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RURAL ROAD REHABILITATION AND MAINTENANCE IN GHANA

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Abbreviations

AfDB	African Development Bank
APPP	Agricultural Productivity Promoting Project
BHC	Bank of Housing and Construction
CDR	Committee for the Defense of the Revolution
COCOBOD	Ghana Cocoa Marketing Board
DFR	Department of Feeder Roads
EPC	Environmental Protection Council
ERP	Economic Recovery Program
GHA	Ghana Highways Authority
ICB	International Competitive Bidding
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
LCB	Local Competitive Bidding
LTPS	Long Term Perspective Study
MOA	Ministry of Agriculture
MOREMAT	Mobile Recurrent Maintenance Unit
MRH	Ministry of Roads and Highways
MTADS	Medium-Term Agricultural Development Strategy
MTC	Ministry of Transport and Communications
NFRRMP	National Feeder Roads Rehabilitation and Maintenance Program
PAMSCAD	Program of Action to Mitigate the Social cost of Adjustment
NRPS	Northern Region Pilot Scheme
SIAM	Spot Improvement and Maintenance (Unit)
SSA	Sub-Saharan Africa
TRP	Transport Rehabilitation Project
WFP	World Food Program

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Background and Objectives of Report

The socio-economic improvement of most sub-Saharan African countries depends on agricultural production of the majority rural dwellers. The strong linkage between access to rural areas and rural area productivity has brought into focus rural roads in the Economic Recovery Program of many African countries. In Ghana, rural road development was neglected during the period of economic decline. Absence of maintenance during the period led to deterioration of most of the country's rural roads that should now be rehabilitated. As rehabilitation costs about three to five times more than if maintenance were sustained, Ghana requires substantial resources to rehabilitate most of its 21,900 km of rural roads. The poor state of the roads is a major constraint on efforts to increase agricultural production under the ERP.

With the assistance from the World Bank and other donors, the Ghana Government has initiated programs to rehabilitate and maintain priority rural roads vital for cocoa evacuation and serving high food growing areas. The young Department of Feeder Road (DFR) has been going under institutional strengthening to build adequate capacity for coping with requirements imposed by the ERP. Scarce financial resources has obliged DFR to actively search for methods and applied technologies that will reduce the cost of rural road rehabilitation and maintenance both in local and foreign exchange requirement. The government has developed new policies that will ensure adequate maintenance requirement in the subsector..

Under the African Development Support Project (698-0464-24), REDSO/WCA has been reviewing rural road rehabilitation and maintenance in some WCA countries. The aim is to identify methods being used by various countries and analyze their cost effectiveness under the respective country conditions. This report on Ghana has been prepared along these lines to provide information base on the Ghana's situation. The reports with those of other countries in the region will be synthetized to identify successful stories for dissemination to other African countries.

Data for the report was obtained mainly from the staff and reports of Department Feeder Roads in the Ministry of Roads and Highways in August 1990.

Executive Summary

1. Ghana Road Network

Ghana has a total of about 36,000 km of road network. This is sub-divided into major roads (14,000 km) and rural (feeder) roads (22,000 km). About 70% of the major roads and 80% of the rural roads are located in the southern half of the country where population and economic activities are concentrated. The rural roads have been constructed over the years by the government, timber firms and mining interests. The rural roads constructed by private firms, for their own interests, have not always met adequate standards for public use. Some are, therefore, characterized with inadequate drainage and steep grades on bad soils which turn slippery during rainy seasons. During the period of economic decline which followed the late 1970s, there was virtually no maintenance which resulted in poor condition of the network,

2. Institutional Setting

The Ministry of Roads and Highways is responsible for all roads in the country. The Ministry oversees basically two agencies, The Ghana Highway Authority and The Department of Feeder Roads. The Department of Feeder Roads manages the 22,000 km of cocoa and non-cocoa roads that constitute the country's rural roads. The department is organized into four levels: district offices, area offices, regional offices and head office for effective coordination and coverage of the country. Because the department is established only in 1983, it is still building its capacity in staffing and logistics. Under the ERP, it is receiving satisfactory support from the government and other donors for its capacity building to cope with requirement of the ERP.

3. Rural Road Program

As rural road is recognized as vital for the process of the ERP, the government has put in place policy framework for the subsector. For rational development, the DRF has created a planning unit which has been prioritizing operations. The technical designs of road projects are undertaken at least cost. Construction of new roads, as a matter of policy, is very limited. The accent is on rehabilitation. A number of projects have been developed with donor support and funds from the Road Fund and COCOABOD. Projects have also been supporting the institutional building of DFR.

4. Rural Road Rehabilitation and Maintenance Methods

The financial constraint on managing the backlog of rural road rehabilitation and maintenance has led DFR to consider other methods of

approach such as labor-intensive, spot improvement, community-based maintenance and mobile recurrent maintenance with local contribution.

With technical assistance from ILO and funding from donors, DFR has initiated these methods and much progress has been made. The labor-intensive method has proved to be well-suited to Ghana's situation and the government has consequently made a policy to expand it throughout the country.

5. Rural Road Budget

Funds for rural road work come from the central budget, Road Fund and external financing. The budget so far have been commensurate with the implementation capacity of DFR. Financing has been increasing steadily, enabling the bubget to reach US$ 10.4 million in 1989. Voluntary labor and fuel contribution by local communities for maintenance work are expected to make significant impact on financial resources in the future.

6. Strategy for Rural Road Program

In order that rural roads contribute to the agricultural growth rate of 4% per year under the ERP, GOG and the World Bank have initiated a nation-wide effort to remove the rural road transportation bottleneck through a National Feeder Road Rehabilitation and Maintenance Program. The program is expected to establish a sustainable road maintenance organization for about 12,000 km by year 2002. The strategy in the program is as follows:

(a) review the present and future role of the rural road subsector in Ghana's economy and its impact on overall economic development, considering in particular the emphasis on export promotion and efficient import substitution, as well as ongoing decentralization efforts,

(b) present a review of the subsector by identifying the main planning, financial, human resource, institutional and technical constraints;

(c) assess the absorptive capacity of existing institutions to implement a nationwide rural roads program; identify and develop measures to strengthen related planning and implementation capabilities at all levels i.e., national, regional and district; and to ensure that key constituencies are involved at various levels of planning and implementation;

(d) improve the subsector policy framework, and coordinate any proposed operations with programs and policies concerning main roads (e.g Ghana's TRP series), as well as with the Medium-term Agricultural Development Strategy (MTADS);

(e) propose appropriate and sustainable funding arrangements to secure timely counterpart funding, contract cofinancing, and mobilize local resources for maintenance;

(f) support labor-based methods, expand the capacity of private contractors, analyze problems with procurement, evaluate prospects of sustainability of present contractors, present appropriate design standards and secure the continued involvement of ILO as a technical coordinator;

(g) give a high profile to maintenance arrangements and requirements, assuring the sustainability of past and proposed investments; and

(h) consider related aspects including, but not limited to examining the scope of further efforts to disseminate intermediate Means of Transport (MT), monitoring and evaluation of the proposed project, and assess the impact of the project on women and the environment.

7. Environmental Consideration

The magnitude of rural road rehabilitation nation-wide is expected to have both positive and negative impacts on the country. To minimize the negative effects, DFR has been adopting engineering designs and technologies that improve local runoff characteristics for reducing soil erosion. Closer working relationship and coordination are being established with the Environmental Protection Council, Department of Forestry, Ministry of Agriculture, Ghana Highway Authority and local authorities during planning and implementation to safeguard the environment.

8. Future Projects

All future rural road project activities are to be incorporated in the National Feeder Road Maintenance Project for better coordination of efforts. Annual work loads will therefore be programmed to be commensurate with the increased institutional and contractor capacity. The project will be implemented in three phases over 1992 to 2002. The first phase will cover 1992-95 for 3,000 km of rural roads to be rehabilitated in 10 road districts. The subsequent two phases will each rehabilitate 4,500 km of rural roads. The first phase funding will be met by IDA, the Ghana Government and cofinancing donors to a tune of US$ 80.0 million.

9. Conclusion

The Ghana Government faces a backlog of huge rural road rehabilitation with its associated cost. The magnitude of financial requirement, if implemented by conventional method, will be enormous.

DFR has therefore put into place a labor-based method which reduces foreign exchange requirement by 50% and makes overall savings of about 15%. These positive results with the labor-based method have inspired the government to disseminate the method over the whole country. The DFR has been undergoing capacity building and has coped with rehabilitation requirement.

The government's policy is to contract out rural road work instead of using force account. The labor-based contracting is estimated to handle over a third of the workload in 1992. Hence for sometime, dependence will be on equipment-based method. The pooling of all projects into a single project, the National Feeder Road Rehabilitation Project, is appropriate for streamlining the rural road activities in the country. GOG's strategy for rural roads rehabilitation and maintenance favors, very much, the development of the private sector.

RURAL ROAD REHABILITATION AND MAINTENANCE IN GHANA

1. Ghana Road Network

Ghana roads are classified into major roads and feeder roads. The major roads total about 14,000 km that is further classified into primary (3,750 km) and secondary (9,900 km) roads. Feeder roads total about 21,900 km. These feeder roads are usually through farming areas linking village markets and connecting the village markets to the primary and secondary trunk roads that inter-connect urban markets and commercial centers. About 70% of trunk roads and 80% of feeder roads are located in the southern half of the country where population and economic activities are concentrated. Town roads also total 770 km.

Of the 21,900 km of feeder road, only 914 km are paved. The balance (about 21,000 km) have gravel surfaces. These feeder roads were in a very poor state when they were handed to the Feeder Road Department in 1981. They have been constructed over the years by various institutions and sometimes private firms, especially, the timber and mining firms for access to their mining and logging activities. Roads for private business interests were constructed, usually, without consideration for standards and long-term maintenance requirements. Most of these feeder roads, therefore, have inadequate drainage systems and steep grades on bad soils which turn to be slippery during the rainy period.

2. Rural Road Institutional Settings

2.1 Ministry of Roads and Highways

The Ministry of Roads and Highways (MRH) is responsible for all road network in the country. MRH oversees basically two agencies, the Ghana Highway Authority (GHA) in charge of trunk roads and the Department of Feeder Roads (DFR) in charge of feeder roads. The third agency, the Urban Roads Department, was created in 1983 to be in charge of urban roads but started functioning only in 1988.

2.2 Department of Feeder Roads

2.2.1 General

The Department was created out of Ghana Highway Authority in 1983 to be responsible for maintenance of about 14,000 km of existing rural roads and the building of new ones. The Department is headed by a Director and three Deputy Directors heading development, maintenance and administration respectively. See Annex A-1 for the organization chart of the Department.

The transfer of Cocoa Feeder Roads to DFR has brought about increased staffing demand which is yet to be met fully. Annex A-2 shows the staffing pattern and projection. Currently, DFR contracts out most of the field activities involving feeder roads development, rehabilitation and maintenance. This has put some pressure on contracting capacity of the department in meeting planned work targets. The department is young but well managed and has so far satisfactorily accomplished its programs.

2.2.2 Organization

Under the government's decentralization policy, DFR offices are being established at four levels:

a. District offices (110 political districts)
b. Area offices (32 previous Road Districts)
c. Regional offices (10)
d. Head office

a. District Offices

These will be managed by foremen whose main activities will be organization of community labor for maintenance. Their activities will involve both paid and unpaid labor for routine maintenance. In addition, the district foreman will provide data, on a regular basis, to the area office for developing a maintenance management system.

b. Area Offices

These are previous road districts which cover 3 or 4 political districts. They are located in towns other than the main towns where GHA is located to give broader coverage. In 1990, only three area offices are fully established; eight are partially established. Each office is in charge of 500-800 km of rural roads in the 3 or 4 political districts it covers. The technician engineer who is in charge of each area office represents DFR in district assemblies. He is expected to be an advisor to the districts in costing and prioritization of rural road infrastructure. DFR plans to recruit more technician engineers to head the area offices and provide basic equipment for recurrent maintenance such as tipper truck, tanker, roller and a maintenance shop.

c. Regional Offices

These offices are already established in all ten regions. They are headed by a regional engineers who serve as advisors to the Regional secretaries and coordinate the resources within the

area offices according to the guidelines from the head office. The regional engineers are backed by at least one engineer.

Currently in five regions, the regional engineer is backed by two engineers; one is in charge of equipment-based activities and the other labor-based methods. Other support staff include a quantity surveyor (except three regions), a technical officer, drawing office staff and administrative personnel.

The regional engineer ensures that area offices receive resources required for identified needs and is involved in planning of rehabilitation and maintenance activities in the region. The regional engineer is also responsible for supervision of labor-based contracts during the final contract periods. One of the important functions of the regional engineer is the supervision of the Mobile Recurrent Mainteenance Team (MOREMAT).

d. The Head Office

The head office organization has been restructured through an institutional strengthening project with Dutch technical assistance. There are three deputy directors under the Director of DFR, namely: administration, development and maintenance. This change aims at improving efficiency and striking some balance between maintenance and development activities. A planning unit has been created and is presently manned by an economist.

Under the Dutch technical assistance, computers are being installed and management information system is under preparation. The management information system will include facilities for preparing contract documents and work evaluations which, at present, take too much management time. DFR envisages rapid expansion according to expected workload involving agricultural production improvement programs and socio-economic activities.

2.2.3 Staffing and Training

As a young establishment, DFR is still building its work force. The evolution of staffing of DFR in 1989, is shown in Annex A-2. At present, DFR has been able to fill the following positions: 5 percent of required senior engineers, 33 percent of principal engineers and 42% of engineers in the regions. There is critical shortage of experienced senior management personnel. It is however hoped that within the next few years. It is however hoped that in the near future, the vacant positions for senior engineers would be filled from promoting present staff or attracting engineers from outside.

Specialized staff like accountants, quantity surveyors and technician engineers are also short of DFR requirement.

Training of personnel on board is one of the priorities of the department since most of the professional staff are fresh graduates. The personnel have been benefiting from post graduate offers and on- the-job training, mostly outside the country. Short-term study tours and attendance in seminars have also been beneficial to the staff improvement. The department has now created a training office which is charged with drawing up training plans and implementing systematically training needs of the staff. The training facilities at the Ghana Highway Authority Training School at Shai Hills is now available to the department for training of road technical personnel.

2.2.4 Vehicles and Equipment of DFR

The effective administration of the feeder road system requires mobility which the department has been improving since its creation. Its acute transportation problems have now been overcome but serious problems exist for inspection and supervisory requirement in vehicles and radios for effective coverage of the country. Though the government policy is geared to contracting out work to the private sector, a minimum level of heavy equipment is required to support community roads care programs and perform work that, for one reason or another, cannot be contracted. Several project components are currently involved in equiping DFR.

The main problem with staffing is the low salaries and benefits (based on civil service policies) which are not attractive to experienced professionals. The private sector and GHA have more favorable offers. DFR is working on improving the conditions to enable it attract suitable professionals by providing housing and other benefits.

Under the new political district setup, each district is to have a DFR foreman who will coordinate routine maintenance and related supervisory function. DFR plans to fill the foremen positions with 170 men of which 110 will serve the political district councils and 60 will supervise labor-based works. DFR already has 120 foremen located all over the country. They are being trained to assume the new responsibilities.

3. Rural Road Program

3.1 Feeder Road and the Economy

Over the years constructed feeder roads were not adequately maintained, mainly, because of insufficient funds for their maintenance.

With the deterioration in the country's economy in the late 70's and early 80's, the conditions of these roads became rather deplorable.

Farming input to and marketable crops out of these areas have been seriously affected. Harvested crop to the markets were therefore limited to the headloads carried by the farming family. This has put constraints on increasing agricultural productivity under the Economic Recovery Program.

A study conducted by the Ministry of Agriculture shows that the poor state of rural roads results in high transportation cost and this account for up to 70% of the difference between farmgate price and retail price of some farm products. Since agriculture takes 50% of the country's GDP, high cost of transportation and lack of accessibility suppresses responses to increased agricultural production. Recent studies conducted as part of the First Transportation Rehabilitation Project shows that road rehabilitation in the various ecological areas of the country would stimulate agricultural output and production could increase between 700,000 to 1,000,000 metric tons. In addition to stimulating agricultural production, improved rural roads would increase benefits to farmers with reduced storage losses and transport cost. Vehicle operating cost would save foreign exchange in fuel and spare parts with the improved roads.

3.2 Rural Roads Network.

The DFR roads for rehabilitation and maintenance consist of:

a) Non-Cocoa Feeder Road totaling about 9,000 km.

b) Cocoa Feeder Roads (12,000 km) which were, before 1988, the responsibility of the Ghana Cocoa Board. DFR maintains these roads with funds provided by the Ghana Cocoa Board. The Board is required to provide 6% of revenue, it receives from cocoa export, for development and maintenance of the trunk roads that serve the major export producing areas.

The DFR classifies the conditions of the roads as follows:

1. Good - refers to roads that can take two-wheel drive vehicles throughout the year regardless of the weather condition;

2. Fair - refers to roads that cannot be transitted by two-wheel vehicles during the rainy season;

3. Poor - refers to conditions of roads that can be transitted only by 4-wheel drive vehicles and tractors regardless of the season.

In 1990, approximately 13,490 km of feeder road (61.6% of the total) are in poor condition while 5,250 km (24% of the total) are classified as fair. Only aout 3,163 km (14.4% of the total) are classified as in good condition. (see Annex A-3).

3.3 Rural Road Policy Framework

At the beginning of the ERP, emergency repair works had to be undertaken on trunk roads with the assistance of IDI and other donors. This was followed by phased rehabilitation of the trunk roads and road drainage structures. The vital linkage between rural roads and activities of the economy necessitates similar consideration for the rural roads which have just began. IDI support has been sought in designing and implementing nation-wide effort in rehabilitation and maintenance of rural roads. The rural road policy framework of the government are:

- strengthening DFR staff through technical assistance and training.
- reducing share of force account activities through contract works.
- introducing incentive schemes for maintenance of roads by communities with food aid from World Food Program (WFP).
- Setting up a Road Fund to be shared with trunk roads to improve resource availability.
- Supporting the development of labor-based contractors for road rehabilitation and maintenance.
- Expanding the role of local consultants for engineering design and supervision of works.

In order to meet the objective of improving the accessibility of rural areas to facilitate the movement of people and agricultural produce, the following strategies have been adapted by DFR:

a) spot improvement of roads which have been rendered impassable by isolated physical obstructions, erosion, slippery slopes, etc.;
b) grading, reshaping and improvement of the drainage of roads rendered badly by loss of shape due to poor side drainage and neglect;
c) construction of new or replacement of damaged or undersized culverts on passable roads to reduce maintenance costs;
d) clearing of right-of-ways and general improvement of roads which have been reduced to "non-road condition" as a consequence of poor or non-engineered design and/or construction or decades of neglect or both;
e) full gravelling of spots improved and reshaped roads;
f) the intensification of routine maintenance through the involvement of local communities; and
g) expanded use of the ILO sponsored labor-intensive technology that was acquired under the World Bank-funded Roads Rehabilitation and Maintenance Project. The aims of the use of the technology are to create jobs and reduce dependence on expensive imported heavy construction equipment.

3.4 Planning

In the past, planning for rural roads was limited to work programs or road selection function for requests passed on from field offices and communities. At the sectorial level, there was analytical process for deciding which proportion of total resources should go to rural roads. For rural roads implementation, there were no guidelines or criteria for splitting resources between new construction, rehabilitation and maintenance. Feeder road selection for construction, rehabilitation or maintenance has been done on an ad hoc basis in the past. The World Bank and ILO in their involvement with feeder roads under Economic Recovery Program has demanded planning approach to feeder roads as a condition for credits.

The Planning Unit of the Department was therefore created around 1986. As a start from scratch, a road inventory compiled from all the regions were put together to constitute initial data base. The road inventory include approximate road length, road surface widths, etc.
The country is divided into 32 road district which are ranked according to agricultural potentials, populations, state of roads, and socio-economic activities into high, medium and low potentialities. The analysis of the preliminary inventory showed that only 16% of the roads are in good condition. The individual road stretches are detailed out with the population along the road corridors and subjected to economic viability and accessibility. Socio-economic studies are undertaken for the roads by the Planning Unit or contracted out to consultants.

The Planning Unit is currently establishing a master plan for feeder road rehabilitation for implementation to start in 1991 for 3 years. It is aimed at increasing feeder roads in good condition from 16% to 40%. New projects to be undertaken are therefore subjected to the economic rate of return which should be greater than 10% for acceptability. In general, however, the projects have had rates of return of about 40%. The Planning Unit hopes to improve the feeder road planning system, especially the basic data input. The planning process is expected to be institutionalized for rational approach to the feeder road management. Management Information System would be one of the helpful products of the planning process.

The road selection methodology is to involve regional and local governments and offices of DFR. In order to involve the participation of local constituencies in the planning system, selection of roads at the DFR headoffice is considered as a pre-selection operation. It will then be discussed with the regional and district engineers who will then present and discuss them with the district secretaries. In this way, a final screening takes place before conducting the economic evaluations. Thus the calculation of economic rate of return would only centralize the final process that will limit the participation of local communities in the process.

3.5 Design

The classical design of roads involving road location, vertical and horizontal alignment and drainage structures were undertaken in the past by mainly local private consultants. The cost involved has been high. The department has now been taking to cost saving measures by designing only stretches of roads that present serious problems.

Presently, to rehabilitate a road, the staff engineer would establish a reasonable location through reconnaissance. As much as possible, the existing road or track would be maintained and modification made only at critical problem stretches. Such stretches will be surveyed and appropriate detailed engineering designs prepared. In the design, cuts in vertical alignments are kept to a minimum for cost effectiveness. The road survey includes road length and width measurement, and locating of bad spots or stretches. The road work is then quantified by quantity surveyors for bid document preparation.

Only one standard road cross-sectional design was used, in the past, for all feeder roads;this was rather expensive. DFR has started classification of its roads in order to adopt appropriate standards according to economic analysis. This move has been reinforced by the exposure of the director and some senior engineers of DFR to the USDA-Forest Service where strict low volume road classification system amply demonstrates economical use of public funds.

Past geometric design for standard design emphasized speed and width of road rather than serviceability requirements. This resulted in rather high standards with inherent high cost of construction. Many of the existing rural road sections have 9.5 meters of formation width. The 7-meter formation width is currently used by DFR but as traffic is usually less than 50 vehicles per day on these roads, this is still not justified. DFR is considering adopting the following standards:

1. width of 5 meters for roads carrying less than 50 vehicles per day.

2. width of 6 meters for roads carrying between 50 and 100 vehicles per day.

3. width of 7 meters for roads with higher volumes of traffic (ie. 100-250).

4. original widths for road sections in towns and villages.

Cumber formation is being emphasized together with side drains, with scour checks to prevent erosion and gully formation.

3.6 Rural Road Construction

Though the GOG policy for feeder roads has accent on feder road rehabilitation, road constructions already started and roads required to link neglected areas like the Afram Plains which has a great potential for agricultural development are permitted. Thus roads already under construction that are substantially completed and which it would not be economically feasible to stop would be completed. Also, new roads that have estimated economic rate of return of more than 15% and are demontrated to be vital to other economic development plans and activities may be constructed. An average limit of 100 km per year of new roads is put on roads not classified as Cocoa Feeder Road.

In the past, contract awards were based on contract sums using pre-determined unit rates. Since January 1988, competitively bidded contracts are used. The contractors engaged in undertaking DFR contracts are normally pre-qualified in accordance with pre-determined objective criteria. Contractor for road construction are therefore drawn from the registered or pre-qualified pool of local contractors.

After awarding construction contract through standard contracting procedure, the adminstration of the contract is done by the DFR staff. Some inexperience on the part of the DFR staff and absence of computer aid has been responsible for some problems whit contract administration. Project is underway with the Dutch Government to institute management information systems that would facilitate contracting and contract management especially in satisfying the exigencies of donor funding.

3.7 Rural Road Ongoing Project

a. Non-Cocoa Feeder Road Rehabilitation and Maintenance Project

This is included in the GOG's PIP and is projected to cost ¢4,995 million over the period 1988-1990. The planned outputs are:

1. 11,400km of road graded and reshaped;
2. 1,170km of full regravelling;
3. 444km of spot improvement;
4. 840 drainage structures installed/replaced;
5. purchase of 10 new motor graders; and
6. the rehabilitation of 23 graders, 11 rollers and 10 bulldozers.

Technical assistance for this is to be provided by The World Bank separate funding.

b. Cocoa-Roads Development, Rehabilitation and Maintenance Project

In the Public Investment Program (PIP) for this project, the planned outputs are:

1. 5,400 km of road graded and shaped;
2. 1,400 km regravelled;
3. 300 km of spot improvement;
4. 800 drainage structures installed/replaced; and
5. 80 km of new road. It is stipulated that economic rate of return of roads to be selected should be at least 15%. The estimated cost of the 3 year project is ¢3,960 and technical assistance would be provided under World Bank funding.

c. Program of Action to Mitigate the Social Costs of Adjustment (PAMSCAD) Intensive Labor Feeder Road Rehabilitation and Maintenance Project.

The PIP includes a 3-year program under PAMSCAD costing ¢2.361 million.

Table 1 shows the funding requirement for GOG's PIP programs for maintenance and rehabilitation of feeder roads.

Table 1

Funding Requirement for PIP (1988-90)

Project Name	Costs (¢ X 10^6) FX	LC	Total
a) Non-Cocoa Road Rehabilitation and Maintenance Project	1,140	3,855	4,995
b) Cocoa Roads Development, Rehabilitation and Maintenance Project	--	3,960	3,960
c) PAMSCAD Intensive Labor Feeder Roads Rehabilitation and Maintenance Project	1,022	1,339	2,361
TOTAL	2,162	10,354	12,516

d Other projects

In addition to the projects in the PIP, the following three other on-going projects supports the feeder roads maintenance and rehabilitation project:

i) Roads Rehabilitation and Maintenance Project (RRMP)

In the activities supported under this project of ¢121.8 million over three years sponsored by the World Bank, ¢6.8 million is being provided for financing a three year pilot Intensive Labor Feeder Roads Program.

ii) Transport Rehabilitation Project (TRP)

This ¢222 million World Bank Sponsored project is to be implemented over six years (1988-1993). Under the activities, ¢13.5 million will be provided to the DFR for the regravelling and general rehabilitation of about 180 kms of non-cocoa feeder road network. The fund will also meet the cost of 72 person months technical assistance and training for DFR staff and contractors. TRP is also to provide vehicles for DFR staff to enable them to effectively supervise the much enlarged maintenance program as well as construction of 25 unit housing for DFR field staff.

iii) Cocoa Rehabilitation Project (CRP)

The World Bank is sponsoring this project costing ¢126 million for implementation over 1988-1993. Thirty eight million dollars budgeted under the project would be used for upgrading roads in the cocoa growing areas. The road improvement portion is to:

1. improve cocoa evacuation efficiency
2. reduce significantly haulage cost
3. increase private haulers' interest in playing larger role in cocoa evacuation.

The activities included in the road rehabilitation are:

a. Consultant Supervised Remedial improvements to some 3,000 km of primary, secondary and feeder roads and bridges, predominantly in Western, Brong Ahafo and Ashanti regions, which carry cocoa traffic from village society to port or railhead. These activities will be planned and supervised by consultants. Approximately 25% of the program will be executed by labor-intensive local contractors currently undergoing training under RRMP by an ILO team. DFR, assisted by ILO, will supervise this element of the program.

b. Routine and Recurrent Maintenance of 2,100 kms of roads including the supply of hand tools for use by community volunteers who will be responsible for subsequent routine maintenance. Road maintenance comprise (a) routine maintenance, i.e. the day-to-day contracted repairs of potholes, ruts and drain clearance; and (b) recurrent annual mechanized maintenance.

c. Construction of 60 km of new road for two major bridges would be constructed in the area between the Bia River and the Cote d'Ivoire border. This is to intercept cocoa which is being transported into Cote d'Ivoire. The road would be supplemented by some 80 km of track suitable for tractor/trailer combination access to contract documents and supervise construction. The proposed program is:

d. Equipment for the DFR: The project will supply vehicles, minor survey and materials testing equipment, materials and radio, for field operation and site supervision of project activities.

e In 1990, other programs undertaken by DFR includes:

(i) the recently negotiated TRP-2 which includes the Northern Region Pilot Scheme (NRPS) with labor-based construction of 150 kilometers of rural roads and promotion of intermediate means transport (MT)

(ii) The Cocoa Rehabilitation Project (CRP, Credit 1854-GH) which includes the rehabilitation of 3,000 km of rural roads in cocoa farming areas;

(iii) the integrated Development Areas project for a total of US$2.35 million funded by the international Fund for Agricultural Development (IFAD, with the Objective of rehabilitating 160 km of rural roads in project areas of northern districts, and procurement of maintenance equipment for the project areas;

(iv) the Agricultural Productivity Promoting Program (APPP) funded by USAID which started in 1989/90 with US$2 million, and was raised to US$6 million per year for 1990/91 and 1991/92 to fund rehabilitation in non-cocoa farming areas and to create maintenance units in road districts;

(v) technical support for the development of labor-based methods from ILO;

(vi) provision of graders for rural road maintenance by former East Germany;

(vii) provision of food aid to supplement wages for road workers by the WFP.

Table 2 shows the achievement of DFR operation in 1989.

4. Road Rehabilitation and Maintenance Methods

4.1 Feeder Road Improvement by Labor-Intensive Method

As noted earlier, the deteriorated economic situation in Ghana could not support the foreign exchange requirement for conventional heavy road equipment for maintaining feeder roads. This has resulted in only 20% of the 21,000 km feeder roads in the country to be described as good. The rest is characterized by ruts, potholes, broken drain structures etc. that eventually cut off potential agricultural production areas. The situation has been responsible for the locked up tons of the country's vital cocoa and food crops in the production areas.

An attractive solution to the problem in Ghana is the Labor-Intensive Method of road maintenance which has been introduced in some other African country's like Kenya, Ethiopia, Botswana and Malawi. This approach is suitable in the Ghana situation because the basic resources necessary are readily available i.e.

- a large number of small locally-based contractors operating in the rural areas

- an underemployed rural labor force ready and willing to improve the access to their village

Table 2

Rural Road Maintenance Achievements in Ghana in 1989

Activity (period)	Road Unit	Fund Cocoa	4th MOREMAT	Direct Highway	Labor	Community	Totals
Periodic (year)							
Regravelling	km	330.6	54.4	-	128.0	-	579.0
Reshaping	m	434.6	233.4	-	128.0	-	796.
Culverts	Unit	105	36	-	269	-	410
Recurrent (year)							
Improvements	km	146.1	214.9	584.0	-	-	945.0
Routine (quarter)							
Grass Cutting	m^2	-	-	-	6,323	2,808	9,131
Pothole Patching	m^3	-	-	-	2,159	2,362	4,521
Ditch Clearing	km	-	-	-	122.7	58.8	179.5

Source: Government of Ghana, 1989, DFR Annual Progress Report, Min. of Roads and Highways.

Some of the advantages of the method in relation to the conventional capital intensive methods are:

1. Reduction in foreign exchange costs of road maintenance.

2. Creation of employment opportunities for both men and women.

3. Bringing funds into rural areas. These funds would otherwise go into imported heavy equipment.

4. Offering opportunities for rural men and women to increase their farm income. It becomes important income generated in case of bad harvest.

5. The direct participation by the rural men and women offers potential for strengthening leadership skills, utilization of labor-saving equipment and support for local enterprise development.

The following project objectives have been set for the DRF's implementation of the labor-based program:

a. to improve the level of service of 245 km of feeder roads in the Sefwi Wiawso District through large scale application of low cost approaches to feeder roads improvement which rely to the extent possible on the utilization of local resources.

b. to evolve effective methods and procedures for improving deteriorated feeder roads using an optimum mix of labour and equipment for replication in other part of the country.

c. to introduce the domestic construction industry to alternative technologies of feeder roads improvement which are less dependent on foreign resources and back-up facilities.

Output of the Labor-Intensive Project started in November, 1986 and as of June 1990, 259 management and supervisory staff from contracting firms and DFR have received training in the application of labor-based technology. New and even larger construction firms continue to express interest in training in the technology, an indication of the success of the training exercise.

At the end of June 1990, 285 km of feeder roads have been rehabilitated to all seasonal use. Some 530 box culverts of project standard design have been constructed. Four construction firms have gone through all the three training stages and are now undertaking standard contract through the normal DFR competitive bidding process. Three other firms are at the stage of standard contract since November, 1989 and are expected to add to the other four for competitive bidding in early 1991. The remaining 22 firms are in the trial stage with 10 of them undertaking advanced culvert construction while waiting for their set of equipment to enable them to start road work.

The average output in the standard contracts is 1.67 km/month per contractor compared with the project target of 2 km/month per contractor. A few have however hit record target of 2.2 km/month. During the trial contracts, the average output was 1.25 km/month per contractor.

The average cost per kilometer of the improved roads including culverts is ¢3.40 million. Up to June 1990, 697,353 mandays (women contributed 156,300 mandays) of employment has been created for about 5,100 rural youths engaged in the execution of the road maintenance and the amount of ¢244.98 million has been paid out as wages.

With the success of the program so far, the labor-intensive method is being integrated into the DFR Regional Structure. Replication is therefore in progress in the Eastern Region under PAMSCAD program and in the Brong Ahafo, Ashanti Regions. The method is planned to be started in Volta, Northern and Central Regions in a short time. See Table 3 for the number of people trained under the program and projection for contractors.

4.1.1 Constraints on Labor-Intensive Road Work

Since 1986, DFR has gone through training and field practices in labor-intensive method, thus accumulating rich experience to be utilized throughout the country. The initial pilot experience has permitted DFR to identify the following constraints which have contributed to the delay of a timely completion and cost of construction:

- The frequent breakdown of the pedestrian vibration roller has resulted in excessive down time or low output which is contributing much to the shortfalls in output.

- As a labor-based activity, a lot depends on the motivation of the workers. Financial constraints that result in irregular payment of salaries leads to a decline in production.

- Unexpected torrential rains have caused delays and sometimes redoing some work.

- Seasonal variations in labor availability and competition with other employers for available labor within an area has been causing shortfalls in the contractor labor strength.

- Inadequate vehicle control hampered the smooth collection of productivity data for works under standard contracts after the trails.

TABLE 3

NUMBER OF TRAINEES TRAINED ACCORDING TO REGIONS

UNDER WIAWSO PROJECT

REGION	FIRST TRAINING COURSE	SECOND TRAINING COURSE	THIRD TRAINING COURSE	TOTAL TRAINED BY JULY, 1989
CONTRACT SUPERVISORS				
Ashanti Region		13	14	27
Brong-Ahafo Region		12	15	27
Eastern Region			8	8
Western Region	29	10	2	41
DEPARTMENT OF FEEDER ROADS				
Service Engineers	12	11	6	29
Foremen	16	8	7	31
TOTAL:-	57	54	52	163

UNDER PAMSCAD PROJECT (KOFORIDUA)

REGION	FIRST TRAINING COURSE	SECOND TRAINING COURSE	TOTAL TRAINED BY JUNE, 1990
CONTRACTORS SUPERVISORS			
Volta	8	24	32
Northern	8	-	8
Eastern	16	-	16
DEPARTMENT OF FEEDER ROADS			
Engineers	6	9	15
Foremen	3	22	25
TOTAL:-	41	55	96

Contractors for Labor Based Works

	Year			
	1990	1991	1992	1993
Cocoa Project	19	19	19	0
Other Projects	6	17	31	10
Training (Koforidua)	11	14	14	14

- Some of the roads were through hilly areas which required substantial earthwork that posed a difficult task for the labor force and resulted in considerable slow down of progress.

- Contracting procedures before award have taken so much time that contractors stay idle and not much time is eventually left for completing annual targets.

- Contract stretches of 25km at a time leaves a long stretch for maintenance by the contractors and this affects their performance on the base contract.

4.1.2 Options for Improving the Labor-Intensive Performance

- Construction firms should be obliged to keep required labor strength on the site and make sure at least normal work hours are put in daily for attainment of required nominal targets.

- Minimum education backgrounds should be set for construction foremen and supervisors in order to reasonably benefit from the training during the learning period.

- The results of the evaluation of equipment performance should be a guide for future purchases.

- Construction sites should be far apart to avoid the competition for recruiting labor among the firms.

- Roads involving extensive earthwork should not be selected for labor-based construction method.

- Contract procedures should be simplified as much as possible to avoid lost of time to start annual work load.

- In the 25km standard contracts, provisions should be made for partial acceptance of reasonable stretch as and when completed in order to lessen the maintenance burden on the contractor.

- Incentives for achievements should be instituted to enhance motivation for higher outputs.

In the 3 year pilot stage, 210km and 420 culverts have been constructed. The most important exercise at this state is collection of data to determine the cost-effectiveness of the concept and the production of technical manuals in sufficient detail to guide application of the method on a larger scale.

4.1.3 Labor-Intensive and Capital Intensive Contracts

Since the inception of the labor-intensive technology in Ghana in 1986, DFR has been satisfied with its success and has been pursuing its replication. Apart from substantial saving in scarce foreign exchange estimated at 50%, DFR has demonstrated that the overall cost of labor-intensive method for low volume roads is relatively less costly than the equipment-based method.

The result of the analysis of the contract cost of the two methods is tabulated in Table. 4. In comparing the cost of labor intensive method with the capital intensive cost, two assumptions were made:

Table 4

Construction cost per km

PRICE LEVEL		CONSTRUCTION METHOD		
			LABOUR INTENSIVE	
		CAPITAL INTENSIVE	TRIAL ROAD +	STANDARD CONTRACT
1987	COST OF ROAD/KM ¢	2,027,158	1,929,681	1,750,45[illegible]
	%	100	95.20	86.3[illegible]
1988	COST OF ROAD/KM ¢	2,635,305	2,420,450	2,174,695
	%	100	91.85	82.52
Inflation factor $\frac{1988}{1987}$		1.30	1.254	1.242

• Estimated inflation factor provided by Head Office .

+ The DFR Unit rates for concrete items and felling of trees were not known, these rates were established by applying an inflation factor of 1.2 to 1987 rates.

Source: DFR Report on Establishment of Labor-based Feeder Road improvement, maintenance and planning systems in Ghana.

a. Quantities of work are the same for both methods except differences resulting from type of culverts.

b. Unit rates for all capital intensive work were standard DFR rates.

The high rate of unemployment and underemployment in the rural areas and the desire of the rural communities to contribute to having all-year motorable road to their areas, set the right environment for the method in Ghana. The use of equipment based method for construction, rehabilitation and maintenance of rural roads in Ghana has been plagued with delays in procurement of equipment and parts as well as problems with foreign exchange availability. Total dependence on the method in Ghana, at this time,would affect adversely the ERP program.

The projected capacity of labor-based contractors for 1992 will only be about 750 km per year. Thus DFR could execute about one-third of the annual work with labor-based methods. The equipment-based contracting would therefore have to complement the labor-based method. In general, use of capital-intensive method on low volume roads cannot be discarded altogether. In areas where the topography requires extensive cuts and fills, capital-intensive method will be the more cost effective method.

4.2 Spot Improvement Maintenance Program (SIAM)

The DFR has embarked on the spot improvement concept which resulted from two problems identified on feeder roads. It has been observed that most feeder roads are motorable during the dry season but are often rendered impassable during the wet season due to the absence of inadequate water crossing structures. Slippery slopes and soft stretches also tend to render the road unusable. DFR has realized that simply removing these isolated spots could make the road all year motorable and the method would be a cost effective way of providing access on a wider scale to the rural areas.

Since most of these spot improvements are of limited scope, time frame, and also of prime interest to the local communities, DFR is cashing in on these to obtain free labor from the communities. Pilot projects were started in three regions: Western, Ashanti and Brong Ahafo.

Two teams each for culvert repairs,construction, and road surface and side ditches repairs were set up. This is a force account program in which tools and materials are provided. In initiating the approach, DFR is addressing the following tasks:

a. trying out different alternatives of organizing spot improvement works with emphasis on the method of work and management practices relating to force account and communal labour mix.

b. monitoring, evaluating and choosing from different methods of slope stabilization using locally available materials.

c. trying out, testing, monitoring and costing different methods of culverting.

d. recommending needed modifications to existing administrative structures and procedures to support a larger scale application of methods.

e. assessing the relevance of the concept of Spot Improvement with community participation in the Ghanaian situation.

In 1988, DFR started assessing the SIAM and has identified some factors which have been responsible for the rather low output despite the enthusiasm of the communities involved. Some of the key factors are:

- The work content of roads selected for the SIAM has been rather substantial, defeating the limited scope and limited duration notion of the SIAM. The community enthusiasm tends to decline with prolonged duration of free labor intervention.

- absence of any form of incentive has reduced output despite enthusiasm.

- there were organizational lapses at the project office level.

- untimely scheduling of work coinciding with heavy rains.

- inadequate backstopping from DFR head office.

4.2.1 Improving SIAM

From the analysis of the problems working against desired output of SIAM, the following options were identified for improving it:

. Duration of community participation in spot improvement to be limited to maximum of two months for a given road.

. In addition to SIAM, routine maintenance should be instituted on maintainable roads in the area as well

. Restructuring at the DFR District level so that SIAM activities will be under the responsibilities of District Heads reporting to the Project Engineer of SIAM and UN volunteers attached to the District Heads for guidance.

. Provision of some incentive to the communities through donations of Food For Work.

. As SIAM pivots around community enthusiasm, rational mobilization of the communities into continuous supply of labor is necessary. Creation of road rehabilitation committees would help to organize groups for continuous availability of persons for roadwork.

4.3 . Community - Based Road Maintenance

The experience over the past decade of road maintenance by force account has demonstrated the inefficiency of the method and its drain on public funds of the country. Table 5 shows routine maintenance targets and achievement by force account.

As most feeder roads are usually short stretches providing access to specific settlement, the community therefore has vested interest in keeping the road in satisfactory condition. With the right organizational approach, the communities would be willing to maintain their access.

DFR has therefore adopted a policy to involve the communities under the Community Road Care Program (CRC) to undertake such maintenance previously done on force account by the department's labor force. The DFR labor force is therefore being allowed to diminish through retirements, resignations etc. without replacement. DFR is obtaining assistance from the World Bank and UNDP to develop the CRC concept. This project has included pilot maintenance management component and procedures for programming, implementation and monitoring of both routine and recurrent maintenance will be put in place.

Table 5

ROUTINE MAINTENANCE TARGETS AND ACHIEVEMENTS BY FORCE ACCOUNT (JULY-SEPTEMBER 1989)

Activity	Unit	Target	Achievement	% of Target
Pothole patching	m 3	11,880	4,843	41
Ditch Clearing	Km	762.3	255.5	33
Culvert Clearing	unit	5,940	80	1
Grass Cutting	Ha	1,293	1,238	96

4.4 Mobile Recurrent Maintenance Team (MOREMAT)

Complementary to the various approaches in progress for road rehabilitation and maintenance, DFR is implementing a mobile maintenance team to assist the various road districts. The system consist of a fleet of two to four graders that will work on selected roads in a district during a specified period. The district is expected to provide the needed fuel and labor for the work to be undertaken. DFR will provide only the graders and the operators.

5. Rural Road Budget

GOG has been mobilizing funding for rural roads through the following sources:

1. Government borrowing, collection of road transport taxes which include Road Fund, central budget and external financing.

2. Local resources which consist mainly of voluntary labor and fuel for maintenance.

The size of resources available for rural roads has depended mainly on the government's ability to borrow, collect road taxes and obtain grants. So far, resources available for rural road financing have been commensurate with the present DFR's implementation capacity.

In 1989, DFR's expenditure amounted to 3.15 billion cedis or US$10.4 million. (See Table 6 for the break down.)

TABLE 6

Expenditure for Road Works in 1989

Source	Expenditure (million cedis)	
	Recurrent	Maintenance& Development
Central Budget	230	-
Road Fund	915	....-
Cocoa Account	-	1,530
4th Highway Project	-	356
USAID (APPP Project)	-	139

Rehabilitation and recurrent maintenance took most of the budget with a small proportion for recurrent expenditure including personnel emoluments and other costs related to, mainly, routine maintenance. Local resources for DFR are from a central budget, a variable proportion of Road Fund and the COCOABOD contributions. The three sources accounted for over 85 per cent of total funds in 1989.

In 1990, donor commitments include US$2.5 million from IFAD to be used for roads in the north; US$6 million from USAID for roads in non-cocoa areas and support of maintenance operations. Outgoing World Bank projects include US$18.9 million for cocoa roads for 5 years from IDA, and US$3.0 for roads in 3 years under transport and Road Project Phase I. AFDB also funds US$8.5 - 10.0 million cocoa roads to cover 5 years.

Road Fund available for rehabilitation (i.e. periodic maintenance) has increased steadily. Therefore, there will be the need for an equal growth of funds for routine and recurrent maintenance. Voluntary contribution of community labor has supported a major part of the routine and recurrent maintenance. In the MOREMAT unit, fuel for the graders and accommodation for operators are furnished by the communities. Another local resource
for routine maintenance is the mobilization of community labor.

6. Environmental Considerations

As rural roads affect all aspects of rural life, a nation-wide program is expected to have both positive and negative environmental impacts. Some environmental effects are:

- opened ground pits with little vegetation serving as potential for increased soil erosion.

- large graders and bulldozers tend to be more environmentally disruptive to vegetation and natural soils. This is significantly reduced by labor-based techniques;

- improved rural road facilitates higher vehicular speed which is normally difficult to control; such a speed tends to endanger crossing wild life;

- improved roads contribute towards increase in production of high value crops. In areas where pressures on land are already high, encroachment on more forest becomes uncontrollable;

- improved roads in charcoal producing areas increase the incentive to produce and market additional charcoal that risks exploitation of forbidden species;

- since most of the rural roads do not have bitumen surfaces, dust pollution will increase and run off water will be charged with suspended soil material which will eventually get to the streams as sediments and pollute streams.

To minimize the negative environmental impacts of rural roads, DFR is adopting engineering designs and technologies that will improve local run off characteristics which are causing soil erosion. Closer working relationship and coordination are being forged with the Environmental Protection Counsel, Department of Forestry, Ministry of Agriculture, Ghana Highway Authority and local political organizations during planning and implementation to safeguard the environment relative to rural road improvement.

7. Future Projects

The reforms initiated in the ERP, have achieved a substantial agricultural growth of 1.9 percent per year. Currently, Medium-Term Agricultural Development Strategy (MTADS) is expected to stimulate agricultural growth rate to 4 percent per year. MTADS has determined that the seventy percent deterioration of rural roads in the country, is a major obstacle to increasing farm production and profitability, therefore a major constraint to agricultural growth. Appropriate rural road rehabilitation and continued maintenance of these roads are now essential requirement for the success of the country's ERP. To support the MTADS, GOG and the World Bank have initiated a nation-wide effort to remove rural road transportation bottleneck through a National Feeder Roads Rehabilitation and Maintenance Program (NFRRMP). The NFRRMP is expected to include rehabilitation and establishment of a sustainable feeder road maintenance organization for about 12,000 kilometers or 55 percent of the rural road network by year 2002.

The program has identified the following major problems to address:

a. institutional weakness.
b. inappropriate planning method, inadequate planning capacity during appraisal and implementation, and lack of local participation.
c. difficulties in human and financial resources mobilization, and shortcuts to counterpart funding.
d. inappropriate technology choices, frequent equipment breakdown and unduly high standard of road design.

The program strategy is as follows:

(a). review the present and future role of the rural road sub-sector in Ghana's economy and its impact on overall economic development, considering in particular the emphasis on export promotion and efficient import substitution, as well as ongoing decentralization efforts.

(b). present a review of the sub-sector identifying the main planning, financial, human resource, institutional and technical constraints;

(c) assess the absorptive capacity of existing institutions to implement a nationwide rural roads program; identify and develop measures to strengthen related planning and implementation capabilities at all levels i.e., national, regional, and district to ensure that key constituencies are involved at various levels of planning and implementation;

(d) improve the sub-sector policy framework, and coordinate any proposed operations with programs and policies concerning main roads (e.g.GHA's TRP series), as well as with the medium-Term Agricultural Development Strategy (MTADS);

(e) propose appropriate and sustainable funding arrangements to secure timely counterpart funding contract cofinancing, and mobilize local resources for maintenance;

(f) support labor-based methods, expand the capacity of private contractors, analyze problems with procurement, evaluate prospects of sustainability of present contractors, present appropriate design standards and secure the continued involvement of ILO as a technical coordinator;

(g) give a high profile to maintenance arrangements and requirements, to assure the sustainability of past and proposed investments; and

(h) consider related aspects including, but not limited to, examining the scope of further efforts to disseminate Intermediate Means of Transport (IMT), monitoring and evaluation of the proposed project, and assess the impact of the project on women and the environment.

The strategy for the program is to concentrate on formulating the basis for a coherent sub-sector strategy that would encompass future World Bank and other donor operation. It will also serve primarily as a means of attracting possible cofinancing for the program.

Table 7 show the cost and funding source of the first phase of NFRRMP (1992-1995). The foreign component is estimated at US$50.0 million.

TABLE 7

Funding Source of the First Phase of NFRRMP

Source	Amount
IDA	US $ 40.0 million
Ghana Govt	US $ 15.0 million
Cofinancing	US $ 25.0 million
Total	US. $80.0 million

The projection of outputs are shown in the preliminary implementation schedule for rural road program in Table 8

Table 8

Preliminary Implementation Schedule for Rural Road Program

(Rehabilitation of existing for Rural road only-
(New rural road construction is not shown)

Project	Year											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
COCOA	200	600	600	600	600	--	--	--	--	--	--	--
OTHERS	100	350	200	--	--	--	--	--	--	--	--	--
TRP-1	200	200	200	--	--	--	--	--	.--	--	--	--
NFRRMP -1	--	--	400	600	800	1200	--	--	--	--	--	--
NFRRMP -2	--	--	--	--	--	.--	1500	1500	1500	--	--	--
NFRRMP.-3	--	--	--	--	--	--		--	--	1500	1500	1500
TOTAL	500	1150	1400	1200	1400	1200	1500	1500	1500	1500	1500	1500

8. Conclusion

The fact that the maintenance of rural roads in Ghana during the difficult economic period has been virtually non-existent left the young DFR much to accomplish in meeting ERP targets. The analysis of the performance of DFR shows that the department has searched for innovations and in the last four years put in place about five methods to respond to rural road rehabilitation and maintenance. Though these methods need more time to take root, results so far with the labor-intensive method are positive and shows savings as well as the potential for dissemination all over the country.

The financial support for rural road activities has been satisfactory. DFR has been undergoing steady strengthening and currently, funding has been commensurate with DFR's implementation capacity. The government policy is to use contracts instead of force account. The building up of the labor-based contractors in the country will in the future, be significant to make a major impact on the country's rural road industry. Until then, equipment-based method will be needed for special works and supplement the labor-based method. The output rate of labor-intensive method is lower than the capital-intensive method. However, the experience in Ghana with respect to delays in equipment and spare parts replacements, render the the equipment-intensive method plagued with extensive down time.The careful balance of the two methods will result in a cost effective mix for the country.

The current move to implement the NFRRMP as from 1992 is laudable step to streamline rural road activities.The strategy for rural roads rehabilitation and maintenance offers opportunities for promotion of local private sector in road construction. Expansion of labor-intensive activities to cover the whole country entails availability of large quantities of certain types of equipment and small tolls for which production capacity exist in the country. This offers the private industrial sector opportunities and a market to exploit thereby enhancing local private entrepreneurship.

From the analysis of the rehabilitation and maintenance activities of the DFR, the following actions could taken to help in the optimization of outputs of the department:

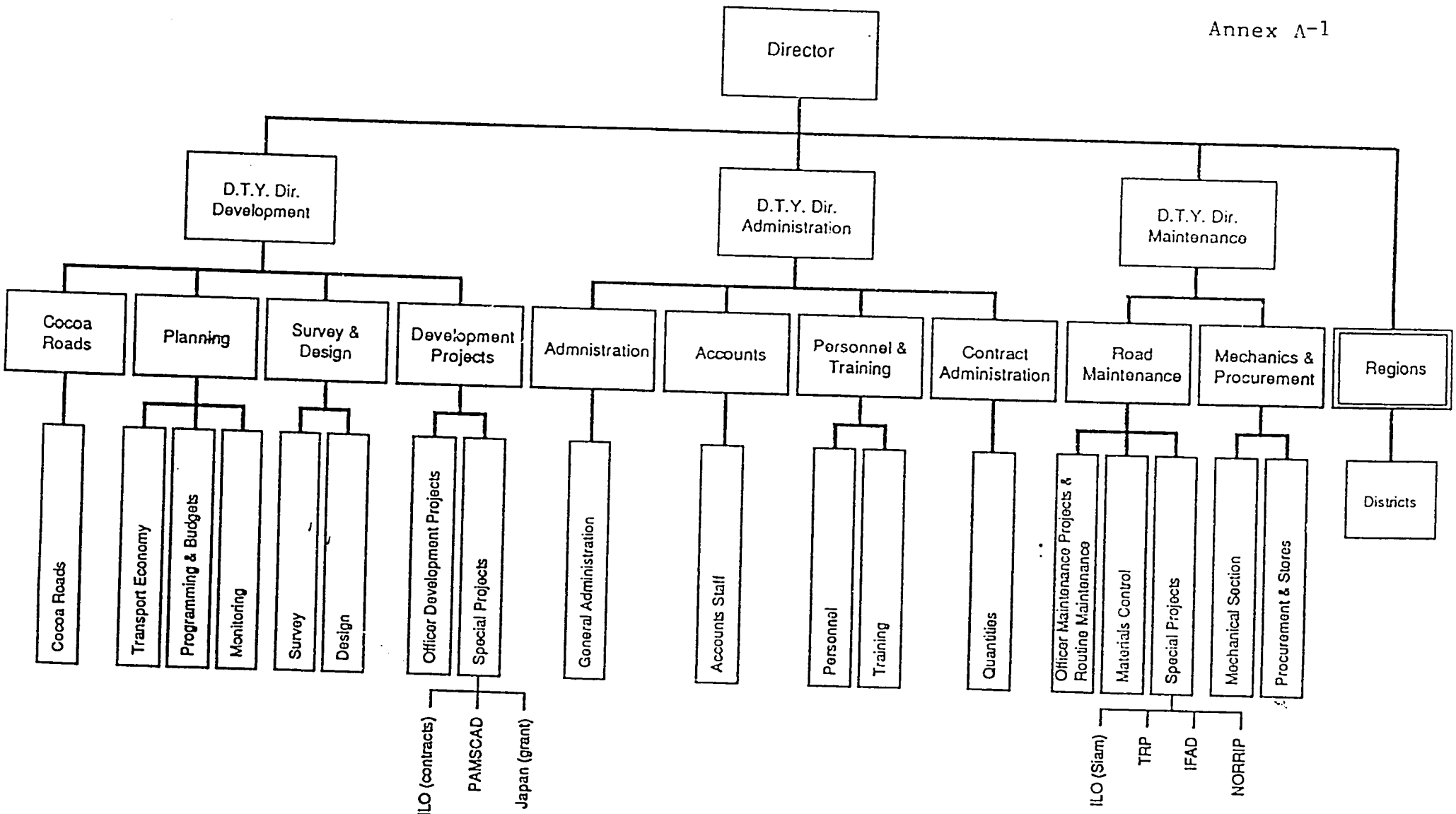
- the country should institute a special appropriate low cost rural road technologies in the University of Science & Technology in Kumasi to be run periodically for the staff of DFR and road construction firms.

- the nature of the involvement and the flexibility necessary in DFR, require separate status from the normal civil service set up for maximizing output.

- the regional DFR offices should be particularly strengthened, as a priority, since the decentralization situation in the country necessitates high quality of service in the regions at this time.

- contracting and payment procedures should be prompt to enable the labor base rehabilitation and maintenance system to perform efficiently.

Annex A-1


Director
D.T.Y. Dir. Development
D.T.Y. Dir. Administration
D.T.Y. Dir. Maintenance
Cocoa Roads
Planning
Survey & Design
Development Projects
Admnistration
Accounts
Personnel & Training
Contract Administration
Road Maintenance
Mechanics & Procurement
Regions
Cocoa Roads
Transport Economy
Programming & Budgets
Monitoring
Survey
Design
Officer Development Projects
Special Projects
ILO (contracts)
PAMSCAD
Japan (grant)
General Administration
Accounts Staff
Personnel
Training
Quantities
Officer Maintenance Projects & Routine Maintenance
Materials Control
Special Projects
ILO (Siam)
TRP
IFAD
NORRIP
Mechanical Section
Procurement & Stores
Districts

Annex A-2

REGIONAL DISTRIBUTION OF DFR PROFESSIONAL, TECHNICAL AND ADMINISTRATIVE STAFF (May 1990)

	Engineers	Quantity Surveyors	Engineer Technicians	Technical Officers	Administra-tors	Snr. Train-Officers	Planners
Head Office	6	4	1	1	7	1	2
Greater Accra	1	0	1	2	2	0	0
Volta	1	1	0	4	1	0	0
Eastern	6	1	7	6	3	0	0
Central	1	0	0	6	1	0	0
Western	4	1	3	7	2	0	0
Ashanti	4	1	5	3	2	0	0
Brong Ahafo	4	1	3	2	2	0	0
Northern	2	1	1	2	1	0	0
Upper East	1	0	1	2	0	0	0
Upper West	1	0	0	2	1	0	0
Totals	31	10	22	37	22	1	2

Annex A=3

Condition and Surface of Rural Roads by Road District (1990)

REGION	ROAD DISTRICT	TOTAL LENGTH (km)	ROAD CONDITION 7/ Good	Fair	Poor	SURFACE TYPE Gravel	Earth	Bitumen
GREATER ACCRA	Accra/Tema	482.0	258.8	89.4	133.8	300.2	54.7	127.1
	Ada	335.3	20.4	125.5	189.4	229.4	89.2	16.7
VOLTA	Ho	451.9	65.2	81.2	305.5	292.6	124.8	34.5
	Hohoe	1,092.5	194.8	192.3	705.4	607.7	448.7	36.1
	Keta	791.7	15.9	124.0	651.8	284.1	499.8	7.8
EASTERN	Koforidua	386.5	80.3	109.2	197.0	187.1	199.4	
	Nsawam	246.6	18.9	139.8	87.9	90.6	156.0	
	Oda	494.4	88.6	273.3	132.5	293.8	200.6	
	Somanya	186.8	2.0	27.7	159.1	13.0	173.8	
	Nkawkaw	992.7	125.4	254.5	612.8	395.0	597.7	
CENTRAL	Cape Coast	880.2	74.2	461.4	344.6	420.8	424.4	35.0
	Winneba	804.7	566.4	238.3	453.1	336.5	15.1	
	Dunkwa	295.6	11.1	146.1	138.4	101.9	193.7	
WESTERN	Takoradi	580.7	100.0	35.5	445.2	122.0	458.7	
	Tarkwa	1,383.0	119.3	284.1	[illegible]	346.1	1,036.9	
	Sefwi Wiawso	631.3	184.5	94.1	352.7	291.8	339.5	
	Axim	120.7	20.1			100.6	6.5	114.2
ASHANTI	Kumasi	1,535.4	220.2	85.3	1,229.9	485.0	1,020.8	29.6
	Bekwai	956.3	151.2	94.4	710.7	394.7	559.1	2.5
	Mampong	839.0	116.9	254.8	467.3	146.7	678.3	14.0
BRONG-AHAFO	Sunyani	1,260.7	263.2	194.1	803.4	420.0	840.3	0.4
	Berekum	887.1	127.2	374.4	385.5	445.7	437.2	4.2
	Techiman	1,527.4	147.0	65.2	1,315.2	202.0	1,325.4	
NORTHERN	Tamale	942.9	177.0	273.3	492.6	382.3	560.6	
	Gambaga	520.8	22.8	193.8	304.2	226.6	294.2	
	Yendi	626.6	86.4	198.0	342.2	288.2	338.4	
	Berekum	290.2	31.9	143.4	114.9	137.3	152.9	
UPPER EAST	Bolgatanga	638.7	76.2	125.0	437.5	256.1	382.6	
	Bawku	313.0	46.7	111.8	154.5	199.0	114.0	
UPPER WEST	Wa	662.6	155.9	28.3	478.4	230.3	432.3	
	Lawra	481.8	134.8	37.4	309.6	160.9	320.9	
	Tumu	259.9	25.8	65.1	169.0	31.1	228.8	
TOTALS		21,901.0	3,162.7	5,248.8	3,489.5	8,441.6	3,134.4	323.0
PERCENTAGES			14.4%	24.0%	61.6%	38.5%	60.0%	1.5%

7/ Good condition refers to roads reconstructed, improved or regraveled between 1 and 3 years ago, or reshaped 1 year ago. Fair condition refers to roads reconstructed, improved or regraveled 4 to 6 years ago, or reshaped 1 to 2 years ago. Poor condition

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1. Establishment of Labor-Based Feeder Road Improvement, Maintenance and Planning Systems in Ghana, Report by DFR (Feb. 1989)

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