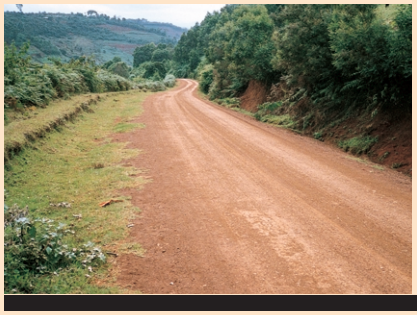
No.

MINISTRY OF ROADS AND PUBLIC WORKS(MORPW)
REPUBLIC OF KENYA

JAPAN INTERNATIONAL
COOPERATION AGENCY(JICA)

THE STUDY ON ROAD MAINTENANCE SYSTEM UNDER THE FRAMEWORK OF THE KENYA ROADS BOARD



FINAL REPORT

VOLUME 1 OF 3

EXECUTIVE SUMMARY

FEBRUARY 2003

ORICONSUL Oriental Consultants Company Limited
in association with
Japan Overseas Consultants Company Limited

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PREFACE

In response to a request from the Government of the Republic of Kenya, the Government of Japan decided to conduct The Study on Road Maintenance System under the Framework of the Kenya Roads Board and entrusted to study to the Japan International Cooperation Agency (JICA).

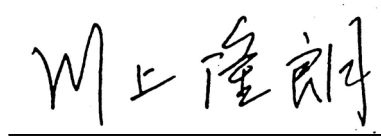
JICA selected and dispatched a study team headed by Mr. Masami FUKUDA of Oriental Consultants Co., Ltd. and consist of Oriental Consultants Co., Ltd. and Japan Overseas Consultants Co., Ltd. to Kenya, six times between November 2000 and January 2003. In addition, JICA set up an advisory committee headed by Mr. Nobuhiro KOYAMA, Senior Advisor, Institute for International Cooperation, Japan International Cooperation Agency between November 2000 and January 2003, which examined the study from specialist and technical points of view.

The team held discussions with the officials concerned of the Government of Kenya and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Kenya for their close cooperation extended to the study.

February 2003



Takao KAWAKAMI
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

January 2003

Mr. Takao KAWAKAMI
President
Japan International Cooperation Agency
Tokyo, Japan

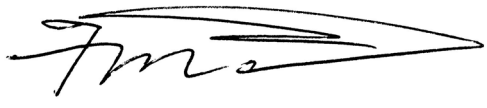
We are pleased to submit to you the final report of The Study on Road Maintenance System under the Framework of the Kenya Roads Board.

This study was conducted by Oriental Consultants Co., Ltd. and Japan Overseas Consultants Co., Ltd., under a contract to JICA, during the period from November 2000 to January 2003. In conducting the study, we have examined the feasibility and rationale of the study with due consideration to the present situation of Kenya and formulated the most appropriate proposal.

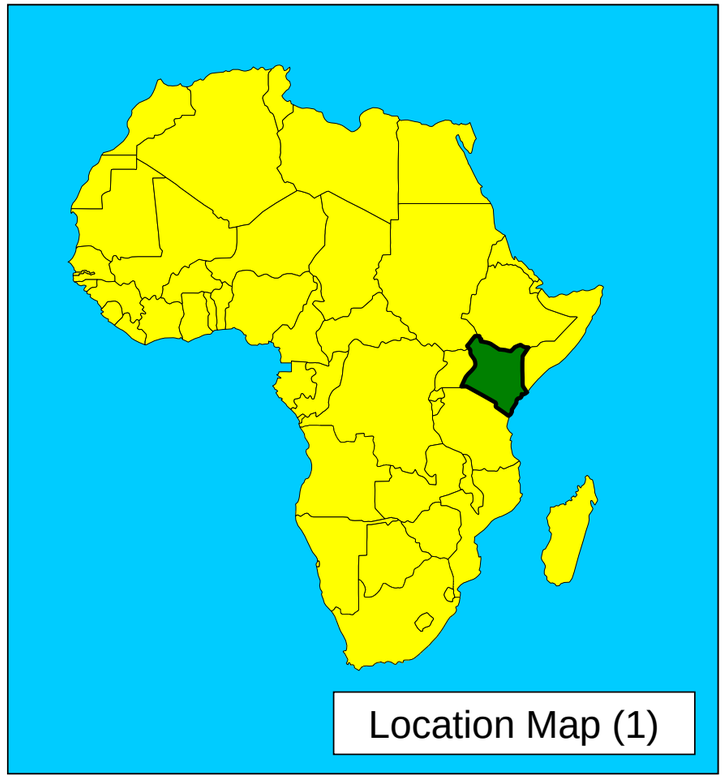
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, Ministry of Land, Infrastructure and Transport, Japan Highway Public Cooperation, the Ministry of Roads and Public Works, the JICA Kenya Office and the Embassy of Japan in Kenya for their cooperation and assistance throughout field survey.

Finally, we hope that this report will contribute to further promotion of the project.

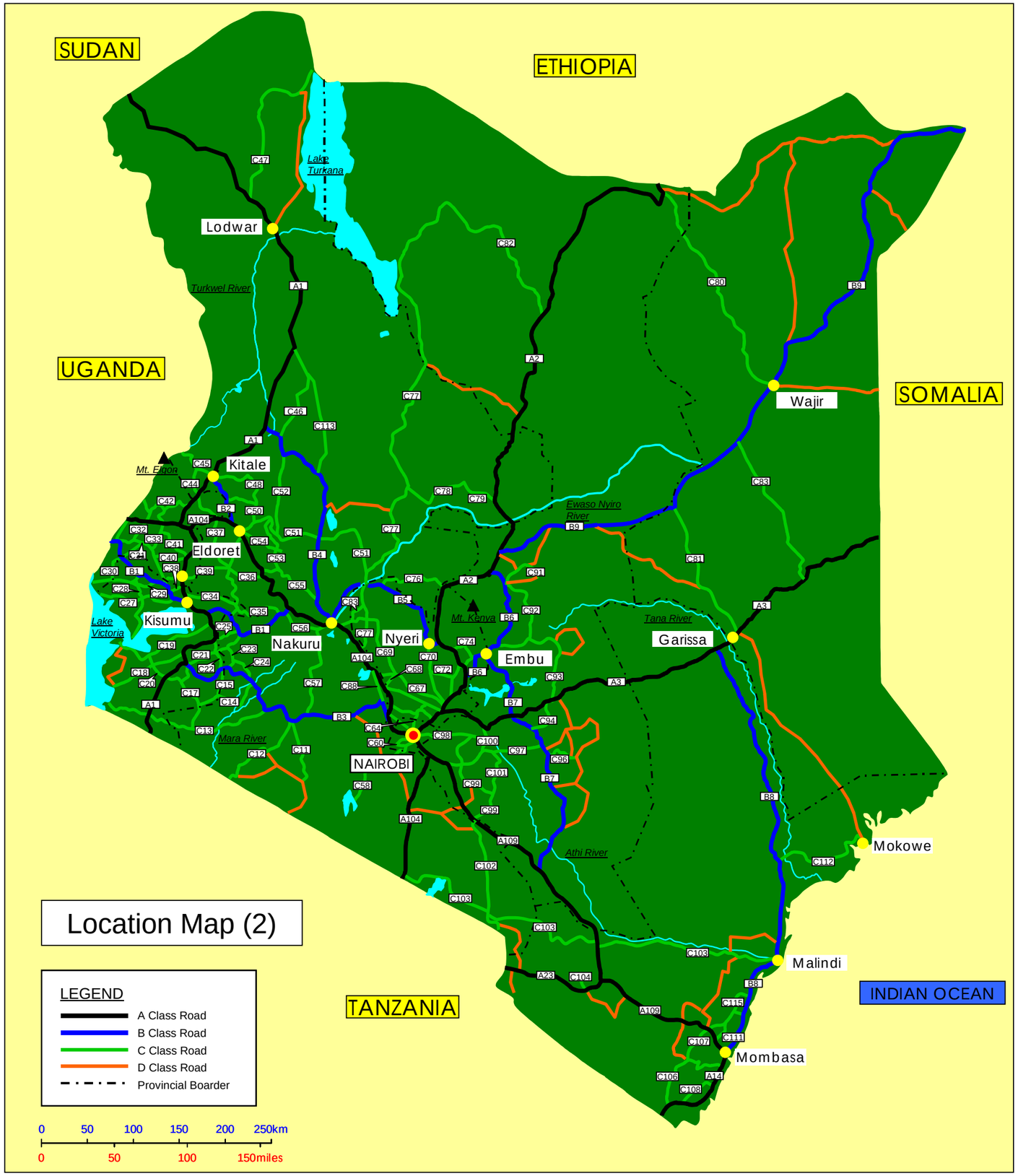
Very truly yours,



Masami FUKUDA
Team Leader,
Study Team on Road Maintenance System under the Framework of the Kenya Roads Board,
Oriental Consultants Co., Ltd.



Location Map (1)



PROJECT SUMMARY

1. COUNTRY	Republic of Kenya
2. NAME OF STUDY	The Study on Road Maintenance System under the Framework of Kenya of the Kenya Roads Board
3. COUNTERPART AGENCY	Ministry of Roads & Public Works (MORPW)
4. OBJECTIVE OF STUDY	Proposals to Improve Effectiveness of Road Maintenance System

1. STUDY AREA: Road Network of Entire Country

2. SCOPE OF STUDY

Phase I

1) Review of the road maintenance system for all road types
2) Analysis of the new Kenya Roads Board (KRB) and road agencies framework (Roads Department (RD), District Road Committees (DRCs) and Kenya Wildlife Service (KWS)) to manage road maintenance
3) Analysis of future maintenance scenarios for all road types
4) Proposal of a road maintenance management system for all road types
5) Proposal of a road maintenance training and capacity building program
6) Development of a maintenance manual (3 volumes) for capacity building of road maintenance

Phase II

7) Advice and guidance for the implementation and operation of the KRB road maintenance system
8) Practical guidance for the application of road maintenance manuals

3. COMPARISON OF FUNDING & COST-REDUCTION SCENARIOS

Based on the Study's examination of existing and future possible funding sources, there are sufficient monies for maintaining a core road network consisting of Class A, B, and C roads. On the other hand, granted even that Class A, B, and C roads are economically the most important part of the network, they still only account for approximately 9% of the total. Therefore, the Study carried out a comparative scenario analysis of cost-reduction and funding measures to determine the size of the funding gap and the amount of road that would have to be financed outside of the KRB system regarding the rest of the road network.

The Study's analysis indicates that even in a best-case scenario about 29,300 km of secondary and minor road would have to be financed outside of the KRB system (e.g., paid for by local communities) or dropped from the network. If the status quo prevails, about 80,400 km of road would have to be paid for by local communities or retired. This clarifies the scale of the funding gap (i.e., between 23% to 63% of secondary and minor roads will be unable to receive money from KRB) and indicates that the aggressive pursuit of new funding sources and implementation of cost-reduction measures are crucial to ensure the overall health of the road network.

4. DEVELOPMENT OF ROAD MAINTENANCE MANUAL

All roads under the KRB should be maintained in accordance with the road maintenance manuals developed by the Study.

The manuals consist of the following three booklets:

Part I: Inspection Manual
Part II: Evaluation Manual
Part III: Execution Manual

5. RECOMMENDATIONS:

1) Road inventory data should be updated and maintenance records/data retained on a computer database.
2) The legal and institutional setup for road maintenance should consider financial, managerial, and technical issues.
3) A national system of guidance for the preparation of Work Plans should be introduced.
4) Standard simplified contract documents for Labor-Based Equipment-Supported work should be introduced.
5) Rationalization and commercialization of MTD should be carried out immediately.
6) Training can be managed, executed and monitored by Kisii Training Center (KTC), but reliable sources of revenue (including donor aid) should be developed. It is suggested that KTC draw up and implement a plan to become a semi-autonomous agency to facilitate this process.
7) Promotion of private sector capacity building should be carried out by improving access to resources and providing an enabling environment for contracting.

ABBREVIATIONS & ACRONYMS

1.	AASHTO:	American Association of State Highway and Transportation Officials
2.	ADB:	African Development Bank
3.	B/C:	Benefit / Cost Ratio
4.	BS:	British Standards
5.	CBR:	California Bearing Ratio
6.	DANIDA:	Danish International Agency
7.	DFID:	Department for International Development
8.	DRCs:	District Roads Committees
9.	EIA:	Environmental Impact Assessment
10.	EIRR:	Economic Internal Rate of Return
11.	EU:	European Union
12.	HDM:	Highway Development Management
13.	IEE:	Initial Environmental Evaluation
14.	IRI:	International Roughness Index
15.	ISC:	Interim Steering Committee
16.	JICA:	Japan International Cooperation Agency
17.	KIHBT:	Kenya Institute of Highways and Building Technology
18.	KRB:	Kenya Roads Board
19.	KTC:	Kisii Training Center
20.	KUTIP:	Kenya Urban Transport Infrastructure Project
21.	KWS:	Kenya Wildlife Service
22.	LBES	Labor-Based Equipment-Supported
23.	MTD:	Mechanical and Transport Department
24.	MOENR:	Ministry of Environment and Natural Resources
25.	MOF:	Ministry of Finance
26.	MOLG:	Ministry of Local Government
27.	MORPW:	Ministry of Roads and Public Works
28.	MRP:	Minor Road Program
29.	MTEF:	Medium Term Expenditure Framework
30.	NPV:	Net Present Value
31.	OD:	Origin-Destination (matrix)
32.	PCU:	Passenger-Car Unit
33.	PIARC:	Permanent International Association of Road Congresses
34.	PRSP:	Poverty Reduction Strategy Paper
35.	PRTA:	Public Road Tall Act
36.	RARP:	Rural Access Roads Program
37.	RMI:	Road Maintenance Initiative
38.	RMLF:	Road Maintenance Levy Fund
39.	SDC:	Swiss Agency for Development and Cooperation
40.	SIDA:	Swedish International Development Agency
41.	SSATP:	Sub-Saharan Africa Transport Policy Program
42.	UK:	United Kingdom
43.	WB:	The World Bank

SUMMARY OF THE STUDY

1. Background & Objective

One of the important features of post independence development in Kenya is the massive expansion of the road network to approximately 197,000 kilometers. However, inadequate maintenance over the last 30 years has resulted in about 40% of this road network being "lost", which in turn has produced higher vehicle operating costs and longer travel times for road users that are having a negative effect on the national economy. In addition, traffic demand has been increasing very rapidly over the past decade, which is putting even a greater strain on road maintenance services.

Given this background, the Government of Kenya (GoK) has decided to develop an appropriate system of road maintenance and the GoK has requested the Government of Japan (GoJ) for technical cooperation for its implementation.

Therefore, the objective of the Study is to develop and enhance the road maintenance management capabilities of the public and private sector under the new Kenya Roads Board (KRB), which is an autonomous body responsible for managing and allocating roads funding to finance the necessary road works and/or services to be carried out by road administration agencies.

2. Scope

The scope of the Study consists of the work items listed below and is for both the classified and unclassified roads of the entire territory of the Republic of Kenya.

1) Review of the road maintenance system for all road types to clarify major issues and constraints of routine and periodic road maintenance.
2) Analysis of the new KRB and road agencies (Roads Department (RD), District Road Committees (DRCs) and Kenya Wildlife Services (KWS)) to manage and execute road maintenance.
3) Analysis of future maintenance scenarios for all road types, including force account versus contracting out as well as labor-based versus equipment-based methods, that focus on funding and cost-reduction for road maintenance.
4) Proposal of a rational and efficient road maintenance management system for all roads under the framework of KRB, via the clarification of major issues and constraints of routine and periodic road maintenance.
5) Development of a program for road maintenance training and capacity building to increase private sector involvement in road maintenance.

6) Assistance with the strengthening of the planning, management, and monitoring capabilities of road implementation agencies engaged in routine and periodic road maintenance works with an emphasis on contracting out.
7) Development of a set of maintenance manuals for routine and periodic road maintenance for capacity building purposes for road maintenance.

The execution of the above-mentioned scope is carried out in two phases. The timing of these phases and their work content are as follows:

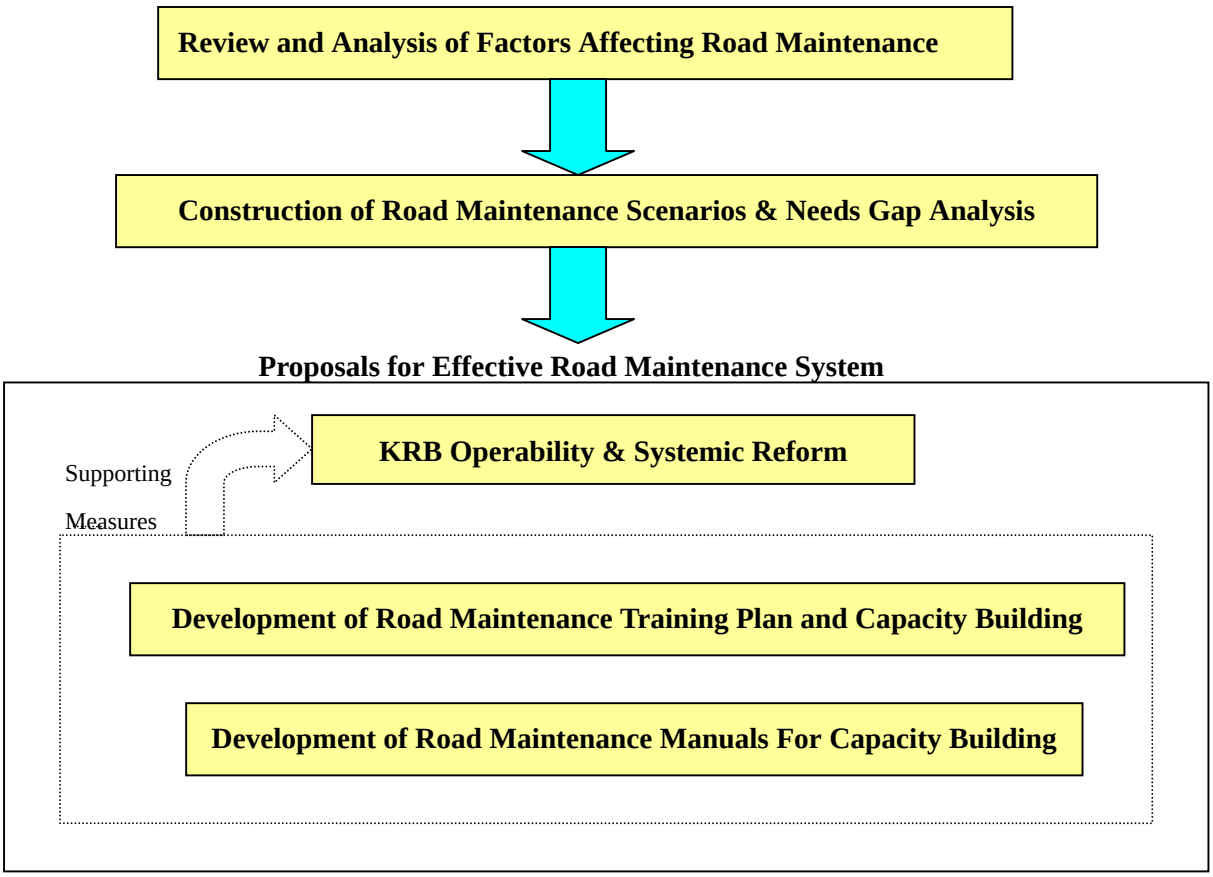
- Phase 1 (November 2000 – January 2002): To examine the current road maintenance system and to make recommendations to increase its overall effectiveness as part of the new KRB system.
- Phase 2 (May 2002 – January 2003): To provide advice and guidance regarding the implementation of the recommendations made in Phase 1 via on-site monitoring.

3. Approach to Realize an Effective Road Maintenance System and Impacting Factors

(1) Approach

To realize an effective road maintenance system, it is first necessary to determine the gap between the needs and resources of road maintenance, and then second to implement the appropriate measures to deal with this “needs gap”.

To accomplish this, the Study Team first reviewed and analyzed factors affecting the costs of road maintenance. These factors were then incorporated into the construction of plausible road maintenance scenarios to assess the existence and size of the above-mentioned needs gap. After determining the needs gap, the Study Team drew up proposals to eliminate it. The proposals consist of KRB operability and systemic reform, development of road maintenance training and capacity building, and the development of a road maintenance manual for capacity building. The proposals are both comprehensive and holistic in nature in order to integrate the relevant road maintenance components and thereby realize the most effective road maintenance system possible. The workflow for this approach is shown below.



Approach for Drawing Up Proposals for an Effective Road Maintenance System

As the above workflow indicates, before road maintenance scenarios can be constructed and proposals drawn up, the factors that have an impact on the costs of road maintenance must be defined. This is taken up in the next section of this chapter.

(2) Impacting Factors

There are a number of key factors impacting upon road maintenance costs and these can be split into **physical** and **non-physical**. Key **physical** factors that affect road maintenance, which taken together represent interactions between levels of use, the natural environment, and the deterioration of road materials, are defined by the Study Team to be as follows:

- Road surface type
- Traffic flows and composition
- Road surface condition
- Climate
- Terrain

Data on these factors for Kenya were carefully reviewed and incorporated into the World Bank's HDM-4 model, which also included data on maintenance frequency and unit costs as well as on vehicle operating costs. The model was then calibrated and used to derive the required costs (funding) for different road maintenance scenarios.

As for the **non-physical** factors that affect road maintenance cost, which are more complex than the **physical** factors due to their intangible nature, these are defined by the Study Team to consist basically of the following:

- KRB operability
- Capacity building
- Interactions between personnel/organizations of both the private and public sector.

The non-physical factors are for the most part management-related in that their effect on road maintenance costs are dependent on the efficient use and allocation of organizational resources. This means the greatest leeway for satisfying any needs gap lies here, since the effects from physical factors for a given level of service and technology are basically fixed (i.e., costs can not be reduced).

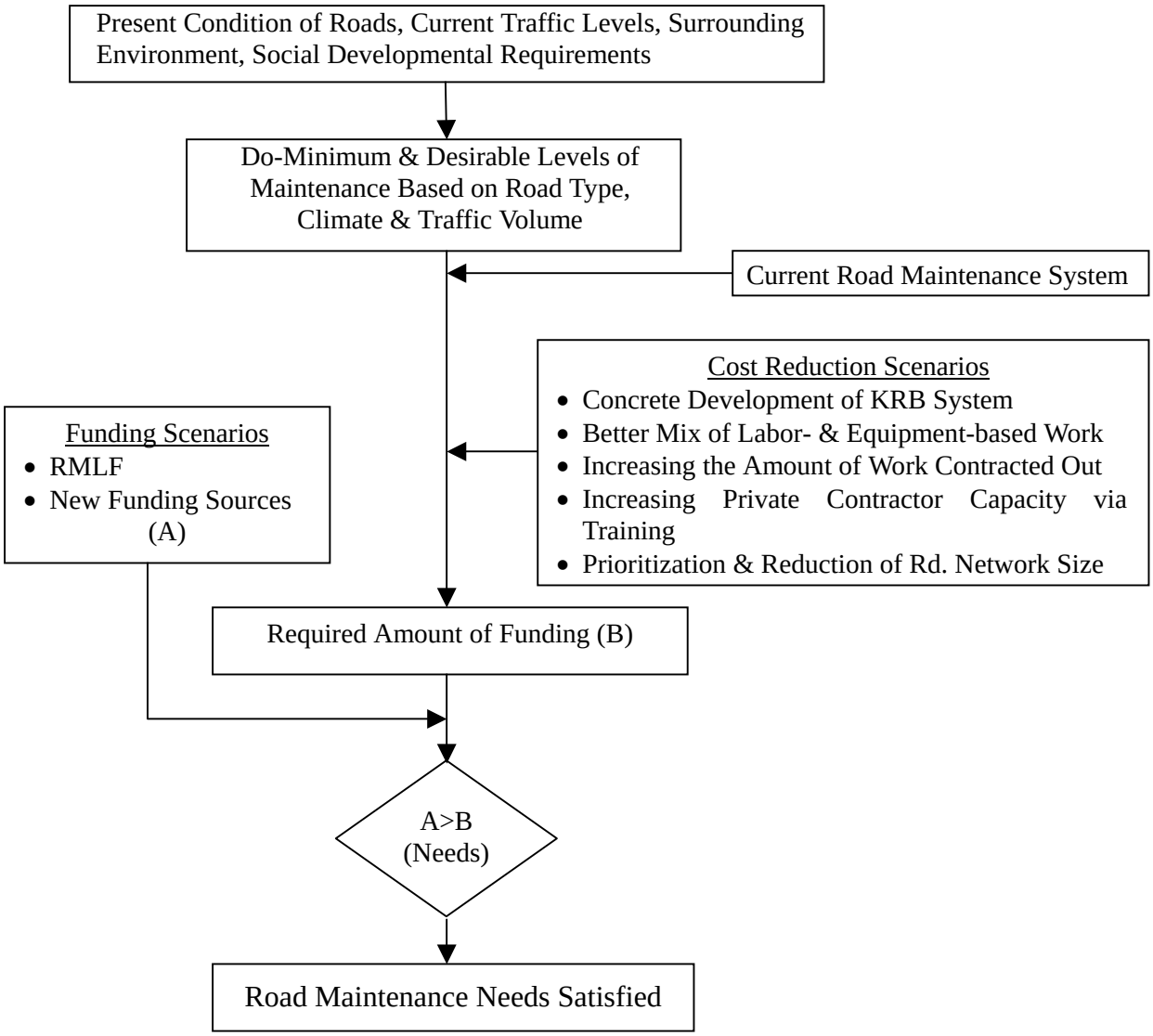
4. Construction of Road Maintenance Scenarios & Needs Gap Analysis

Applying the above **physical** and **non-physical** factors, the methodology shown below is adopted by the Study Team to determine the (funding) needs of Kenya's road network and the possible scenarios to satisfy those needs. Note that **physical** factors determine the costs required to maintain the Kenyan road network at a minimum and ideal level of condition, while the **non-physical** factors represent cost-reduction measures to match costs with funds. Note, however, that even with current and new funding sources there would still be a significant shortfall in funding to maintain the entire road network even at a minimum level of service. For these reasons, cost-reduction measures, which include the development of the KRB, capacity building of the road sector, contracting out, etc., are all important and form the crux of the proposals contained in the next chapter.

On the other hand, the Study Team has determined that despite the implementation of the proposals described in this text, together with new funding sources, approximately 30,000 km of secondary/minor road would still have to be retired, as compared to 80,000 km if the status quo continues as is. Therefore, it is important that local authorities decide on what roads to retire and/or have local residents pay for. In order to do this, it is recommended that a separate study be executed to determine those roads of the secondary & minor road network that should receive funding. This would, however, require that the following be carried out:

- Execution of a road inventory survey
- Execution of a road condition survey
- Definition of a core road network

Given the above lack of funds, RMLF should only be used for the maintainable road network and any road rehabilitation should be financed by other sources including the donor community. The Study Team would like to note that, if the Kenyan Government draws up a plan detailing its core network and possible scenarios for funding it, together with better management via the full operation of the KRB system, there should be no problems in obtaining outside funding to rehabilitate roads the Government considers important.



Workflow for Needs Gap Analysis

5. Proposals to Realize an Effective Road Maintenance System

Below, proposals to increase the effectiveness of road maintenance and thereby eventually reduce its costs are described. Note that the KRB is to be the linchpin of the Kenyan road maintenance system and its success in becoming fully operational and the systemic reform necessary to achieve that will determine whether or not an effective road maintenance system can be realized. As for other proposals contained in this chapter, although important, they are supporting measures for the KRB and the road maintenance system as whole.

(1) KRB Operability & Systemic Reform

Although the Kenyan Parliament passed the KRB Act in 1999, the KRB itself was not fully staffed and outfitted until July 2002, and has only been in partial operation since November 2001. Even though only a short time has passed since becoming partially operational, the KRB's activities have resulted in monies being distributed to the constituencies of all 70 districts in Kenya for road maintenance, something that rarely if ever occurred previously, resulting in the KRB being highly evaluated.

Despite this initial good start, the KRB is still not fully operational and this next year will determine whether or not it the reform of the road maintenance system is a success. Based on analyses of surveys carried out by the Study Team, it is recommended that the actions described in the 5 items below, which will result in the necessary systemic reform to make the KRB fully operational, be carried out.

Funding

Under the KRB Act, 57%, 40% (16% and 24% to be distributed equally and equitably, respectively), and 3% of the money collected from the Road Maintenance Levy Fund (RMLF) is supposed to go to the Roads Department (RD) of the Ministry of Roads and Public Works (MORPW), the District Road Committees (DRCs), and the KRB. Although the above-mentioned 16% for road maintenance is now reaching the constituencies of the 70 districts in Kenya, the following should be carried out to resolve remaining problems regarding funding:

- The KRB should try to set up a system that does not require going though the permanent secretary of the MORPW for the disbursement of monies to the DRCs or any other non-MORPW entities, since this is just an extra administrative step that slows down the process unnecessarily.
- It is recommended that KRB clearly define when the DRCs are going to be receiving their remaining 24% of the 40% of the RMLF due to them during the fiscal year of 2002/2003, which is being used by MORPW to pay off previous commitments.

- It is recommended that KRB apply the criteria it has developed (see 6.6 of Chapter 6) for disbursing the above-mentioned 24% once it is made available, which is needed by the DRCs to carry out important maintenance work that can not be addressed by the current 16% of the RMLF that they are receiving now. However, it should be recognized that the system for allocating money equitably may need fine tuning in order strike a balance between fairness and ease of understanding.
- It is recommended that consideration be given to making the budgets for road maintenance rolling budgets so that monies left over from the previous year, due either to late or irregular disbursements or work flow problems, can be applied in the next fiscal year immediately so that work can be carried out efficiently.
- It is recommended that the KRB and MORPW, as well as any other related agencies, closely examine the proposal submitted by the KWS regarding classified roads that should be entrusted to it for maintenance so that the KWS can receive monies directly from the KRB.
- It is recommended that the DRCs designate urban and town roads for the Ministry of Local Government (MOLG) to be responsible for under the KRB system so that the MOLG can receive the money it needs to maintain these roads, which are being neglected by the DRCs.

Organization

- It is recommended that the DRCs and MORPW effectively utilize existing organizations with sufficient capacity to act as sub-agencies to carry out maintenance work on their behalf. Examples of such organizations include the Kenya Wildlife Service (KWS), the city councils of Nairobi, Mombasa, Kisumu, El Doret, and Nakuru, and perhaps local producers of agricultural products such as coffee, tea, etc.
- It is recommended that the Mechanical and Transport Department (MTD) carry out its planned rationalization as quickly as possible by referring to the rationalization plan contained in the JICA Study Team's Main Report. It should be noted that the longer the MTD waits the less attractive it will become as an organization and the more difficult it will be to become an autonomous entity. The World Bank's intention to execute and complete a feasibility study on rationalization by the end of 2002 will be useful in spurring on this process.

The above is crucial for assisting in the creation of a more competitive market in Kenya for the contracting out of maintenance equipment. Concretely, the following goals for the next 3 years should be kept in mind as a reference:

(i) Retrenchment of current equipment stock from 3325 pieces to 500 pieces.
(ii) Sales of surplus equipment items: Ksh. 646,530,000 is expected.

(iii) Rationalization of staff: Staff and administration costs should be cut by 50 %, or from Ksh. 277,603,234 (FY2000) to Ksh. 138,801,617

(iv) Establishment of Regional/Sub-regional Mechanical Workshops
Eight to 10 Regional Mechanical Workshops and 16 to 20 Sub-Regional Mechanical Workshops.

(v) Development of new revenue sources: Such as the commencement of a leasing system, the provision of inspection services for the registration of imported and other vehicles, etc.

- With the termination of Swiss assistance, the Kisii Training Center is starting to experience financial difficulties. It is recommended that the Kisii Training Center draw up and implement a plan to become an autonomous entity so that it can deal with this problem in a proactive manner.

KRB Facilities/Equipment

- It is recommended that the DRCs obtain their own facilities by the end of the 2002/2003 fiscal year, so that they may become more independent as originally intended under the KRB Act. This will require that the DRCs consider the staffing of these facilities. It is recommended that the KRB and the MORPW discuss staffing at the district level so there is no unnecessary overlapping. Ideally, this should result in a slimmer MORPW.
- It is recommended that all of the DRCs, each of which received a computer from KRB, link up with KRB and with each other via e-mail so that data and information can be reliably exchanged.

Data

- It is recommended that road condition and traffic data be obtained from all districts and sent to the KRB for planning purposes via a rapid condition survey. This is necessary since it seems that the current World Bank road condition survey will still take some time to complete. In addition, the World Bank survey is only for classified roads, which are less than half of the total road network. Data for the unclassified network is also necessary for proper planning.
- It is recommended that the KRB obtain information not only on road conditions and road traffic, but on road re-classification and kilometer markers as well (to be installed if necessary) in order to carry out planning.

Communication

- Communication between the KRB and the road agencies still has much to be desired and it is therefore recommended that a reporting system be set up. For example, it is suggested that the minutes of meetings of working committees (or at least a summary) be sent to all road agencies and their staff so that they understand what is going on and

to create a common understanding.

- It is recommended that a system for collecting, sending, and updating data be established between the KRB and the road agencies so that allocation of monies can be carried out accurately. According to KRB, the Swedish International Development Cooperation Agency (SIDA) will be providing funding for the implementation of a reporting and road maintenance work plan system.
- It is suggested that the KRB consider a system for updating and revising the road maintenance manual to be submitted by the JICA Study Team in January 2003, so that important and timely changes can be made to the manual as required.
- It should be emphasized that the concept of the KRB is still not correctly understood by some of the road agencies and their staff. It is recommended that the KRB send out a memo clarifying and explaining its mission, vision, and strategy to all stakeholders, as well as hold regular meetings.

(2) Development of Road Maintenance Training Plan & Capacity Building

Training

The Training Plan can be managed, executed and monitored by the Kisii Training Center (KTC), under the umbrella of the Kenya Institute of Highways and Building Technology (KIHBT). Furthermore, the road maintenance manual developed by the JICA Study Team will serve as the standard for road maintenance training at Kisii.

KTC's core clients for training during the transition period will be:

- Labor-based small-scale contractors
- LBES medium-scale contractors
- Roads Department (RD) staff at province level.
- KWS staff.
- RD staff at district level.
- Local Authority (LA) Level – LA staff.
- Persons participating in community-based road maintenance projects in rural areas and in urban low-income settlements.
- Mechanical and Transport Department (MTD) staff – with a focus on equipment-based technology for selected periodic maintenance activities (e.g., surface works on paved roads) and routine maintenance works in sparsely populated areas (lack of labor) and in security risk areas where an equipment-based approach would result in quicker execution of works.

Private Sector Capacity Building

Private sector capacity building consists of the following items:

- Access to Credit
- Access to Tools, Equipment and Spare Parts
- Access to Materials
- Access to Works

The matter of access to works (particularly the first-term contract) is absolutely vital. Otherwise training is just wasted, as has been the case with the currently dormant Roads 2000 projects (excluding Danida). In other words, the process for realizing "access to works" needs to be institutionalized between KTC and KRB/road agencies.

(3) Development of Road Maintenance Manual for Capacity Building

KRB is responsible for the maintenance of all public roads in Kenya. Therefore, to achieve some consistency in the field of road maintenance, all roads under KRB should be maintained in accordance with the manual developed jointly by the Study Team and Kenyan engineers/road agencies. The KRB should send out a memo informing all stakeholders that the JICA road maintenance manual is "ready for use". The road maintenance manual consists of the following three parts:

Part I: Inspection Manual
Part II: Evaluation Manual
Part III: Execution Manual

It is recommended moreover that the Kisii Training Center (KTC) design and carry out training, which will include on-site practice, using the JICA road maintenance manual as a standard. It is also recommended that all road agencies send their engineers and technicians to KTC to be trained in the use of the JICA road maintenance manual, and that they provide feedback to Kisii one year after finishing to ensure that they are performing as intended.

Finally, the road maintenance manual should be updated periodically (see the main text of the Executive Summary) to reflect changes in the field of road maintenance or to make necessary modifications, revisions, or corrections. It is recommended that the Kenya Roads Board be responsible for keeping digital copies of the three manuals at its office in Nairobi and for distributing **official** versions of these manuals as required.

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CHAPTER 1 INTRODUCTION

1.1 Background & Objective

1.1.1 Background

One of the important features of post independence development in Kenya is the massive expansion of the road network to approximately 197,000 kilometers. However, inadequate maintenance over the last 30 years has resulted in about 40% of this road network being "lost", which in turn has produced higher vehicle operating costs and longer travel times for road users that are having a negative effect on the national economy. In addition, traffic demand has been increasing very rapidly over the past decade, which is putting even a greater strain on road maintenance services.

In response to the above, the Government of Kenya (GoK) became an active participant in the Road Maintenance Initiative (RMI), with the Roads 2000 Program representing the principal implementation strategy for road maintenance in Kenya. RMI is an African-wide program supported by the World Bank and a number of other Donors. RMI originated from an acknowledgement that road maintenance was in a state of crisis in the Sub-Sahara region, and that action was required in terms of policy at senior government level if this situation was to be reversed. The GoK now accepts the basic premise that attention must now turn from constructing new roads to maintaining existing roads. Hence, the GoK has decided to implement a policy to develop an appropriate system of road maintenance. The Kenyan Ministry of Roads and Public Works (MORPW) has identified new strategic plans for the road sector, and the GoK has requested the Government of Japan (GoJ) for technical cooperation for their implementation.

In response to a request from the GoK, the GoJ has decided to implement one of the projects, i.e., "The Study on Road Maintenance System Under the Framework of the Kenya Roads Boards" (hereinafter referred to as the Study), in accordance with the relevant laws and regulations in force in Japan and Kenya. Accordingly, the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of the technical cooperation programs of Japan, will undertake the Study, in close cooperation with the authorities concerned in Kenya. The scope of work for the Study has been agreed to and was signed by both sides, Japan and Kenya, on July 28, 2000.

1.1.2 Objective

The objective of the Study is to develop and enhance the road maintenance management capabilities of the public and private sector under the new Kenya Roads Board (KRB), which is an autonomous body managing a road fund to finance the necessary works/services for roads to be carried out by road administration agencies.

1.2 Scope

The physical area to be covered by the Study consists of both the classified and unclassified road network for the whole of Kenya. In order to achieve the Study's objective mentioned in 1.1.2 for this area, the scope of the Study will cover the following items:

1) Review of road maintenance system for all types of roads to clarify major issues and constraints of routine and periodic road maintenance

(1) Legal and institutional setups for road maintenance
(2) Funds for road maintenance
(3) Performance of road maintenance work
(4) Road maintenance capacity by force account
(5) Involvement of the private sector in road maintenance
(6) International cooperation in road maintenance

2) Analysis of the new KRB and road agencies framework (Roads Department (RD), District Road Committees (DRCs) and Kenya Wildlife Services (KWS) to manage road maintenance)

(1) Mandate and responsibilities of KRB and road agencies
(2) Institutional setup and organization of KRB and road agencies
(3) Funds available to KRB and road agencies
(4) Relationship of KRB and road agencies with MORPW, local authorities, etc.

3) Analysis of future maintenance scenarios for all road types, including force account versus contracting out as well as labor-based versus equipment-based methods

(1) Future traffic trends by road classification
(2) Future funds available for road maintenance
(3) Comparison of force account and contracting out for road maintenance work by road classification
(4) Comparison of labor-based and equipment-based methods for road maintenance work

by classification

(5) Plausible future road maintenance scenarios

4) Proposal of a rational and efficient road maintenance management system for all types of roads under the framework of KRB, via the clarification of major issues and constraints of routine and periodic road maintenance

(1) General framework for road maintenance system

(2) KRB and road maintenance management

(3) Road agencies and road maintenance management

(4) MORPW, local authorities, etc.

5) Development of a program for road maintenance training and capacity building program to increase private sector involvement in road maintenance

(1) Labor-base technology

(2) Equipment-based technology

(3) Road maintenance training plan

(4) Private sector capacity building

(5) KRB's Secretariat capacity building

6) Assistance with the strengthening of the planning, management, and monitoring capabilities of road implementation agencies engaged in routine and periodic road maintenance works with an emphasis on contracting out.

7) Development of maintenance manuals for capacity building of road maintenance

(1) Inspection Manual for Routine and Urgent Maintenance

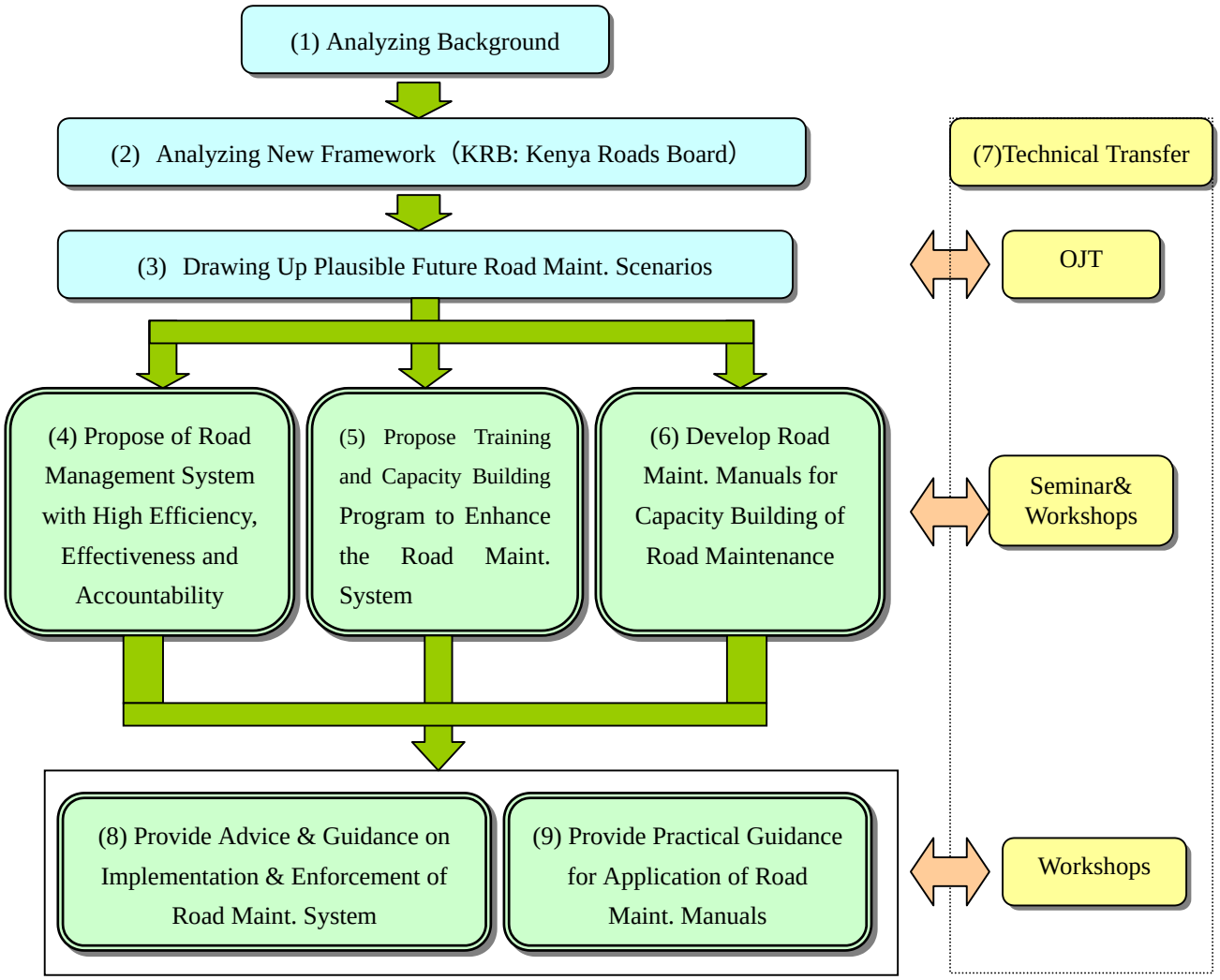
(2) Evaluation Manual for Routine, Periodic and Urgent Maintenance

(3) Execution Manual for Routine, Periodic and Urgent Maintenance

1.3 Study Approach

The Study is executed in accordance with the scope of work described in the previous section. The major focus of the Study is to analyze future road maintenance scenarios and to propose a rational and efficient road maintenance management system, to draw up a training program to promote the capabilities of both the public and private sector that will encompass personnel from management to the laborer in the field, and to draw up manuals for road maintenance for the capacity building of road maintenance. The basic approach of the Study is as follows:

1) To analyze the background as to why the present road maintenance system does not function well.
2) To analyze the new framework of KRB and the road agencies including the funds available.
3) To draw up plausible future road maintenance scenarios.
4) To propose a road maintenance management system with high efficiency, effectiveness and accountability.
5) To propose a road maintenance training and capacity building program to enhance the road maintenance management system.
6) To develop road maintenance manuals for capacity building of road maintenance
7) To take into account the transfer of technology during the Study.
8) To provide advice and guidance on the implementation and enforcement of the road maintenance system.
9) To provide practical guidance for application of the road maintenance manuals.



CHAPTER 2 CURRENT STATUS OF ROAD MAINTENANCE

2.1 General

Although Kenya Roads Board (KRB) officially began operation on July 1st, 2000, it is still in transition and almost all work is still carried out under the previous system. The Study Team carried out a field survey to collect data from numerous on-site offices of related road organizations, which accurately reflects the issues and constraints of the Kenyan road maintenance system. The analysis in this report is built up on the basis of these collected data. The methodology and criteria for the selection of the districts taken up by the survey are described in ANNEX 2 of Volume 3 of the report.

2.2 Present Road Inventory and Road Condition

2.2.1 Road Inventory

Classified Roads

The total length of the classified road network was 63,941.9 km as of 1996. Road length by province and road class is as shown in Table2.2.1.

Table 2.2.1 Road Length by Province and Road Class (unit: km)

Province	Road Class					
	A	B	C	D	E+SPR	Total
Nairobi	90.5	8.3	122.1	39.5	123.5	383.9
Central	265.4	154.2	769.5	1,642.0	5,091.9	7,923.0
Coast	573.4	439.8	597.8	1,033.5	3,214.4	5,858.9
Eastern	960.3	590.0	1,358.8	1,961.1	8,212.1	13,082.3
N/Eastern	204.0	590.9	524.5	957.1	2,576.1	4,852.6
Nyanza	210.1	152.9	874.5	1,071.0	4,973.1	7,281.6
Rift Valley	1,094.5	683.3	3,255.0	3,820.0	11,661.2	20,514.0
Western	212.7	51.5	538.4	804.6	2,438.4	4,045.6
Total	3,610.9	2,670.9	8,040.6	11,328.8	38,290.7	63,941.9
Ratio (%)	5.6	4.2	12.6	17.7	59.9	100.0

Source: Schedule of Classified Roads in 1996 (Volume 1 Lists and Tables by Province and District).

High standard roads, Class A, B and C, form approximately 22.4% of the total road length. Classified roads have four types of surface structure: premix, surface-dressed, gravel and earth. In Nairobi, approximately 83% of all classified roads were constructed with a premix surface; however, in other provinces, bitumen, premix and surface-dressed were only used on 13.0% of all roads. Table 2.2.2 shows road length by province and surface type.

Table 2.2.2 Road Length by Province and Surface Type (unit: km)

Province	Surface Type				
	Premix	Surface Dressed	Gravel	Earth	Total
Nairobi	319.0	32.6	30.8	1.5	383.9
Central	260.1	1,732.8	3,610.7	2,319.4	7,923.0
Coast	133.5	627.0	1,832.7	3,265.7	5,858.9
Eastern	158.2	1,030.7	4,898.8	6,994.6	13,082.3
N/Eastern	136.4	11.0	659.0	4,046.2	4,852.6
Nyanza	193.1	558.8	3,888.0	2,641.7	7,281.6
Rift Valley	153.3	2,887.0	10,347.4	7,126.3	20,514.0
Western	154.8	283.4	2,634.3	973.1	4,045.6
Total	1,508.4	7,163.3	27,901.7	27,368.5	63,941.9
Ratio (%)	2.4	11.2	43.6	42.8	100.0

Source: Schedule of Classified Roads in 1996 (Volume 1 Lists and Tables by Province and District).

Unclassified Roads

(1) Forest Roads

Forest roads consist of three classes: access roads, feeder roads and plantation roads. The surface of these roads consists of gravel and earth. All access roads have a gravel surface, while the rest have an earth surface. Table 2.2.3 shows the road length for these three road classes.

Table 2.2.3 Length of Forest Roads

Road Class	Road Length (km)
Access Roads	2,252.5
Feeder Roads	2,836.8
Plantation Roads	1,726.8
Total	6,816.1

Source: Data from Forest Department HQ.

(2) KWS Roads

Kenya Wildlife Service (KWS) maintains three categories of road and their lengths are as shown in Table 2.2.4.

Table 2.2.4 Length of KWS Roads

Road Class	Road Length (km)
KWS Roads in Parks	4,411.0
KWS Roads in National Reserves	2,734.0
MORPW Classified Roads in Parks	1,763.0
Total	8,908.0

Source: Data from KWS HQ.

(3) Urban Roads

The length of urban roads outside Nairobi city is unavailable, since many county councils, municipalities and townships do not keep road inventory data. The 1994 Local Authorities Inventory Survey provided revised data that cites the total length of unclassified road as being 134,035.3 km compared with the 94,161.1 km provided by the Ministry of Roads and Public Works (MORPW). Further details on the revised figures are contained in Section 4.2 of this summary.

2.2.2 Road Condition and Types of Road Damage

Classified Roads

Classes A to E roads consist of four surface types: premix, surface-dressed, gravel and earth. The selection of surface type is based on route importance and traffic volume. Generally, Class A and B roads have a bitumen surface and are in good condition. However, the bitumen surface of other roads was found to have cracks and potholes. Gravel and earth roads were found to have rutting, pavement softening and waterlogged sections.

Unclassified Roads

(1) Forest Roads

Forest roads have two surface types: gravel and earth. Rutting, pavement softening and waterlogged roads are found on some sections.

(2) KWS Roads

KWS roads also have two surface types: gravel and earth. These roads are in the same condition as forest roads.

(3) Urban roads

Urban roads have three surface types: surface-dressed, gravel, and earth. Generally, road maintenance in municipalities and townships is inadequate due to an insufficient budget and a lack of engineers and equipment.

(4) Sugar, Tea and Wheat Roads

Sugar, tea and wheat roads also have two surface types: gravel and earth. Although rutting was found on some sections, road surfaces were in reasonably good condition.

Present Types of Road Damage

Possible road damage types in Kenya are shown in Table 2.2.5.

Table 2.2.5 Possible Types of Road Damage

Structure	Damage
Embankment	(1) Submerged (2) Collapsed
Pavement	(1) Settlement (2) Cracked (3) Potholed (4) Rutted (5) Waving (6) Waterlogged (7) Softening
Gully	(1) Accumulation of debris (2) Settlement (3) Collapsed
Shoulder	(1) Washed out
Side Ditch	(1) Accumulation of debris (2) Settlement (3) Collapsed
Retaining Wall	(1) Cracked (2) Settlement (3) Collapsed
Slope	(1) Landslide (2) Rock avalanche (3) Protection wall collapsed (4) Cracked (5) Eroded
Culvert	(1) Accumulation of debris (2) Settlement (3) Collapsed

2.3 Legal and Institutional Setup for Road Maintenance

2.3.1 Background and Present Situation

The Kenyan road network had been maintained by road agencies such as the Roads Department (RD) of MORPW, the 167 local authorities under Ministry of Local Government (MOLG), the KWS under the Office of the President, and the Forest Department (FD) of the Ministry of Environment and Natural Resources (MOENR). Furthermore, independent authorities and/or boards maintained some of the roads in agricultural areas, producing items such as tea, coffee, sugar, and wheat.

Kenya's road network was mostly developed before the 1980s; however, maintenance was ignored for a long time and existing roads deteriorated to a very bad condition. In the 1990s, the Government of Kenya (GoK) became more aware of the importance of road maintenance, resulting in Parliament passing the Road Maintenance Fuel Levy Fund Act in 1993, which was amended in 1994, to establish a source of sustainable road maintenance funding. Until the Finance Bill of 1997, these funds were mostly used for the repair/rehabilitation of classified roads. After this Bill's passage, funding was widened to include both classified and unclassified roads.

The widening of the RMLF resulted in the involvement of more road agencies, making the fund more difficult to manage. To increase accountability and better the performance of road agencies, the KRB Act was passed and enacted on 1st July 2000. However, the Act failed to

resolve several important issues such as the status of DRCs, the management of CESS and LATF funds, and the jurisdictional and administrative relationship between the KRB and local authorities. Due to these issues, the KRB system has not been able to become fully operational.

2.3.2 RD

Of the ministries in Kenya, the MORPW has been the key agency for road maintenance works. In compliance with the "Road Authority Ordinance of 1961", the Minister of MORPW categorized roads into Class A through E and special purpose roads (SPRs), while remaining roads were categorized as unclassified roads. The RD has been responsible for the classified roads.

MORPW is composed of four departments. Among them is the RD, which plays a key role in road administration and is in charge of such work as programming the annual implementation plan, the allotment plan for the budget, and the acquisition plan for the equipment of classified roads. After the annual maintenance schemes, road maintenance procedures are approved by the Minister of MORPW and maintenance works executed by district roads engineers (DREs) stationed at district works offices (DWOs). Instructions issued by the Engineer-in-Chief of MORPW is relayed to DWOs via provincial works offices (PWOs).

The main role of a PWO, excluding special projects, is to act as a liaison between the headquarters of the MORPW and the DWOs. Special projects would be managed directly by the provincial roads engineer (PRE). Guidance for the planning, monitoring and evaluation of district activities, etc., are carried out through PREs. On the other hand, actual execution of road maintenance work under RD has been mainly carried out by the DREs stationed at DWOs, in line with the Government policy of focusing on the development of districts.

Once RD becomes responsible for Class A, B and C roads only, which is the proposal for the new KRB system, RD should change its maintenance system from being district based to being regional based. That is, the RD had been responsible for the entire classified road network of 63,942 km, which had been maintained by 70 DWOs, while the total length of A, B and C roads is only 14,322 km in length. This means a DWO that previously had handled about 913 km of road on average is now only responsible for about 205 km of road under the new system. This is too short for a road maintenance office. Accordingly, there should only be a maximum of nine or ten offices under the RD.

2.3.3 MOLG/ DRCs

As mentioned previously, there are 167 local authorities, which consist of cities, municipalities, townships, counties, etc. Each local authority has its own administrative organization that includes a road maintenance unit that handles the maintenance work of roads within their respective administrative territories. All local authorities have direct access to the MOLG and there is no intermediate organization at the provincial level as in the case of MORPW. Orders and/or instructions issued from the Head Office of MOLG reach the local authorities directly.

Funding for road maintenance for local authorities had come from the fuel levy, CESS and LATF. However, the KRB Act does not specify the allocation of funds to local authorities, since they are not recognized as road agencies under the Act. Instead, DRCs have been specified as road agencies. However, due to Members of Parliament being included as committee members, DRCs are not legally authorized to discharge powers as road agencies. This has resulted in the use of the concept of sub-agency in order to properly carry out road maintenance functions. That is, a sub-agency, such as RD, KWS or some local government road maintenance unit, will execute road maintenance work on behalf of a DRC upon approval of its designation by KRB.

Local authorities prior to the establishment of the KRB system had managed the unclassified road network, which totaled 134,035 km in length. However, with the KRB system came the inclusion of Class D and E roads and SPRs under DRC jurisdiction, resulting in the length of road under the DRC increasing to 183,655 km. On average each DRC shall manage 2,685 km of road. This is too much for a single DRC to handle.

2.3.4 KWS and Other Agencies

KWS is specified as a road agency under the KRB Act, but the FD, the Sugar Board, and other entities that maintain their own roads are left un-specified. KWS also has its own road department that is capable of executing maintenance work on roads in parks and game preserves regardless of a road's classification. For example, MORPW empowers KWS to maintain classified road segments in KWS territory and allocates funds for this work.

Forest roads, as defined by the MOENR, are generally maintained by the FD via force account. Although, FD sometimes contracts out road maintenance work in the case of urgent repairs and/or for large-scale work. FD has its own road classification that consists of access, feeder, and plantation roads.

The Ports Authority has no particular unit within its organization to maintain ports and access roads. The Authority contracts out road maintenance work usually with its own funds.

Some boards and agencies, such as those for tea, coffee, sugar, maize, wheat and other agricultural products, have their own units for carrying out road maintenance. However, they generally contract out this work with some funding coming from the CESS.

2.3.5 Maintenance Work Methodologies

Some road agencies retain a certain number of engineers and workers for the execution of road maintenance work via force account. There is a trend, however, towards the phasing out of force account because of its ineffective use of funds as compared to contracting out. On the other hand, if the employment of casual laborers for temporary maintenance work is categorized as contract-based work, the majority of road maintenance in Kenya can said to be contracted out.

2.3.6 Transition Issues

Setting up and/or restructuring the KRB, RD, DRC, KWS and their offices are essential for making the KRB system fully operational. To achieve this, resolution of legal conflicts between the Act and other existing laws and the training of officials/engineers are key factors. A three year-time period is assumed to be the required minimum to deal with these factors.

2.4 Maintenance Equipment

(1) General Issues

At present all organizations responsible for road maintenance, i.e., the MORPW, KWS, FD, and MOLG, and the several boards of the agricultural industry, have a pool of equipment to enable them to carry out work on a force-account basis. However, most of these organizations have been suffering from the following major problems:

(a) Lack of a budget for the procurement of spare parts and the replacement of equipment due to large expenditures on administration.
(b) Lack of appropriate equipment for maintenance and a surplus of obsolete equipment.

(2) Mechanical and Transport Department (MTD)

1) Introduction

The MTD of the MORPW was originally established to provide plant, equipment, and vehicle services to all ministries of the GoK. Recently, however, its activities have concentrated upon providing plant and equipment services to RD. Until the early 1980s, the MTD provided relatively good service. Rental charges had been established to adequately provide for spare parts and equipment replacement. However, the inability of ministries to pay the rental charges resulted in the collapse of the rental scheme. Moreover, GoK's annual budget and periodic injections of donor-funded equipment have been insufficient to provide the necessary resources, and there has been a continuous decline in the effectiveness and morale of MTD.

Strategic Plan

In 1997, MTD drew up a Strategic Plan in response to the national trend of rationalizing government organizations. The Strategic Plan, Medium Term Expenditure Framework (MTEF) and Poverty Reduction Strategy Paper (PRSP) all recognize the present weaknesses of MTD and the need for fundamental change. The Strategic Plan proposed the following changes:

- A substantial reduction in the size of MTD's holding of plant and equipment from 3,000 to 1,500 pieces.
- Establishment of a semi-autonomous government agency and the creation of a commercialized plant pool providing services to both the public and private sector.

Progress of Commercialization

In accordance with the Strategic Plan, MTD has recommended a new organizational structure for its operation. MTD has identified regional workshops that would be created with existing provincial workshops, and is implementing a program to reorganize its staff with the aim of strengthening these regional workshops. The role of a regional workshop will be to:

- Ensure the availability of equipment for an entire region.
- Ensure funding for the provision of sufficient maintenance/repair services.

Establishment of sub-regional workshops (using existing district workshops) is also proposed to carry out preventive and minor maintenance works on a district basis, and to ensure that equipment in their area is properly utilized, maintained, and available for work in other parts of the region when required. Further changes to the organizational structure and commercialization process of MTD, based on a feasibility study sponsored by the World Bank, will be carried out. The study will commence during fiscal year 2002.

2) Organization

Function

The PWO/DWO is the head of all construction and maintenance works for classified roads at the provincial/district level. The current organizational chart for the MTD is shown in Figure 2.4.1.

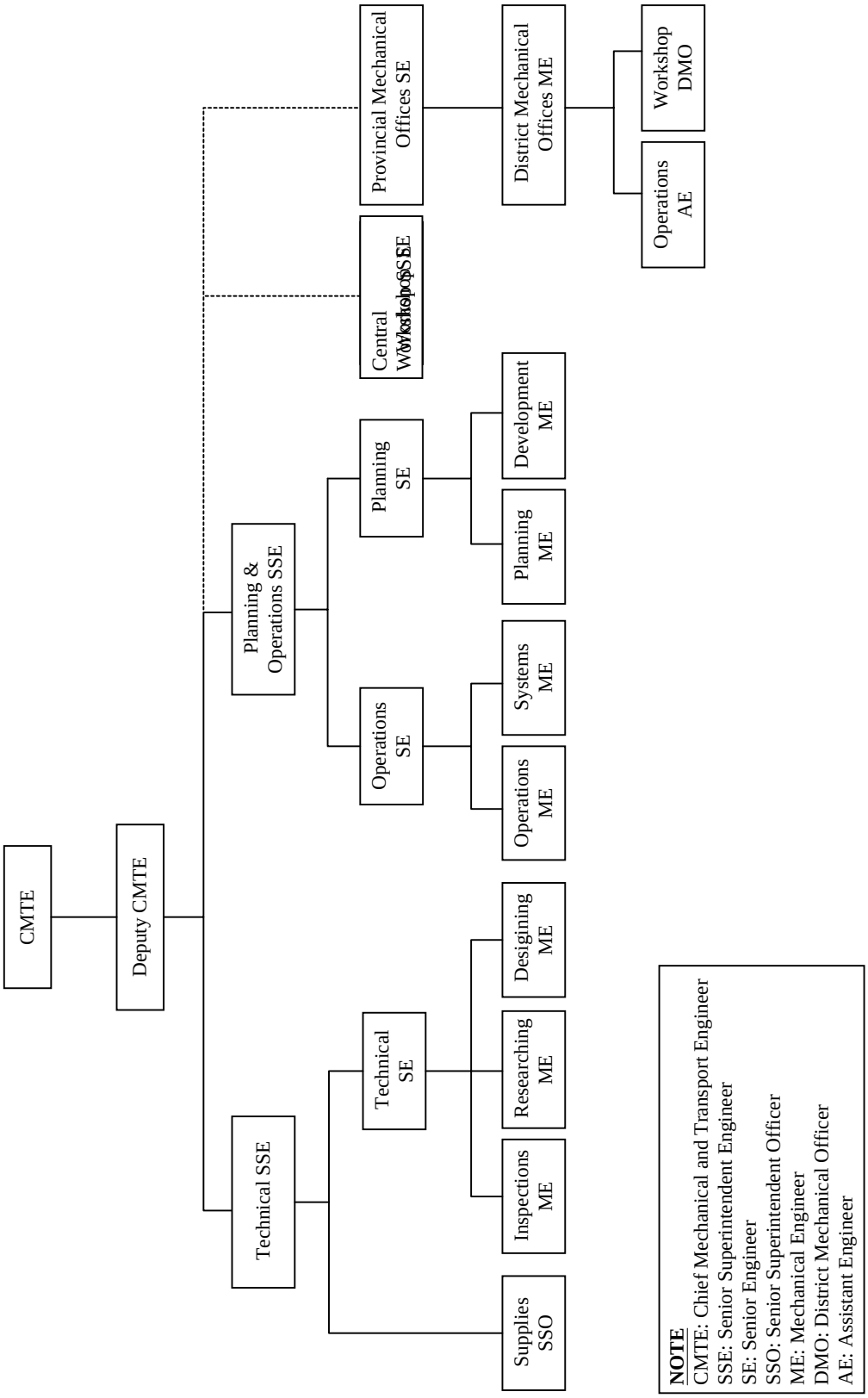


Figure 2.4.1 Organizational Chart of the Mechanical and Transport Department

Equipment Procurement Procedure

For the purchasing of spare parts for items costing less than Ksh. 10,000, the DME/PME can purchase directly with cash. For spare parts costing more than Ksh. 10,000, the PME/DME shall submit a request to the CMTE with his budget estimate. If the CMTE approves the request and funds are available, then PME/DME carries out the procurement procedure for the designated item (i.e., quotation, evaluation, award and delivery).

For the purchasing of new equipment, the PRE/DRE sends an application to the CE(R)/CMTE, who collects these applications from all the provincial/district offices and carries out a formal tender procedure (i.e., tender advertisement, tender and evaluation) when there are sufficient number of applications to warrant this. After a review and approval by the Ministry Tender Committee (MTC), the supply is confirmed and the equipment delivered to the respective provinces/districts.

Purchasing spare parts takes at least 5 weeks, and occasionally the budget of the CMTE is insufficient to comply with a request, meaning that a PME/DME has to wait until the CMTE has monies available. This results in a great amount of uncertainty in the procurement process and is a constraint on managing equipment and its servicing. As for purchasing new equipment, the issue is even more serious. As mentioned previously, the requests of PREs/DREs are held by the CE(R)/CMTE until a sufficient number are received to make a viable tender. It is therefore almost impossible to estimate the date for the completion of a purchase. This situation causes delays in road maintenance works, resulting in MTD losing the trust of its customers.

3) Level of Service

The level of service provided by MTD seems very poor in terms of both the availability and utilization of equipment. According to an equipment inventory executed by MTD, there were 3,325 pieces, consisting of vehicles, plant and equipment. Of this, only 26.0% of plant and equipment was serviceable and 53.3% was uneconomical to repair. However, district reports show a much lower level of availability. RD is now moving to lease equipment from the private sector when MTD equipment is unavailable or unreliable. Where there are large shortages of spare parts, cannibalization of plant and equipment is thought to be widespread. Such a low rate of serviceability is caused by a shortage of funds. In fact, of the 687 pieces of equipment (i.e., 20.7% of the total number) recorded as ‘under repair’, the majority of them are actually grounded in the workshops because of the unavailability of spare parts.

2.5 Involvement of the Private Sector in Road Maintenance

2.5.1 Registration of Contractors for Road Works

In March 1999, the MORPW directed that the register of contractors should be reviewed. Contractors were invited, through a newspaper advertisement, to apply afresh for registration, and 133 applications were eventually received as of 30 September 1999. Currently the register is being updated but the present situation can be summarized as follows.

- The registration process involves seven works categories: road construction (paved); bridge construction and other drainage structures; gravelling; labor-based construction and maintenance; special works such as piling and rock drilling; resealing and re-carpeting; and routine maintenance.
- Eight financial/contract ceilings are used (known as A through H but not related to class of road): A (over Ksh. 1.0 billion); B (Ksh. 500.0 million to 1.0 billion); C (Ksh. 250 to 500 million); D (Ksh. 100 to 250 million); E (Ksh. 75 to 100 million); F (Ksh. 50 to 75 million); G (Ksh. 25 to 50 million); and H (up to Ksh. 25.0 million).
- Of the seven works categories, only three include all eight money ceilings: road construction (paved), bridge construction, and resealing and re-carpeting. For example, labor-based construction and routine maintenance only have two money ceilings: G and H.
- Of the 133 applications, about 50 were deferred or rejected due to lack of plant experience or inadequate information.
- Thirty-nine of the 133 applicants were foreign or domestic/foreign together or unidentified, while the remainder were Kenyan. To undertake works in the top Category “A”, 12 contractors were registered of which nine were foreign and three were domestic. Of the 133 applications, 90 were based in Nairobi and the remainder in such places as Mombasa, Thika, Kisumu, Nakuru and Nyeri. A schedule of contractor classification is attached in Appendix 3.7.1.

2.5.2 Small-Scale Contractors

Following recent training initiatives launched by the Kisii Training Center (KTC), 126 labor-based small-scale contractors have been trained by KTC and 28 are registered with RD. The lengthmen system is no longer used in some provinces, mainly because donor-financed projects have dried up but also partly because the system needs a lot of RD supervision (RD does not have a sufficient number of supervisors, overseers and inspectors).

2.5.3 Equipment-Based Contractors

In terms of national contracting capability for equipment-based works, there is a shortage of firms compared with the length of the main road network. This is indicative of there being no significant history in Kenya of large contractors sub-contracting to medium-sized firms. About 30 years ago, the World Bank supported a program in Kenya for the development of national contractors. The program was successful but most of the firms that emerged went into the building sector rather than the road sector.

2.5.4 Labor-Based Experience

In terms of capability in applying labor-based methods, there is a large pool of experienced persons in Kenya, largely as a result of two earlier labor-based programs - the Rural Access Roads Program (RARP) and the Minor Roads Program (MRP). However, this pool of experience remains largely untapped, due to a business environment highly unfavorable to small/medium-scale contractors. Personnel with labor-based experience include lengthmen, as well as others, who were engaged in the RARP and MRP, as well as former RD staff who took early retirement or were made redundant under the civil service downsizing program.

2.5.5 Key Issues

There are many small- and medium-scale building firms. These are mainly family-owned businesses working for private sector clients. Few of these firms are registered with the RD. The reasons are several: lack of experience in road works, shortage of road funds leading to a lack of demand for road works contracts, and the need for firms to invest in road maintenance equipment. However, there is a good chance that these firms will enter the road maintenance market if entry incentives are improved.

At present, developing the capacity of building contractors for road maintenance is constrained by several factors, including:

- Lack of access to resources such as works, credit, materials, etc.
- Inadequate environment for contracting due to problems with such things as funding, timely payment, etc.

2.6 Road Maintenance Training

In September 1996, MORPW's Department of Staff Training was re-named the Kenya Institute of Highways and Building Technology (KIHBT). Over a period spanning about 50 years, roads-related training has evolved such that the Institute is now a major skill improvement and training body. It is relatively well staffed and has an annual trainee turnover of more than 1,200 (about 800 for roads-related training and about 400 for buildings). It serves MORPW, other ministries, parastatal bodies, private sector clients, emerging small/medium-scale contractors and client countries in the Sub-Saharan region and beyond.

As part of MORPW, the Institute derives its training objectives from the National Manpower Training Policy. Its objectives are summarized below.

- To redress the imbalance of training artisans, craftsmen, technicians and professionals both for the public and private sectors across the country.
- To provide skills for self-reliance.
- To ensure a continuous supply of required skills in the roads and building sectors in the country.
- To create a capacity for increased and sustained productivity.
- To improve the performance of craftsmen, technicians, and supervisors offering them suitable skill improvement courses.
- To ensure a continuous supply of required technical skills – working in cooperation with National Polytechnics and the Directorate of Industrial Training.
- To assist in improving management/supervisory capacity by offering tailor-made courses for other ministries, parastatals, the private sector and foreign countries on request.

2.6.1 Kisii Training Center and Ngong Training School

The Kisii Training Center (KTC) specializes in labor-based road maintenance programs, both for national and international trainees. KTC, acting as an agent for the Roads Department (RD), is responsible for maintaining 450.9 km of RD roads in the Kisii area and consequently all things taught in the classrooms can be exercised and tested on site. KTC's lecturers and instructors are experienced labor-based practitioners. In fiscal year 1999/2000 KTC accomplished 1,297 man-weeks of roads-related training including courses for supervising labor-based contractors, routine maintenance overseers, routine maintenance contractors, Roads 2000 rehabilitation, and trial contract training for DANIDA's Roads 2000 Project in the Coast Province.

Similarly, the Ngong Training School, which specializes in equipment-based methods, is responsible for maintaining 420.8 km of RD in the Ngong area. For purposes of teaching theory, KTC has fully equipped classroom facilities in the modern training center built with the assistance of the Swiss Agency for Development and Cooperation (SDC). KTC is currently in the process of developing a laboratory for materials testing.

2.6.2 Key Issues

Future training programs and priorities shall also be driven by existing conditions and constraints in the Roads Sector as summarized below.

- With the introduction of the road maintenance levy fund, the issue of funding becomes somewhat less pronounced, leaving capacity building (technical, institutional and managerial) as the most urgent constraints requiring resolution. However, the issue of capacity building includes the urgent need to set up sound and transparent financial control systems at all three levels – KRB/Road Agencies.
- There is an urgent need to move away from maintenance by force account.
- The environment necessary for small/medium-scale contractors to emerge in any significant way needs to be put in place.
- Small/medium-scale contractors will need training.
- Supervisory staff in RD and DRCs will need training.
- As new entities, KRB and the DRCs will need a lot of capacity building support based on sound technical and commercial principles.
- To encourage more small/medium-scale national firms to enter the market for road works, the business environment needs to be improved and contractor training needs to be put in place.

Some training needs can be satisfied in-house by KIHBT with donor support, while others will require tailored technical assistance projects supported by the donor community. Firstly, we look at KIHBT's challenges and strategy, and secondly at the broad type of technical assistance projects that will be necessary to get KRB and the road agencies up and running and somewhere towards maturity.

CHAPTER 3 APPROACH TO REALIZE AN EFFECTIVE ROAD MAINTENANCE SYSTEM

To realize an effective road maintenance system, it is first necessary to determine the gap between the needs and resources of road maintenance, and then second to implement the appropriate measures to deal with this “needs gap”. To accomplish this, the Study Team constructed plausible road maintenance scenarios to assess the existence and size of the above-mentioned needs gap, and then drew up proposals that are both comprehensive and holistic in nature in order to integrate the relevant road maintenance components and thereby realize the most effective system possible to eliminate it. Below, the process for doing this is described.

3.1 Key Findings for Drawing Up Road Maintenance Scenarios

The Study Team was able to determine the current status of road maintenance in the previous chapter. Based on this, the Study produces output describing a suitable road maintenance system and strategic operation scenarios for Kenya’s entire road network. As for the main findings for drawing up road maintenance scenarios, they are as listed below.

(1) Condition of Roads

- Lack of maintenance work has caused deterioration leading to the need for costly rehabilitation work.
- A significant percentage of the network is not in a maintainable condition and requires rehabilitation.
- The Roads 2000 Program, which calls for a new approach to rapidly bring the classified road network up to maintainable standard and place them under effective maintenance with optimum use of local resources, has not been implemented sufficiently.
- Current road condition data is not available.

(2) Legal and Institutional Setup for Road Maintenance

- Implementation of the KRB Act has been delayed by High Court action. The repercussions may delay full implementation.
- The issues identified by the “Interim Steering Group” need to be resolved as soon as possible. Especially, conflicts with previous legislation have to be resolved, which includes legal, finance/management, and technical issues.

(3) Road Maintenance Funding

- The fuel levy has been used for rehabilitation work reducing the amount available for maintenance. Funds for rehabilitation work should be kept separate from the fuel levy.
- Funds have not generally been allocated on a network priority basis.
- Funds are delayed, resulting in higher costs for work and materials and creating a lack of work continuity. This makes it a less attractive environment for the private sector.
- Funds have been used for purposes other than those designated.

(4) Management, Performance and Training

- The planning, supervision, and financial control of maintenance work needs to be improved.
- The accountability of the management, monitoring and evaluation system needs to be improved.
- Implementation plans have not always been carried out in accordance with work plans, and there are no standards for executing the contents of the work plans.
- There is a lack of skilled staff at the local level.
- Kenya has been relying on force-account method for road maintenance work.
- The majority of equipment is obsolete and is no longer economic to retain or maintain.
- Good training courses have been developed at Kisii, but the training has not been executed efficiently and effectively because of shortage of funds.
- A number of high quality manuals have been produced from previous studies. However, during our field survey, none were in use. A maintenance manuals that are user friendly, should be produced to ensure a consistent approach to maintenance under the KRB.

(5) Donors

- Donors have provided crucial support to the road sectors (e.g., RARP, MRP, Roads 2000). Donors have also provided funds for reviews of the institutional framework, as well as for the development and implementation of the KRB.
- Donors are likely to support road sector funding provided they see a functioning system that is capable of programming its work and that is transparent, accountable, provides proper technical/financial audits, and ensures that funds are spent on designated works.

3.2 Approach for Drawing Up Road Maintenance Scenarios

Scenarios are drawn up by the Study Team for both the classified and unclassified roads for the entire territory of the Republic of Kenya, and focus on such items as maintenance by road surface type, funding availability for road maintenance, maintenance by the different road administration agencies, force account versus contracting out, labor-based methods versus equipment-based methods, and the promotion of small-scale contractors in road maintenance works. The scenarios are for plausible future road maintenance, and propose a comprehensive and holistic program that focuses on the integration of all road maintenance components in order to realize the most effective road maintenance system possible. The Study Team's approach to drawing up road maintenance scenarios is as follows:

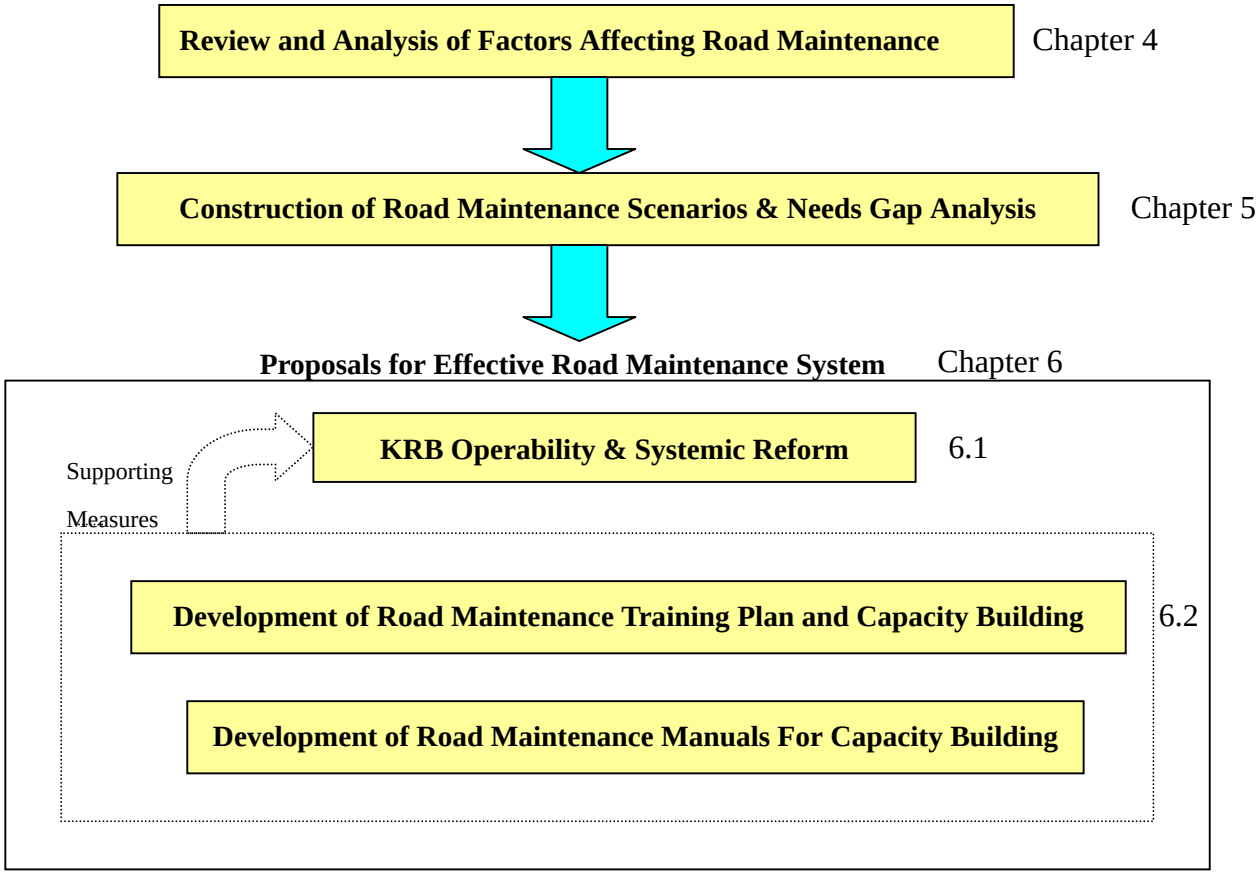


Figure 3.2.1 Approach for Drawing Up Proposals for an Effective Road Maintenance System