Equipment-based methods

Despite the limitations of the EB methods, developing countries still prefer to use them over the LB methods. The main reason for this is that road rehabilitation using the EB methods is comparatively fast, as has been shown in Ghana. EB rehabilitation is approximately 1.5 times faster than LB rehabilitation in Ghana (Stock 1995). The EB methods can also meet higher engineering standards allowing rehabilitation of gravel roads which are wide, while the LB methods rehabilitate roads that are narrow. The International Labor Organization claims that if a road is wide, a contractor needs to excavate and haul additional material to build up the road profile. This extensive excavation and movement of earth will be unsuitable for LB methods, which can only rehabilitate roads six meters or less in width, as the materials excavated from the ditches will be sufficient to build up a road profile (ILO. 1970). The World Bank and other donor organizations argue that, although narrower roads reduce the vehicle speeds and the ability to overtake other vehicles, they are cheaper and are easier to maintain (Riverson et al. 1991).

The EB methods may have political benefits because government officials can quickly mobilize equipment to do work for their constituents, whereas labor is difficult to mobilize. For instance, in Zimbabwe, prior to an election, government officials used government tractors to plow farmers' fields and roads, and thus gained their votes (Howe et al. 1993). EB methods can also command more funding from donors who will finance only the foreign exchange costs of a project (Tendler 1979a). Thus, governments which want to maximize donors' contributions will be more attracted to

EB than LB methods. Tendler further states that EB methods are in many ways less complicated than LB methods. For example, when there is only one large contract to monitor, the pace of work is easier to plan and the nature of the task and the expenditures required are more easily predicted and described in a document.

The use of some operations such as longitudinal earth haulage, large scale compaction and some bituminous surfacing are suitable for the EB methods (Riverson et al. 1991) The EB methods can also minimize management problems, as these methods require fewer laborers for the construction of gravel roads than the LB methods. Experience with LB methods in Asia has encountered problems, such as poor supervision, corruption and low worker motivation (Riverson et al. 1991). In addition, government officials who supervise these sites have often added “ghost” workers to pad their payrolls and these have weakened the productivity of work (Gaude et al. 1992; Bruton 1974).

Finally, the use of EB methods is more effective in activities such as underwater excavation, the mixing of hot materials, the production of certain aggregate gradings, and achieving certain surface tolerances (World Bank 1978). Whereas, it is very difficult to achieve a high value of compaction of earthworks with LB methods; in those cases, the use of EB method for compaction is advisable.¹⁰ Experience in Honduras suggests that compaction carried out by hand had unsatisfactory results. Overall, LB methods are generally not competitive for the hauling and unloading of materials. One can argue that small machines, trucks or animal drawn-vehicles can be used but these cannot compete with the EB methods.

¹⁰Labor-based compaction is either carried out manually, or the soil is left to consolidate by itself or by using a small vibrating plate compactors (Edmond et Bhalla 1979).

Labor-based methods

Deteriorating economic conditions, an abundant supply of cheap labor, and a crippling scarcity of foreign exchange suggest that the labor-based method might be a viable alternative in the development of rural road networks. The need to counter the argument for the use of the EB methods for the construction and maintenance of rural roads has led international organizations such as the International Labor Organization, the World Bank and the United Nations Development Programs to embark on labor based demonstration programs (ILO 1986).

In order to support their arguments, the donor agencies evaluated a number of projects by using cost-benefit analysis. Despite the fact that LB methods are claimed to be more costly in actual cost-per-km than EB methods, studies based on the unit rates for equipment and labor showed the opposite to be true in low- income countries (a wage not more than US \$2.50/day). In Kenya, in the mid-1970s, when the wage rate was below \$2.50, the World Bank used a unit rate analysis to reevaluate a road construction project that was completed by the EB methods. This analysis demonstrated that it could have been cheaper to build roads using the LB methods (Tendler 1979). Table 1 illustrates the unit analysis of determining the financial cost feasibility of the LB methods. This analysis demonstrated that the LB methods were cheaper for rural road projects than the EB methods in most Sub-Saharan African countries. Because of this framework, the World Bank and the ILO began to justify the use of the LB methods on financial and not just on economic grounds.

Table 3. Financial Cost Projections for Equipment and Labor-based Construction of Rural Roads: (Wage rate for unskilled labor = US \$1.00 per day)

Equipment-based Construction			Labor-based construction	
Component	Details	Approx. cost (\$/km)	Details	Approx. cost (\$/km)
Labor			Labor	
Unskilled	100 man-days @\$1/day	100	1,000 man-days @ \$1/day	1,000
Skilled	150 man-days @\$2/day	300	200 man-day @ \$2/day	400
Local	25 man-days @\$2/day	50	50 man-days @ \$2/day	100
Supervisory				
Subtotal		450		1,500
Tools/Equip			Tools/Equip	
Tools, minor equip.	Hand tools, wheelbarrows etc.	150	Hand tools, wheelbarrows etc.	250
Major equipment	Grader, dozer, rippers, trucks	2,750	Trucks, tractors/trailer etc.	750
Subtotal		2,900		1,000
Materials			Materials	
Culverts		600	Culverts	600
Others		200	Others	200
Subtotal		800		800
Site Overhead		200	Site Overhead	200
Total		4,350		3,500

Note: The following assumptions are made about road characteristics:

Width: 4,00 m (+1.5 m x 2 shoulders)	Maximum grade: 10 percent
Minimum horizontal radius: 15m	Culverts/km: 1
Earthworks excavation/km: 3,000 cu.m (max)	Earthworks haulage distance: 150m (average)
Surface: 80 percent earth; 20 percent gravel	haulage distance: 24 km (average)
Anticipated traffic: 10 vehicles per day	Bridges /km: 0.25
	Project size: 100km

Source: Coukis Basil. 1983. *Labor-based Construction Programs: A Practical Guide for Planning and Management*. Washington, D.C. World Bank. Page 32.

The international organization bias for the use of the EB methods is based on the fact that developing government policies try to make the EB methods cheaper by subsidizing the cost of imported equipment and setting wages above the marginal productivity of labor (Sadhi 1974). According to these organizations, these policies make the EB methods appear cheaper to operate than the LB methods. The international organizations' justifications for the LB methods are based on social and economic grounds.

The economic justification for using LB methods is that they would provide jobs on the road sites. In Kenya, for example, the use of the LB methods for the construction and maintenance of rural roads has employed 13,552 casual laborers (World Bank's World Development Report 1994). Laborers were used for activities such as bush clearing, tree and stump removal, scrapping and rock excavation. As stated before, the LB methods may be less appropriate to use for compacting of earthworks, surfacing and spreading of bituminous material, as these tasks require the use of the EB methods. Nevertheless, the LB methods have shown a comparative advantage over the EB methods as in the case of pilot project in Tanzania (Riverson et al. 1991).

LB methods will benefit the rural poor more than EB methods. For instance, these benefits will filter down when there is a high population density in the rural areas, a high level of rural unemployment and a social mechanism that can be mobilized to support a large labor force for a particular task. These tasks may involve developing a small contracting industry or a community self help program. An example of a self-help program occurred in Afghanistan where workers donated their services for free or for the provision of food. Their objective was not primarily the generation of employment but the development of a rural infrastructure. (Glaister 1981) This process creates employment opportunities for men and women and the use of the road building process as a vehicle for enhancing the self-reliance of the villages concerned, as well as to increase their capacity to effectively manage their own resources. Further, the LB methods avoid delays in procuring imported spare parts (World Bank 1991).

The activities in which LB methods produce better quality than the EB methods include: (i) embankment on very soft ground; (ii) shallow excavations with a high water table; (iii) selection of materials in excavations and the exploitation of small quarries. The LB methods are suitable for rehabilitating and maintaining narrow, winding roads in densely populated urban areas, as bull-dozers cannot maneuver well in such condition. For example, contractors in South Africa (SA) choose to use labor when constructing side-roads on site-and-service projects because beneficiaries deliberately design these roads to be winding and narrow (3.5 meters in width) for safety reasons. Initially, beneficiaries designed roads in SA with speed bumps but taxi drivers found ways to remove them. Thus, to discourage taxi drivers from speeding, beneficiaries design the roads as described above. (Stock and de Veen 1995). Another example was found in Kenya's highland regions, as labor was more suitable for gravel road rehabilitation. The high population pressure forces farmers to till the soil up to the road's edge. In contrast to graders, which deposit material excavated from the drains onto farmers' land holdings, the laborers deposit material on the road surface to build up the road profile. Thus, grubbing material which cannot be used to build up the road profile can be deposited neatly on the farmer's land.

On the basis of the economic and social justifications discussed above, the international organizations targeted the LB methods as the most feasible program for the construction and maintenance of rural roads. However, few developing countries showed interest in introducing these methods into their road programs. Most government officials and engineers have held the common misconception that LB methods are a "primitive" alternative that uses no equipment. In fact, the international

organizations did not propose building developing countries' roads without using equipment; instead, they encouraged the use of the most effective combination of labor and equipment for road rehabilitation and maintenance. This can be translated as using labor and light equipment such as tractors, trailers, and cutlasses, to name a few.

Although the misunderstandings about the LB methods have been explained, some developing countries still resist adopting them. Why is this so? One factor is that a large proportion of engineers and decision makers for various other reasons choose not to consider the LB models. Another consideration is that, local sustainability and social questions, such as employment creation, have seldom been considered seriously in the context of executive decisions about road program implementation. Finally, there is a lack of unequivocal evidence on the cost effectiveness, quality and speed of a well-managed LB method for the construction and maintenance of rural roads (World Bank, Coukis; 1993, de Veen 1984; Beenhakker et al. 1987).

International organizations are attempting to address this problem, first, through program intervention by providing contractors with technical assistance and thus subsidizing the contractors' cost of adopting this new technology. The ILO is also introducing a payment system to increase worker productivity. The payment system will be based on a task-rate, whereby laborers are paid according to output, instead of time worked. According to the ILO, this system will motivate workers to work harder as their wages will be tied to output.

In summary, the key advantages of the LB methods are: (i) reducing foreign exchange costs, (ii) creating employment opportunities for men and women (iii) boosting the rural economy and (iv) involving communities in their own development. The opportunity offered by the LB methods needs to be taken into consideration, especially during this time of devaluation of the local currency in most developing countries. However, the implementation of the LB method requires a strong policy commitment from the governments of developing countries.

Chapter IV

An Overview of the Labor-Based Method

This chapter gives detailed overview of the LB method with various approaches drawing examples from other countries. I look at the implementation of various models, such as force account operations, small contractors and large contractors. The chapter also examines the advantages and disadvantages of these approaches.

As rural roads are continuously deteriorating and with the rapid rate of unemployment, policy makers are seeking ways in which they can utilize the vast unemployed. As stated in Chapter I, the LB method was initiated in the late 1960s by international organizations, such as the World Bank and the ILO. A World Bank study found that substituting labor for equipment for a wide range of construction was technically feasible and also produced the same quality product (Feb-Oct 1971). From November 1971 to October 1973, the World Bank used the LB method to examine its economic feasibility by performing field observation of construction activities in India and Indonesia. The study concluded that the labor based methods of construction were not economically competitive with modern equipment at a lower rate. However, it was noted that there was potential to increase labor productivity through (i) improved organization and management, (ii) improved tools and hardware and (iii) upgrading the health and nutritional status of the workers. The World Bank concluded that in low income countries, the labor -based method could compete successfully with equipment-based methods as long as the work is executed with better tools, high incentives and good management of the labor force. (Stock and Veen, 1995)

In 1975, the World Bank, with technical assistance from the ILO, financed projects in the following developing countries: Kenya, Honduras, Chad, Benin, Lesotho, Dominican Republic, Philippines, Colombia, Malawi, Guatemala, Ethiopia, and Mozambique. In these countries the LB method was implemented directly through the use of the force account system. In 1978, the force account agencies started contracting out to either small or large scale contractors. According to the World Bank's Guide to Competitive Bidding on Construction Projects in Labor-Abundant Economies, procedures such as designs, contract documents, project packaging, and the methods of finance projects were mostly biased towards equipment-based methods even where a more labor-based method could be justified. This guide further stated that contract and administrative procedures should be left neutral so that bidders would be able select the type of technology they desired. However, considerable attention should be given to the use of available resources (labor) in order to make the LB method more effective. (World Bank 1978b).

4.1. Methods for Implementation

In this section I describe the various ways in which rural roads have been implemented and new ways in which implementation can be structured.

4.1.1. Force account

Where the force account has been used, public agencies supervise, manage and control their equipment and labor directly. Force account agencies have played an important role in most of the history of construction in Africa. They are commonly found under a central government ministry of public works. Force account agencies

offer a number of advantages. First, the fact that the client pays the actual costs involved in construction, rather than an estimate that is calculated to include the overheads and profits of an independent firms, means that it should always be a cheaper way of building, provided that it is executed reasonably efficiently. Tanzania provides a good example. In the late 1983, force account operations were found to be as much as 60 percent cheaper than construction by contractors. (Wells, E. J. 1984) Force accounts also involve much closer control by the client over own construction operations and therefore, afford an opportunity to raise the standard of labor and control the quality of the finished product. Another good example of the force account model was implemented for Kenya rural roads projects. A program called the Rural Access Road Program (RARP) constructed 8,120 km of access roads between 1974 to 1992. In 1986, the RARP phased out and became the Minor Roads Program (MRP). This program used the LB method for rural roads rehabilitation. The program employs primarily low-income residents and pays them wages, increasing their cash earning and thus reducing the gap between the upper and lower income groups (J. J. de Veen, 1995).

The Problems

It must of course be recognized that the force account agency can only be as effective as the management that is appointed to direct it; and its performance can only be judged by the objectives which it is in fact set. Thus, despite the above advantages, the force account may also face constraints in the following areas: (i) employment practices, (ii) inadequate salaries, (iii) education requirements, (iv)

disbursement and procurement and (v) highly centralized and hierarchical administrative structure.

With respect to the employment practices, a country's government regulations may restrain the hiring and firing of casual laborers. In Honduras, for example, the labor laws state that if a laborer worked for more than two months before being dismissed, the worker had the right to receive another month's pay. To avoid this payment, a road agency could change the labor force every two months. By so doing, the labor agency loses all the accrued skills and experience of the workers, and frequent turnover further interrupt the road activities. (World Bank 1978b).

A second problem encountered by using the force accounts is usually the unattractive salaries paid by the government to their engineers or road employees. In most of the Sub-Saharan African countries, the salaries paid to government employees are usually below the going market wage, thus forcing employees to supplement their income elsewhere during regular working hours. For example, annual median salaries range from approximately, \$10,000 in Botswana, Lesotho, Namibia and Swaziland to \$6,000 in Zimbabwe, \$4,000 in Malawi, \$2,200 in Mozambique, \$950 in Tanzania, and \$650 in Zambia, just to name a few. These low salaries make it very difficult to hire qualified and experienced staff and have caused a large exodus of road employees to look either for a part-time job or move to the private sector where payment is much higher and with good benefits(Heggie 1995). This exodus causes a shortage of employees and often encourages governments in many developing countries to hire foreign expatriates and pay them international salaries with donors funding. For example, in Cameroon, employees on roads are not

adequately performing their jobs due to lack of salaries from the government for the past several months.¹¹

The third problem is government regulations on the educational requirements for hiring employees. Such regulations often require a specific level of education. This makes it impossible to hire staff who have little or no education. For example, in Honduras, the central recruiting agency of the government required all technical positions to be filled by candidates with a university degree. This puts the agency in competition with private agencies which pay higher salaries. Since the government found it difficult to recruit university degree staff, they finally agreed to recruit undergraduates to fill the shortage of applicants (Stock and Veen 1995).

The fourth problem is the disbursement and procurement procedures, which are bureaucratic and often delay the work. Further, most of the project funding runs through the central government, which can cause problems. For example, a central agency may prefer to purchase imported tools rather than high quality locally made tools. In some cases, the government bought the cheapest tools without taking into account productivity losses, e.g. Honduras (Cook et al. 1985). In other cases, there is a strict adherence to rules. In Kenya, for example, garden tools of inferior quality were used as the government insisted on awarding tenders to the lowest bidders regardless of quality (Stock and Venn 1995.)

The fifth problem that hinders the force account is its highly centralized and hierarchical administrative structure. Due to the fact that the force account is highly centralized and there is a lot of bureaucratic red tape, the use of the labor-based

¹¹interview sources from the Ministry of Public Works.

method will be very difficult to implement. The government can usually influence the construction and maintenance process through its payment procedures which involve the transaction of several documentation and signatures. In Honduras, for example, the force account programs, before paying the unskilled labor, required 35 administrative steps, involving ministries and several departments (World Bank 1986). In a survey carried out in some countries in sub-Saharan African countries pursuing the contracting route, an interim payment certificate may have to pass through 25 to 45 checkpoints before it is paid and irregular practices may delay each signature. (Latran 1993).

The Reforms needed

A well structured government road agency using the force account system can restructure its institutional policy by (a) changing its employment practices to be long-term basis in order, to retain a skilled work force; (b) improving its conditions for employment, by increasing its salary to make it a more reasonable wage. (c) relaxing requirements that limit employment to University degree holders and opening up to other applicants who are capable to do the job and (d) decentralizing the management structure. In Ghana, for example, the Highway Authority undertook the process of restructuring by introducing a new reward and career system, and reviewed and revised the disciplinary code and further decentralized the management of the roads to the local level (Heggie, p. 105, 1995). Mexico is a good example of a decentralized system. The success of the Directorate-General of Rural Roads Construction (DGCR) came from its decentralized system of management. DGCR

delegated authority to "Residencias Generales" (General Residencies) in each of the Mexican states which manage the planning, design and execution of rural roads construction within their jurisdictions. These "Residencias" further coordinate the work of special programs for the development of rural works (World Bank 1986).

4.1.2. Large-scale contractors

In countries where large scale contractors have been used, they usually rely on foreign firms or on an established domestic contracting industry to execute works. These established large scale contractors possess all the resources required to execute projects, such as labor, materials, machine, and money. They have the finances required for salaries and wages and the purchase of materials; and the credibility in commercial circles to obtain sureties, to open accounts with suppliers and to hire equipment. They also possess the managerial, commercial, technical and administrative skills required to secure and execute contracts. For example, in Ghana, a local road contracting industry was developed after independence and by 1991, 146 domestic contractors were hired using equipment for paved and unpaved road construction, rehabilitation and maintenance (Ofori 1991).

The Problems

In most cases, the large-scale contractors have a bias against using the labor-based method for construction and maintenance, as was demonstrated in the 1970s by international organizations, such as the World Bank and ILO. Even in cases where there is abundant labor and the wages are low, interview sources with the Ministry of

Public Works and some researchers have suggested that large-scale contractors still have a bias against LB methods. Most researchers have attributed this avoidance to developments in new technology that have drawn people's interest to use them and advance their knowledge. For example most of the construction methods used by developing countries often discourage the use of labor-based method. Further, in most countries large scale contractors have to comply with a set of minimum wage and unions agreement for hiring and firing of employees. This calls for concern in case a large labor force is used and the low wage may result in discontent and will increase the likelihood of a strike which would stop the work. Also, the cost of not using an equipment once it is bought and replacing it with labor would be very difficult for large contractors to bear.

The Reforms needed

The large-scale contractors can be encouraged to use labor-based methods through contract specifications. They can use sub-contractors to hire laborers for certain projects such as bush clearing, ditching and sloping. However, this type of strategy needs to be monitored and regulated to prevent the listing of "ghost" workers. For example, in South Africa, from 1985 to 1990, through the Special Employment Creation Program(SECP), the South African Government committed R719 to be used on "labor-intensive" construction and maintenance projects. Observers claimed that because the program was never evaluated on a routine basis, many laborers were "ghost workers", to conform to the numbers required by the government. (McCutcheon, ND 1991). This poor result of SECP has been attributed to

the fact that large contractors are being encouraged to use the surplus amount of labor but the job-creation potential of the project is never realized.

Another issue is that subcontracting usually is done informally within groups that are bound together by traditional ties of craftsmanship, tribe, caste, and religion. To operate on the competitive market and often with a high demand for its skills, these groups have a vested interest in restricting membership, a situation that is not very conducive to change (Edmonds and Miles, 1984). In Senegal for example, when large contractors were asked to recruit members, they recruited their extended families. Thus, instead of narrowing the gap in wealth distribution, the contractors defeated one major purpose of using the LB method and instead retained the wealth within their families.

4.1. 3. Small scale contractors

The labor-based method can also be expanded by using small scale contractors. In general, large firms sub-contract to small firms. Small-contractors usually provide laborers, while large contractors generally supply materials or equipment. Sometimes large contractors set up the administrative and quality control framework of the project. Thus, the only responsibility left to the small contractor is the management of the labor force. However, sub-contractors do not only act as agents for supplying labor for a fixed price or at an agreed rate. For example, a small contractor might agree to fix the centering for a bridge span at a certain price, with the large contractor supplying the necessary timber. The small-contractor will then supply and pay all the labor, for which the large contractor does not have any responsibility.

The benefit for the large contractor is that it is removed from the problems associated with the management of the labor (Edmonds and Miles, 1984). Beside managing labor, small-scale contractors also undertake certain other jobs. For example, a large scale contractor may grant the right or license to a small-scale contractor to market its goods. In South Africa, for example, COLAS, a large international bitumen manufacturer, has opted for this model as it finds it beneficial. Labor laws and regulation will get passed onto the small-scale contractor, who will be using COLAS's bitumen product. Although the small-scale contractor will not take part in converting raw bitumen into usable bitumen, they will acquire technical and financial assistance from COLAS.

The ILO and the World Bank have been promoting the execution of LB programs in the construction and maintenance of rural roads Sub-Saharan Africa, Asia and the Caribbean countries. In Botswana, with assistance from ILO and the World Bank, the Ministry of Local Government and Lands established a District Roads Improvement and Maintenance project in 1980. This department has since been in charge of the increased use of labor-based methods for road maintenance systems using the small scale contractor model. In Ghana, a very successful Department of Feeder Roads (DFR) a small contractor training programme co-financed by UNDP and the World Bank, has built up the capacity of the DFR to plan, manage and control labor-based feeder road improvement through small contractors. Since its start in 1986, some thirty firms have been trained in the effective execution of such work. These firms have obtained a set of light equipment and tools for compacting and haulage through a local bank. Each firm is able to rehabilitate some 20 km of gravel

road per year. Currently the ILO is assisting the World Bank in the appraisal of a ten year National Feeder Road Rehabilitation and Maintenance Programme (NFRRMP). Interesting elements of the NFRRMP include community-based maintenance, rural transportation pilot activities and a maximum utilization of the available labor-based contractors for feeder road rehabilitation. Before the project started, Ghana's Feeder Road had been deteriorating for many years. According to Mr. Mensah Gbedemah, Secretary for Roads and Highways in Ghana, it was very difficult to allocate sufficient resources for proper maintenance and the "force account" agency was not able to help out. Now they have been able to address their road problems under the assistance of the World Bank and ILO. Through this program, there has been support for the locally small-based contractors. The response from these contractors has been their commitment to the labor-based technology and the quality of roads they have being able to build. From the rural communities point of view, the benefits accrued have been in employment and cash in the pockets of the workers. Ways are being sought to expand the idea into other regions of the country.

In Asia, Thailand has successfully implemented the labor-based method on their rural roads projects using the small contractors. The rural road project began as a pilot project some five ago. Now, the Thai government has decided to set up a more ambitious programme covering several provinces of the country. The programme can count on an appropriate annual investment of US\$ 4 million. This programme is organized under a separate unit of the Public Works Department (ILO 1991).

The striking thing about the Thai Programme is that it has been wholly financed by the Government. Although there has been some technical assistance from the ILO, the programme is staffed by Thai personnel. The Thai programme is effectively managed. It has a well defined administrative and logistic system. It is developing an effective monitoring system and it is also producing good quality roads at competitive prices. Another interesting feature is that this project has produced a whole range of innovative intermediate equipment for hauling, compacting and spreading. There are, however, issues still to be resolved regarding the maintenance of the completed roads and how the funds going into the rural areas through the programme can be used to generate longer term employment and income. (Ganesan, S. 1982)

In Kenya, the ILO has had a long standing successful involvement in the implementation of the large scale labor-based rural access roads and minor roads programmes. A new ILO executed regional programme of Advisory Support, Information Services and Training (ASIST) has been set up in Kenya to assist in the coordination of the donor community involved in the Minor Road Programme. ASIST trains engineers and managers of LB road programmes. Their principal activities involve policy advice, project and programme design and reviews, coordination of externally funded activities, and technical advice to staff.

Although small-scale contractors play an essential part in using the LB method as service providers as well as employers, they encounter many problems which lead to high failure rates. These failures have meant that small contractors cannot establish themselves to cooperate with larger firms. Therefore, in many sub-Saharan African countries the road construction industry is split between many large

contractors and very few small contractors, which makes it very difficult to implement the LB method. Most of the large-scale contractors will bid high for all the contracts and use the EB method more.

The problems faced by small scale contractors are lack of managerial, administrative and technical skills to help them improve their performance and allow them grow. Second, small contractors lack financial resources to purchase materials, tools and pay wages. Third, they lack the credit and sureties for the procurement of materials. Finally, they lack the knowledge to enter the tendering procedures and contract documentation.

The Reforms needed

Emphasis should be placed on educating contractors on tendering procedures and contract documentation, the acquisition of basic technical and administrative skills, and the employment and supervision of labor in order to avoid "ghost workers" - although this might not stop their use. Countries using small scale contractors should offer the contractor the opportunity to mature, eventually, into conventional contractors, who have sufficient resources to execute a project (Watermeyer, R. B. 1992). Such a strategy should allow small contractors to develop commercial skills, managerial and administrative skills, credibility in commercial circles and experience in pricing complete contracts, while accepting increasingly greater risk and contractual responsibility. Watermeyer (1992) proposes a model for increasing the number of small-scale contractors for the use of the LB method.

Table 4. Level of developing small scale contractors

<i>Level Type</i>	<i>Contractor's contractual responsibility</i>	<i>Construction/materials managers duties</i>
1	Provide labor and small tools	Offers advice, practical assistance and training; provides and distributes materials, finance wages
2	Provide labor, small tools, minor materials, finance and administers transport for distribution and collection of materials	Offer advice, practical assistance and training, issue most of the materials, and finance wages
3.	Provide labor, small tools materials, transport and finance wages	Offer advice, practical assistance and training, tools and material
4	Provide labor, all materials, transport finance all contractual aspects including the provision of surent	Offer advice, practical assistance and training, materials for purchase
5	Provide all labor, plant materials finance all contractual obligations	Offer advice and consulting services

Watermeyer 1992 Contractor Development in Labor-based Construction. The Contractor Development Team, Johannesburg, South Africa

The procedure produced by Watermeyer identified five levels of small contractor development. At each successive level, the contractor's responsibility is increased and the management function of the professional team is diminished. As the level of development increases, contractors become responsible for the distribution of materials, the financing of wages, the procurement of materials, the furnishing of sureties, and the degree of protection (by the assigned manager) is progressively reduced. This program gives small-scale contractors the opportunity to develop managerial skills and financial expertise and resources. They reach higher levels of the contractor skills only after undergoing successive development in the contractor development program. Not all contractors will advance to level 5. Some may reach level 2 or 3. Similarly, not all projects will be sufficient to permit the introduction of all 5 successive levels of contract. Finally, implementing this small-contractor model requires a sound legal system that will foster its execution.

Similar to the Watermeyer model, AGETIP (Agence d'execution des travaux d'interest public contre le sous-emploi) is a non-governmental agency established in 1989 in Senegal to manage the bidding, contracting and execution of a series of

small-scale public infrastructural projects on behalf of municipal construction authorities in Senegal. AGETIP is part of a World Bank-sponsored jobs creation program in the Senegalese informal sector. The Agency is an independent executive unit managed by private sector staff. Since the purpose was to employ informal sector labor, all the procedures of the Agency were designed with the abilities and limitations of small and medium scale enterprises (SMEs) in mind (OECD, 1993).

First, AGETIP designed a program to make potential small and medium scale contractors aware of the existence of the Agency, as well as its bidding procedures, payment plans and adjudication schedules. This enabled potentially broad participation of the informal sector. The Agency's contract bidding procedure and its required bureaucratic documentation are simplified to allow SMEs participate more easily. The notification procedures are designed to permit even non-literate contractors to understand and be able to identify who had won which bids.

To facilitate the contracting process, simplified versions of model contracts written in non-legal lay person's language are distributed to the bidders. Those bidders who lost out in the bidding process are offered guidance on how to improve the quality of their bids in the future. This is done by showing them how to identify the components of a good bid. Those who win are then enrolled in a series of short management courses covering such issues as record keeping, accounting, stock control, and other aspects of project operational management. Foremen and site supervisors are trained in the technical management of construction jobs and how to raise the productivity of their workers. AGETIP also provides ad hoc on-the-job training in specific construction techniques.

It was discovered that payment delays were a major disincentive to workers and suppliers. To avoid lengthy, discouraging payment delays, the Agency arranged with the government to make World Bank credit readily available in the form of a series of advances of liquid funds. The Agency also assembled a team of supervisors and auditors to guide the payment process. The efficiency of the AGETIP's payment system was such that the entire process from invoice receipt to actual payment took an average of just eight days. Between 1989 and 1992, AGETIP contracted out almost 200 projects and had some 800 small and medium size construction firms on its roster. These firms perform infrastructural projects from street repairs and sanitation to the rehabilitation of urban building.

Finally, assisted by a group of local management consulting firms with expertise in technical training, AGETIP designed and administered series of training seminars addressing micro-enterprise management, taxation issues, financial management, and how municipal authorities can use computers to raise the efficiency of their work. All these measures not only raised the quality of the final project but also offered new and enhanced skills to the contractors and laborers. In addition, it introduced the contractors to the public contracting business.

The AGETIP case illustrates the benefit of concentrating just on the construction sector. AGETIP succeeded in designing a set of focused training classes geared specifically to the needs of the informal sector members who are interested in applying their skills to public works projects. Many high-cost training programs have less impact than expected because they focus on either supply or demand, to the exclusion of the other. AGETIP's approach closely matched the

supply function of the construction industry (labor availability, workers skills, training programs, lending agency funding), to the industry's demand function (demand for socially beneficial public works projects and in the future for skilled labor) in a way that heightened the motivation of all those involved in the project. Since training was linked to the immediate needs of a particular set of development projects, the turnout for the training seminars was enthusiastic, with a large majority of contract winners participating.

The success of AGETIP can be attributed to the fact that during that period of the late 1980s Senegal was in the midst of a severe economic recession, high inflation, high unemployment and other harsh effects of rigorous structural adjustment programs. Thus AGETIP was formed for the purpose of job creation by benefiting from the availability of low cost of implementing projects with the labor-intensive method. Other success factors include the following: First, wages of the employees are much higher than those of the public agency and this therefore attracted highly motivated and experienced staff. Second, AGETIP hired local consultants to prepare design and bid documents as well as supervise their work, thereby reducing its own staff. Third AGETIP received donor funding (i.e. the World Bank). Because of outside funding they are constantly subject to monitoring, auditing including financial and technical.

AGETIP has spread to some of the African countries such as Benin, Burkina Faso, The Gambia, Madagascar, Mauritania and Niger. It ought to be borne in mind that without donors to support it, AGETIP might not be able to function efficiently. If

AGETIP was financed by the Senegalese government, its ability to pay workers in a timely manner might have been curtailed due to internal economic troubles.

In order to choose the appropriate model for the labor-based method, the table below compares the main models according to the following features: payment schedules, institutional reform, ability to work with the government and long-run efficiency.

Table 5. A Comparison of all the models

Models	Payment Experiences	Institutional reform	Government experiences using these models	Long-run effect
Force account	have experienced delayed payment but this can be rectified if a secure fund system is establish	needs an institutional reform in order to implement a labor-based method	this has been very risky for the government as they must deal with government procurement and labor regulations that will affect their ability to complete a project	have shown inefficiencies in the long-run throughout payment delays
Large-scale contractors	avoid payment delays by paying workers on time	does not really need institutional reform as it is well established	working with government is less risky as they already possessed the skills required for contracting projects	inefficient as it is not cost effective for contractors to substitute labor for equipment. It will also be very difficult for the government to implement the use of labor-based method in the long-run.
Small-scale contractors	have experienced delayed payment but can be eliminated if a secure funding system is established	requires time for development and institutional reform is needed	can be risky for the government as they lack the experience in securing contracts and are not financially stable	provides a long term answer for the use of labor based method if given the opportunity to compete
AGETIP	successful with regards to timely payment	has been designed by donor agencies to expedite the development of small-scale contractors	will also be risky if some of their deals will pass through the government. This might encounter bureaucratic red tape	has shown a effective result in the long-run with the use of small-scale contractors

4.2. Selecting an appropriate model

The above table gives a comparative view of choosing an appropriate model. one of the most critical issue for success of the model is timely payment to the

laborers. The large-scale contractor model presented in this chapter shows the ability to pay their laborers on time. The AGETIP model also shows success with regards to timely payment but this success is guaranteed by donor funding. The two models that experience difficulty in payment are the force account and the small-scale contractors. With the force account delayed payment eliminated if bureaucratic red tape can be minimized. The small-scale contractor can have successful timely payment if a secure funding system is established.

Institutional reforms are not really needed for the large-scale contractors. The large-scale contractors are already developed, have experience with tendering documents, are financially stable and can purchase or rent equipment. For the force account model, they need institutional reform in order to expand the labor-based methods and operate efficiently. Force account models must ensure a steady flow of funds and be free from bureaucratic red tape. Similar to the force account model, the small scale contractors need time for development and institutional reform in order to expand the use of labor-based methods. This will involve areas such as secure funding and improve business environment for small-scale contractors. Under the small-scale contractors, project designers may choose to adopt the AGETIP model to expedite the development of small-scale contractors.

The government experiences working with the large-scale contractors model has been less risky, as the large-scale contractors are well established and possess the skills necessary in construction management. The force account models are riskier as they involve a lot of bureaucratic red tape that hinders project completion. Working with the small-scale contractors can also be risky for the government as the

contractors do not really have the experience and lack adequate finances. Using the AGETIP model will reduce some of the risks involved with the government as the model is closely monitor by a donor agency.

The long-run effect of using the large-scale contractors model will be to persuade the contractors to use the labor-based method, when the contractors have already been using equipment-based method for their projects. The insistence on using the labor-based method might lead to non-productive labor or "ghost workers". The force account model has inherent inefficiencies in the long-run. For example, they often suffer from serious payment delay. With the small-scale contractor model, the long-run effect can yield efficiency if given the opportunity to develop. This can be done either through the AGETIP model or through a direct small-scale model; however, it all depends on what the government's institutional strategy is. If there is a way to expand and develop the small-scale model then the direct model should be used, but if the road agency is extremely corrupt as in the case with Senegal, then an AGETIP model will be more suitable. Here, a donor agency will design all the institutional policies and reforms and the road agency will constantly undergo auditing from the donor agency. However, the final analysis of what model to chosen depends on what commitment the government has for its people as well as the type of reforms needed in order have the model work in the long run.

Despite the great advantage of using the labor-based method with emphasis on small scale contractors in most of the rural roads projects in developing countries (sub-Saharan African in particular), the model is yet to develop fully, particularly with regard to contracting. This chapter has examine the various models of implementing

labor-based method by looking at comparative views of these models. To successfully select an appropriate model will involve a very comprehensive legal, administrative and institutional support for firms that would like to use the LB methods. This will have to be achieved within a national policy for regulation and development of the activities of the overall contracting sectors. These policies and institutional support cover areas of licensing of the contractors, advance payment to contractors, construction equipment, and promotion of small-scale contractors.

Chapter V

Proposed Model For Cameroon

The experience and success of using the labor-based were highlighted through examples of different countries in the previous chapter. This chapter draws from these examples and begins to put together a proposed model for Cameroon. In order for any successful change in the road transport sector to happen in Cameroon, there has to be widespread institutional reform. Coupled with this reform, there needs to be a period for experimenting with a series of pilot projects, in order to fully learn how to implement an appropriate model effectively. In this chapter I will propose institutional reforms, procedures and steps for implementation of the proposed model.

The field and literature research I conducted during 1995 showed that the existing roads in Cameroon are inadequate and poorly maintained and that available data and institutional capabilities are very limited. The endemic rural road deterioration has created a crisis in the whole transport sector. In fact, the economic effects of neglecting rural roads are borne by the road users in the form of increased vehicle operating costs, which makes it difficult to integrate regions economically. Arresting the deterioration will require serious government commitment and a change in attitudes and behavior towards rural roads. Changes in policy and improvement in institutions and management, as well as reliable financial inputs to the road sector will also be necessary.

5.1. Institutional Reforms

An extensive review of literature and conversations with public and private officials suggest that the effective management of the rural transport infrastructure requires an inventory of the extent and condition of the rural transport network, an assessment of its users, and identification of the agency responsible for it. The rural roads that are classified are managed by the central government, and the unclassified rural roads are hardly known to the Ministry in charge of transportation or of public works. The required inventory will help to prioritize and plan for rural road construction and maintenance.

Decentralization of the rural road agency is very important, particularly where the centralized agency is far away from its constituents as in Cameroon. The central government should establish decentralized rural road units (maybe in the Ministry of Public Works or in a separate local NGO). Responsibility for everyday policy and planning for rural roads should be delegated to this unit, which can work with local governments depending on their involvement with and capabilities for managing rural roads.

The institutional reform is an ongoing process that should be developed over the long term, but there is a recommended sequence for reform. First, an assessment of the country's experience should be undertaken and problems defined; second, policies should be formulated with a fleshed-out rural road strategy and a defined institutional chain; third, implementation should be undertaken by putting the organizational structure in place.

Management. As there are a multitude of centralized, uncoordinated agencies in Cameroon that are involved with rural roads projects, these road networks would benefit if coordinated decentralization were undertaken. Decentralization of responsibilities would increase responsiveness, accountability and coordination (Galenson and Calvo 1994). One way of delegating functions can be drawn from the experience of Kenya and Ghana, where separate departments have been set up under the central road ministry in charge of rural roads projects. Likewise, in Nigeria, a Ministry of Local Government was created to delegate day-to-day operations to the local authorities. More research is needed to determine the best model for Cameroon. Whichever institutional framework is adopted, the rural road agency should be given the autonomy to frame policy, plan rural road projects, and manage funds. In order to implement these functions, the agency needs to have sufficient human and financial resources available.

The rural road agency has to be looked upon to some extent as a business entity, with a mission clearly defined. Once road users are involved in the management of roads (see below), they will tend to press for better road management, which requires the introduction of sound business practices to ensure that users get the value of the money they donated. Some of the required reforms include clear management objectives, satisfactory terms and conditions of employment, consolidated budgets, commercial cost systems, and an effective management system.

Emphasis should also be placed on the maintenance of rural roads. According to interviews in Cameroon: "Building a rural road is one thing but maintenance is

another problem on its own." Further, "most political elected bodies will act immediately when it comes to creating new roads rather than spending money on maintaining what is already on place." Since the management structure for rural roads maintenance is very weak in Cameroon, one cannot be sure if decentralization of responsibilities of the road network will automatically lead to greater attention to the maintenance issue. However, the agency to be involved in rural roads must be required to set up priorities as to how to undertake the critical maintenance work.

The above key institutional reforms, if undertaken, will insure more coherent planning, coordination and a clear definition of management and maintenance responsibilities, as well as help to develop methods for financial resource mobilization and prioritization of expenditures.

Ownership: Institutional reform should involve the road users in the management of rural roads. The idea of ownership is to empower the local communities and encourage them to take a vested interest in the management of rural roads. That is, the local communities should be made aware of the need for their contribution and their ability to participate in the rural road projects. Ownership can be set up through local organizations, such as farmers cooperative organizations and other community groups, many of which exist in Cameroon. When local communities are involved in road projects, they are willing to contribute to the better management of their rural roads.

It is also important to establish a system whereby the local communities are made aware that they can contribute to the maintenance of their own roads. This can be done by having a development worker assist in setting up a local organization

and devising a plan for the management and financing of road projects, with some technical assistance provided by the relevant agency of the central government. This type of set-up will encourage local contributions or provide other means of harnessing of resources (or other self-help) for rural road projects.

Financing: Reform should establish an adequate and stable flow of funds and a better way of channeling the funds to the local agency or agencies involved in rural road projects. This reform should start from the budgeting side, with a clear service assignment from the central government to help eliminate redundancy or inadequate provision of funds. Furthermore, there should be an enhanced fiscal role for the local authorities or NGOs and built-in incentives to use the money effectively. The reform should also develop expenditure guidelines to minimize the incidence of arbitrary decisions.

Given the budget constraints at the community level, it is important to create a means of raising funds for long-term sustainability of rural road projects. This can be done in part by community contributions, as noted above, but it would also be necessary to open a separate road fund for rural roads. Funds can be raised through land taxes, business taxes (market leases), agricultural taxes, and in-kind contribution of land, labor and materials. This system can work best if the local communities are made aware of where and how their funds are being invested.

The costs of road maintenance should be borne primarily by the road users. If this is the case, there will be an incentive for maintenance. In rural areas where roads often become impassable during the rainy season, poor road maintenance also has a profound effect on agricultural production. When a road is not maintained -- and is

allowed to deteriorate -- each dollar saved on road maintenance increases vehicle operating costs by \$2 to \$3 (Heggie, 1995).

Implementation: The expansion of rural roads activities means recruiting and training new and old staff. Unskilled labor can be hired locally on a temporary basis. In-house training should be designed. The staff of a rural roads programs does not necessarily need to be fully trained engineers. Although engineering skills are required in order to execute a sound road improvement program, management skills and the ability to work well with different kinds of people under difficult site conditions appear to be more important.

Hiring local staff is one way to improve communication between agency staff and beneficiary groups. These persons will assist the project by transmitting information concerning local needs and priorities to agency staff as well as communicating agency plans to the community.

5.2. Procedures and Steps for Labor-based Method Implementation

Before starting a pilot project, a branch within the Ministry of Public works or a separate local agency to deal with rural roads should be established. This agency should emphasize the use of local small-scale contractors which will be involved with the use of the labor-based method.

The first step in designing a pilot project is to select an appropriate technology given the road benefits and costs. Rural road construction costs are a function of the type of method used in the construction process. In this case construction costs are those involved with carrying out the various physical operations for building the rural

roads. For example: clearing, excavation of earth, compacting and grading, production and hauling, laying of base course and surfacing , and drainage and structure (Allah and Emonds, 1979)

To estimate the direct construction costs, project evaluators must have access to input data, including a detailed inventory of all the various technologies involved in the construction process. An example of an input inventory using the labor-based method would include excavation with picks, shovels, wheelbarrows for loading and unloading trucks and unskilled labors and foremen. Given the units of labor, equipment, and materials construction costs can be estimated.

Indirect costs are usually borne by road users, and so are the costs of negative externalities resulting from the rural roads projects. For example, costs such as despoiling the environment and injuries to workers are usually dealt with separately.

In calculating the benefit of rural roads, it would be possible to determine such factors as a reduction in user costs of gasoline, vehicle depreciation, wages, and nonuser impact such as local employment and income generation. If the traffic volume is low, as it will be in some of the cases in rural roads in Cameroon, there will be no need to use a high-speed design.

After completing the planning and cost-effectiveness of the pilot project, participants need to be prepared to undertake the training. Training in project management for road engineers and supervisors is essential. The following should be included in the project management programmes:

- General management, including over-all understanding of technical as well as economic aspects of the projects, especially cost-benefit analysis and network-planning methodology;
- Operational management training on the machines and the labor force, with an emphasis on basic training in the use of the work techniques;
- Accountancy and financial management, with special emphasis on cost accountancy and the rate of return on capital investment;

Human resources management, including understanding of the importance of incentives and motivation, attitudes of the labor force towards their work, etc, is also required. The training program should include instruction on the employment creation potential of the labor-based method.

The small-scale contractors chosen to take part in a LB method also need training. An essential part of the pilot project should be the training of supervisory and other site and office personnel and this should be provided by the government. The technical assistance provided will be through theoretical and practical training. In this training the contractors will learn the following: labor-based construction techniques, work programming, site organization, setting task work, reporting and control, incentive bonus schemes, quality control, cost and estimation, and mechanical maintenance. Following the training stage, the small-scale contractors will be assessed according to their performance when working on their own. However, technical advice and close supervision should still be provided by the central government.

5.3. Conclusion

This thesis has presented strategies for the construction and maintenance of rural roads in Cameroon. The research examined the experience of different African countries as well as some countries in Asia, and contrasted the strengths and drawback of two alternative methods: the labor-based and the equipment-based method. Based on these experiences, I outline a strategy to make more efficient use of local resources through the use of the labor-based method.

The framework for managing rural roads in Cameroon is deficient. Too many agencies are involved with rural road projects. Although rural roads are seen as part of the national road network, they are not overseen by the government. Rural roads should be engineered as part of the national road network, as they carry motorized traffic and therefore require a certain level of technical, logistical, and managerial support (Heggie, 1994.). In Cameroon there is a fragmentation of responsibility for management of rural roads and uncertainty about the size and location of the network. A well established framework for the main rural road networks will help set the stage for better management.

In Cameroon, the rural road network is not adequately prioritized, there is lack of funding for maintenance, and the institutional capacity to establish more funding is lacking. The most pressing issue is the reallocation of domestic and external resources to balance new construction with maintenance of old roads. Given the present financial constraints, reallocation of the rural road budget might limit investment for new roads. Thus, more emphasis has to be placed on maintenance and rehabilitation of existing roads.

Labor-based methods of rural road maintenance represent an effective tool for improving maintenance and creating employment. There are, however, a number of barriers to more widespread use of labor-based method. In chapter three I identify reasons found in literature explaining why government officials express preference for the EB method over the LB method. The literature states that EB methods: (i) can rehabilitate gravel roads faster than LB methods; (ii) meet much higher engineering standards than LB methods; (iii) minimize management problems as fewer employees are required for the construction of roads projects; (iv) command more funding than LB methods when donors will finance only the foreign exchange costs of a project; and (v) offer political benefits because government officials can quickly mobilize equipment to work for their constituents.

Although much has been written about why governments have been adverse to using LB methods, my research shows that LB methods are financially competitive with EB methods. As shown in chapter three, LB methods provide a cost-effective alternative to EB methods for both road rehabilitation and maintenance. Second, LB methods generate employment on the road sites. Third, LB methods reduce a country's expenditure on imported equipment and, thus reduce dependence on scarce foreign exchange. Fourth, LB methods generate incomes in the rural economy. Finally, the LB methods involve the community in their own development. My research indicates that these advantages can be applied to Cameroon.

Following a discussion of institutional reform, I propose labor-based method implementation beginning with a pilot project. The effort would mobilize available local resources, such as small-scale contractors and the underemployed labor force.

Specific recommendations include: an emphasis on employment generation, and the establishment of an administrative mechanism to coordinate and monitor vital road projects and to develop a systematic information management system. In addition, there is a need to develop reliable funding mechanisms and to ensure greater accountability in the use of funds. Eliminating the force account method and increasing the use of local contractors would be a sound first step in this direction. In agreement with most developing agencies, such as the World Bank and ILO, my study tends to confirm that adoption of the labor-based method and incremental policy reform (decentralization, ownership, financing and management) can accomplish more in the construction and maintenance of rural roads than the alternative equipment-based method. Systematic research, however, has to be done to select the specific form the LB method would take in Cameroon. The starting point for reform in this case would be the systematic collection of basic data.

Appendix 1

List of Personnel Interviewed

- Mr. Jean Pierre Kedi, Director of highways infrastructure -- Ministry of Public Works
- Mr. Ntonga Emmanuel, Coodinateur IER. Cellule PST, Ministry of Transport
- Mr. Sindeu Jean Bernard, World Bank Office -- Coordinator of projects in rural roads
- Mr. Kingston Aparara -- Senior Project Officer -- World Bank, Cameroon
- The Director of Agriculture -- Ministry of Agriculture
- The Director of Community Development
- Mr. Jerome Obi Etta--retired, used to be Deputy Manager of Highway infrastructure
- The Director of Caisse Francaise de Developpement
- Non Governmental Organizations

Appendix 2

Questions for Construction and Maintenance of Rural Roads in Cameroon

Institutional Framework

- Please describe the laws and agencies that are responsible for the construction and maintenance of rural roads.
- What is the administrative structure of the highway department? (a) Are the staff informed of their responsibilities?
 - (b) Is there any kind of job training in place?
 - (c) What does it consist of ?
 - (d) Would you say that workers are adequately trained and motivated?
- Describe any constraints that may have hampered construction?
- Who handles the financing of construction and maintenance?
- What are the criteria for evaluation of investments?
- Describe the regulations and procedures for potential donor agencies.
- Who is responsible for maintenance: the national government or some local government?
- Is your agency's road network classified into different categories? (i.e., primary, secondary, tertiary, community etc.),
 - (a) Please describe each category and its corresponding length (in km.)?
- Is the Ministry of Public Works evaluated in any formal way? What have been results in the past?

Project Development:

a) Planning and Programming

- How are rural roads planned?

- What are the design standards used by the highway department?
- What methods are used to assess the demand for rural roads?
- Who is responsible for the planning and programming of road maintenance?
 - (a) What is the position of the individual?
 - (b) What is his/her relationship to the organization?
- Describe the current transport modes. i.e., human, animal, or motor-powered means?
- Are people walking on the roads countered as traffics/humans/animals. Are these things survey?
- What steps are used to incorporate the local community in
 - (a) planning,
 - (b) execution, and
 - (c) maintenance of rural roads?
- What are the extent and conditions of the rural road network?
 - (a) number of km of district roads, community roads, tracks, paths etc.?
 - (b) number of bridges and water crossing?
 - (c) number of links to the rest of the road network.
- What is the density # of km/per square mile?
- What is the number of “ford” similar to bridges?
- How many of the bridges are in good conditions?
- How would you describe the present condition of rural roads?
- Describe how rural roads are being used (e.g. by vehicles, animals, or pedestrians)
- To what extent are private industries involved in road development?
 - (a) Can you think of any particular companies which have undertaken rural road development themselves?
 - (b) How successful or effective have they been?
 - (c) Do they have any control on the roads?
 - (d) How much of the mileage do they maintained?
 - (e) Do they construct and maintained the roads competently?

Implementation:

- Describe government policies for implementing rural roads projects.
- Are there any special programs implemented on a yearly basis. What are the sources of revenue?

Bids and contract

- What are the current procedures for bidding?
- What type of
 - (a) contracting?
 - (b) procurement is being undertaken?
- How many are employed
 - (a) What level of skill is required?
- Who approves for bidding?
- Can I see a Term of Reference (TOR) for a highway bid?
- How many people are employed?
- Are they privatized?

Construction

- Are there government policies for how rural roads should be constructed?
- What are the different kinds of roads, lengths/width and construction materials?
- What is the balance between the labor-based and equipment-based methods?
- What is construction phased, or prioritized?
- Describe the current method of construction.
- Should construction be as labor-intensive as possible or rely heavily on machinery?
 - (a) Is this the favored mode of construction? Why?
 - (b) Has any other method even been tested?
 - (c) Would you say that the present model relies more heavily on labor force?

power or on machinery

- Describe the type of equipment used for construction and maintenance.
- Is there any policy to encourage, or even require, labor-intensive methods?
 - (a) if so what is it?
- What have been the arrangements for supervision of construction?
 - (a) How is it evaluated?
 - (b) How is it paid for?

Maintenance

- How is maintenance planned?
 - (a) Please provide information on the type of maintenance in place (for example, routine or periodic maintenance)?
- What techniques are employed to assess road conditions?
- How is maintenance executed:
 - (a) Organizational structure?
 - (b) Equipment?
 - (c) Personnel?
 - (d) Work methods?
 - (e) Material used?
- What are the procedures for emergency maintenance?
- How is maintenance calculated?
- How is it overseen?

Project management

Selection of maintenance of rural roads:

- Describe how the rural roads are selected for maintenance
- Describe how communities contribute to the construction and maintenance of rural roads
- What was the last inventory taken?.

- (a) Do these inventories cover location and classification of the roads
- Describe any particular industry (ies) that has influence rural road development?

Budgeting

- From your point of view where do you need help the most?
- Please describe the planning and budgetary procedures of rural roads projects?
 - (a) For example, what is good for the public work organization is not necessarily good for the Finance Ministry, and vice versa.
 - (b) Does the organization that deals with roads maintenance have stable and reliable sources of funding
 - (c) Please describe the types of funding sources?
- How is the budget allocated among regions, provinces or districts for the construction and maintenance of rural roads?
- What was the budget for the previous 5 years, adjusted for inflation?

General

- Is there a need for rural road development and improvement?
 - (a) why?
- What effect does rural road development have on the rural community?
- What has been the impact of Decentralization on the construction of rural roads? I will discuss this with the World Bank resident mission.
- Does the national policies leads to a better management of rural roads?
- What is the responsibilities of various units in the Ministry of transports?
- What are your most training deficits?
- What is the process of creating highways -- land acquisitions etc.?

Bibliography

- Ashong, K. 1993. "The Use of Small-scale Contractors in Labour-based Road Rehabilitation and Maintenance in Ghana: Evolution from 1986 to Date." Accra: Ministry of Roads and Highways, Department of Feeder Roads.
- Barwell, Ian and Calva, Christina. February 1989. "Market Integrated Rural Transports Project: The Transport Demands of Rural Households: findings from a village-level travel survey," ILO, Geneva
- Beenhakker, Henry, S. Carapetis, L. Crowther and S. Hertel. 1987. Rural Transports Services - A guide to their Planning and Implementation. Intermediate Technology Publications, London.,
- Bentall, Peter. 1992. "Aspect and Background for Labor-based contracting - the Ghana Experience," in a Report of Proceedings, 2-6 March 1992. Gerrit Bosma and Bjorn Johnnessen (Eds). Geneva: ILO
- Calva, Christina Malmberg and Silverman, Jerry. 1995. "The institutional Framework of Rural Transport Infrastructure. Sub-Saharan Africa Transport Policy Program. The World Bank and Economic Commission for Africa. Working Paper No. 17.
- Carapetis Steve, Levy Hernan and Wolden Terje. The Road Maintenance Initiative. Building Capacity for Policy Reform. Vol. 1. Report on the Policy Seminars. Sub-Saharan Africa Transport Program.
- Carapetis, S, Beenhakker and Howe. 1984. The Supply and Quality of Rural Transport Services in Developing Countries. A Comparative Review. The World Bank. Washington, DC:
- Connerley, Ed and Schroeder, Larry. 1995. "Rural Transport Planning" Sub Saharan Africa Transport Policy Program. The World Bank and Economic Commission for Africa. Working Paper No. 19.
- Cook, Cynthia C., Henri L. Beenhakker and Richard E. Hartwig. 1985. "Institutional Considerations in Rural Road Projects". World Bank Staff Working Papers No. 748.
- Coukis, Basil. 1983. Labor-based Construction Programs: A Practical Guide for Planning and Management. Washington, DC: World Bank.
- David, L. Chicoine and Norman Walzer. April 1987. Financing Local Infrastructure in Nonmetropolitan Areas. New York. Praeger.
- de Veen, Jan 1994. "Guidelines on the Introduction of Employment Intensive Technologies in Large Scale Road Sectors Programs". Draft. Geneva: ILO.

Edmonds G.A. and D.W.J. Miles. 1984. Foundations for Change. Aspects of the Construction industry in developing countries. A study prepared for the International Labor Office within the framework of the World Employment Programme with the financial support of the Swedish Agency for Research Co-operation with Developing Countries. Intermediate Technology Publications. London.

Edmonds, G. A. and J. J. de Veen. 1992. "A Labor-Based Approach to Roads and Rural Transport in Developing Countries." International Labor Review, Vol. 131, No. 1.

Estache, Antonia. 1995. Decentralizing Infrastructure. Advantages and Limitations. World Bank Discussion Papers. Number 290. Washington, DC:

Ganesan S. 1982. Management of Small Construction Firms. A case study of Sri Lanka, Singapore, Hong Kong, Thailand, The Philippines and Japan. Asian Productivity Organization Tokyo.

Gaviria, Juan, April 1993. "Analyses of Rural Transport and Economic Development in Less Developed Regions of Sub-Saharan Africa," Dissertation Series. Institute of Transportation Studies. University of California at Berkeley.

Gaviria, Juan, Vishva Bindlish and Uma Lele. 1989. The Rural Road Question and Nigeria's Agricultural Development. Managing Agriculture Development in Africa Discussion Paper 10. Washington. DC: World Bank.

Gessellschaft, Carl. Duisberg. The Road Maintenance Initiative. Building Capacity for Policy Reform. Vol.3. Guidelines for Policy Action Planning. Sub-Saharan Africa Transport Program.

Heggie, Ian G. 1995. Management and Financing of Roads. An Agenda for Reform. World Bank Technical Paper Number 275. Africa Technical Series.

Howe, John. "Conceptual framework for Defining and Evaluating Improvements to Local Level Rural Transport in Developing Communities," World Employment Programme, ILO Report # CTP. 19, Geneva, 1983.

Howe, John and Deborah Fahy Bryceson. 1993. "Women and Labour-based Roadworks in Sub-Saharan Africa," in Labour-Based Technology: A Review of Current Practice, Report of Proceedings, 27 September - 1 October 1993. Zimbabwe: ILO.

Hussian, M.I. 1993. Rehabilitation and Maintenance of Roads in Nigeria - Choice of Technology and Implementation Issues. Paper prepared for Road Maintenance Initiative Seminars, Federal Ministry of Works and Housing. Nigeria: ILO.

International Labor Organization. "Notes on Rural Mobility", Geneva, 1988

Muller J. April 1970. Labour-Intensive methods in low-cost construction. International Labour Review Vol. 101, No. 4.

McCutcheon, R. T. ND. "Employment Creation in Public Works. Labour-intensive Construction in Sub-Saharan Africa: The implications for South Africa." Johannesburg: Department of Civil and Environmental Engineering, University of the Witwatersrand.

Pickering, David., Park and Bannister. 1993. Utility Mapping and Record Keeping. Urban Management and Infrastructure. Vol. 10. UNDP/UNCHS/World Bank. Urban Management Programme.

Riverson, John D. N. , Juan Gaviria and Sydney Thriscutt. June 1990 "Rural Roads in Sub-Saharan Africa: Lessons from bank Experience". Sub-Saharan Africa Transport Program, World Bank, Washington, D.C.,

Schleifer, Andrei. "Establishing Property Rights" 1984. Paper Prepared for the World Bank Annual Conference on Development Economics, Washington, D.C., April 28 and 29, 1994.

Smoke, Paul 1993. "Local Government Fiscal Reform in Developing Countries: Lessons from Kenya" World Development. Vol. 21, No. 6 pp.901-923

Stock, Elizabeth Anne. 1995. "Why Labor-Based Programs have had limited success and what to do about it: Evidence from Ghana". Department of Urban Planning, Massachusetts Institute of Technology, Cambridge, MA.

Stock, Elizabeth and Jan de Veen. 1995. "Expanding Labor-based Methods in Road Programs" Sub-Saharan Africa Transport Policy Program. Working Paper No. 18. The World Bank and Economic Commission for Africa.

Tendler Judith. 1979a. "New Direction in Rural Roads." A.I.A. Program Evaluation Discussion paper No. 2. Washington, DC: A.I.D.

_____. 1979b. "Rural Works Programs in Bangladesh: Community, Technology and Graft." Washington, DC. World Bank.

_____. 1993. New Lessons from Old Projects: The Workings of Rural Development in Northeast Brazil. Washington, D.C. World Bank

The Road Maintenance Initiative. Building Capacity for Policy Reform. Sub-Saharan Africa Transport Program. Vol. 2. Readings and Case Studies. Sub-Saharan Africa Transport Program.

World Bank. 1978a. "The Study for the Substitution of Labor and Equipment in Civil Construction." Report on the Bank-Sponsored Seminars in Washington, Cologne, Copenhagen, London and Tokyo, Washington, DC.

_____. 1978b. "Guide to Competitive Bidding on Construction Projects, in Labor-Abundant Economies." Report Prepared jointly by the World Bank and Scott Wilson Kirkpatrick & Partners, Washington, DC.

_____. 1988. Road Deterioration in Developing Countries, Causes and Remedies

_____. 1994. Meeting the Infrastructure Challenge in Latin America and the Caribbean.

Watermeyer, R.B. Ed. 1992. Contractor Development in Labour-based Construction. The Contractor Development Team Johannesburg, South Africa.