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STAFF APPRAISAL REPORT

RWANDESE REPUBLIC

TRANSPORT SECTOR PROJECT

APRIL 30, 1990

**Infrastructure Operations Division
South-Central and Indian Ocean Department
Africa Region**

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CURRENCY EQUIVALENTS

Currency Unit	=	Rwandese Franc (FRW)
US\$1.00	=	FRW 80
FRW 100	=	US\$1.25

The U.S. dollar/Rwandese franc rate is subject to change, since the FRW is pegged to the SDR. Conversions in the Staff Appraisal Report were made at US\$1.00 = FRW 80, the average exchange rate at the time of appraisal in July 1989.

WEIGHTS AND MEASURES

1 meter (m)	=	3.28 feet (ft)
1 kilometer	=	0.62 mile (mi)
1 square kilometer (km ²)	=	0.386 square miles (sq mi)
1 hectare (ha)	=	2.47 acres
1 metric ton (m ton)	=	2,204 pounds (lbs)

ACRONYMS AND ABBREVIATIONS

BUNEP	=	National Bureau for the Study of Projects
DE	=	Maintenance Department
DPC	=	General Directorate of Roads and Bridges
DSM	=	Dar-es-Salaam (Tanzania)
EDF	=	European Development Fund
EEC	=	European Economic Community
FRG	=	Federal Republic of Germany
HDM-III	=	Highway Design Model
LNTP	=	Laboratoire National des Travaux Publics
MAGERWA	=	Magasins Généraux du Rwanda
MININTER	=	Ministry of Interior
MINITRANSCO	=	Ministry of Transport and Communications
MINITRAPE	=	Ministry of Public Works, Energy and Water
NCTA	=	Northern Corridor Transit Agreement
NGO	=	Non-Governmental Organization
ONATRACOM	=	Office National des Transports en Commun
OPEC	=	Organization of Petroleum Exporting Countries
PPRC	=	Communal Roads Pilot Program
SDC	=	Swiss Development Cooperation
SME	=	Small and Medium Enterprises
STIR	=	Société des Transports Internationaux du Rwanda
TRC	=	Tanzania Railways Corporation
UNDP	=	United Nations Development Program
VOC	=	Vehicle operating cost
vpd	=	Vehicles per day

GOVERNMENT OF RWANDA FISCAL YEAR

January 1 - December 31

RWANDA
TRANSPORT SECTOR PROJECT
STAFF APPRAISAL REPORT

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- IBRD 21189
IBRD 21834R

RWANDA

TRANSPORT SECTOR PROJECT

Credit and Project Summary

Borrower: Republic of Rwanda

Beneficiaries: Ministry of Public Works, Energy and Water (MINITRAPE)
Ministry of Transport and Communications (MINITRANSCO)

Amount: SDR 31.1 million (US\$40.0 million)

Terms: Standard IDA terms, with 40 years maturity

Project Objectives:

The objectives of the project are to (i) protect capital investment in main roads through improved maintenance; (ii) strengthen institutions in the sector through better planning and resource mobilization; (iii) promote communal development and better economic integration through improved communal roads; (iv) improve access to the Kibuye prefecture; (v) support lake transport; and (vi) improve vehicle safety. This program also has important policy dimensions such as streamlining the regulatory environment, financing of sectoral expenditures, and improving institutional arrangements and responsibilities in the sector.

Project Description:

The project will cover roads and transport for which the responsibility is split between two ministries (MINITRAPE and MINITRANSCO). A comprehensive program of road reconstruction and maintenance, institutional strengthening and transport sector improvements for 1991-1994 was designed to meet the highest priority for the country with support confirmed by donors during appraisal in July 1989. The main project components are as follows:

- (a) participation with other cofinancing agencies in the upgrading of the Gitarama-Kibuye road;
- (b) rehabilitation and maintenance of a pilot project of 600 km of communal roads;
- (c) support to a four-year road maintenance program;
- (d) institution building, technical assistance and professional training both for the above ministries and road contractors; and
- (e) a transport sector program including support to lake transport and vehicle inspection.

Benefits:

Improvement of road maintenance, and selective road upgrading, would reduce vehicle operating costs and reduce the need for costly rehabilitation especially for the paved network in the future. Better access to the Kibuye area will support production of coffee and tea, and tourism to the Kivu lake. The Kibuye road, in particular, has also been subject to an environmental assessment, to provide guidance in the bidding documents for improved safeguards concerning environmental impact, and other aspects such as measures for road safety, plan for any relocation and of tourism development of Kibuye. Improvement of rural roads would also support export crops and more rational food production. Less costly international access and improved transport policy would reduce costs of imports and enhance the competitiveness of exports. The project would also support development of local contractors for road works and further privatization of transport services.

Risks:

The proposed road components under the project would be subject to certain potential risks. Cost overruns on the Gitarama-Kibuye road, delays in implementation of the road maintenance program and cost increases and/or delays with the communal roads pilot program are the main elements of risk. The likely cost overruns for the Kibuye road has been minimized through detailed design, based on recent cost data from ongoing construction works in similar terrain. The main response to the institutional risks of the communal roads project is through intensive project monitoring, and technical assistance, spreading the participation geographically and using different means of implementation (i.e. works partly by administration, partly by contractors).

Project Cost:

The total cost of the project is estimated at US\$148.85 million equivalent with foreign costs of about US\$96.61 million and local costs of US\$52.24 million. The detailed cost and financing plan are in the following table.

Rate of return: 45% over 86% of total project costs.

RWANDA

TRANSPORT SECTOR PROJECT

PROJECT COST ESTIMATES AND FINANCING PLAN

Project Cost Estimates 1/

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Foreign as</u>
	----- (US\$ million) -----			<u>% of total</u>
Transport Component	1.69	1.94	3.63	53%
Road Component				
Gitarama-Kibuye	11.62	35.41	47.03	75%
Periodic maintenance	6.85	14.55	21.40	68%
Routine maintenance	7.67	4.96	12.63	39%
MINITRAPE services	3.22	5.86	9.08	65%
Communal roads	7.05	5.02	12.07	42%
Institutional development	<u>0.37</u>	<u>3.41</u>	<u>3.78</u>	90%
Base Cost	38.47	71.15	109.62	65%
Physical Contingencies	3.85	7.11	10.96	
Price Contingencies	<u>9.92</u>	<u>18.35</u>	<u>28.27</u>	
Total Project Costs	52.24	96.61	148.85	65%

<u>Financing Plan:</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>% of total</u>
	----- (US\$ million) -----			
Government	24.90	29.16	54.06	36%
EEC/EDF	8.10	24.50	32.60	22%
Swiss Cooperation	2.34	7.03	9.37	6%
OPEC	1.00	3.00	4.00	3%
FRG/KFW	1.52	3.23	4.75	3%
IDA - Transport Sector Project	12.70	27.30	40.00	27%
Sixth Highway	<u>1.68</u>	<u>2.39</u>	<u>4.07</u>	3%
Total	<u>52.24</u>	<u>96.61</u>	<u>148.85</u>	100%

1/ Costs are net of taxes which are estimated at FRW 608 million
(US\$ 7.6 million equivalent)

Estimated IDA Disbursements:

	<u>IDA Fiscal Year</u>						
	91	92	93	94	95	96	97
	----- (US\$ million) -----						
Annual	1.8	5.4	7.4	7.8	8.8	6.8	2.0
Cumulative	1.8	7.2	14.6	22.4	31.2	38.0	40.0

I. THE TRANSPORT SECTOR

A. Geographic and Economic Setting

1.01 Rwanda is a small landlocked country situated south of the equator in Eastern Africa between Burundi, Tanzania, Uganda and Zaïre, about 1,500 km from the Indian Ocean. The country covers an area of 25,900 square kilometers and its terrain is dominated by a mountain range and Lake Kivu in the west, hilly terrain and valleys in the center and a low-lying plain in the east. The generally rugged terrain, the dense settlements in large parts of Rwanda as well as its landlocked position have contributed to shape its transport infrastructure.

1.02 With a population of approximately 6.7 million (1988) growing at a high rate of over 3.0% p.a., Rwanda is the most densely populated country in Africa with 260 inhabitants per sq.km (400 inhabitants per sq. km of arable lands). Over 90% of the population live in rural areas as small farmers who depend mainly on subsistence agriculture and on two main cash crops, coffee and tea, which provide the major source of foreign exchange for the country. Gross National Product (GNP) per capita, estimated at US\$ 310 in 1988, is among the world's lowest. Agriculture is the main economic activity and provides some 80% of export value.

1.03 The prevailing economic and financial conditions in Rwanda have been taken into consideration in designing the proposed transport sector program and its financing. The program is seen as an integral part of the economic development process and therefore, calls for appropriate policy actions within the transport sector. A Letter of Sector Development Policy, with an Action Plan, has been prepared by the Government (see para 2.10). Policy actions will aim at more emphasis on maintenance of infrastructure, more reliance on the private sector for road maintenance, better planning and improvement of cost recovery mechanisms as well as more liberalization of transport operations, in order to make exports more competitive and to reduce the costs of imports and internal transport.

B. The Transport System

1.04 The transport system in Rwanda consists of about 12,500 km of roads and tracks (of which about 6,000 km are classified and about 3,400 km under responsibility of the Ministry of Public Works, Energy and Water, MINITRAPE). There is an international airport capable of use by long-range aircraft but no railways or navigable rivers. Lake Kivu is mostly used for transport along the lake between Cyangugu, Kibuye and Gisenyi, and very limited traffic to Zaïre. As a landlocked country far from ocean ports, Rwanda depends on external transport links, at high cost, for its foreign trade.

External transport

1.05 Rwanda's foreign trade is mostly with developed countries and to a lesser extent with its neighbors. It has grown markedly in volume in recent years. However, the external trade volumes are still relatively low: during the 1985-1988 period, imports averaged about 255,000 tons p.a. while exports totalled about 50,000 tons p.a. (of which coffee represented 30,000 tons). The annual external trade growth rate is expected to be in the 5-6% range in the coming years and the trade flow will remain imbalanced.

1.06 As a landlocked country, Rwanda is dependent on transit through neighboring countries. Two main corridors including various routes (see Map IBRD 21189) are now used for external trade: (i) the Northern Corridor (all-road route) to Nairobi and Mombasa via Kampala; (ii) the traditional Central Corridor (road/lake/rail route) to Dar-es-Salaam (DSM) via Bujumbura and Kigoma ; and (iii) a recent Central Corridor (all-road route) through Tanzania, in dry season. The Northern Corridor route now accounts for about 65% (petroleum products and general imports) of total international traffic, the Central Corridor routes have increased to 33% since 1981 and direct air transport represents 2% (Annex 1.1). Under these circumstances transport costs are obviously high even in the best conditions. Costs are further increased by other factors including poor transport infrastructure, cumbersome transit procedures, the low efficiency of transport operators and highly imbalanced import (80% of the traffic volume) and export (20%) flows. Overall transport costs are estimated to add about 30-40% to the cost of imports and exports.

1.07 In the late 1970s, the Northern Corridor suffered disruptions in transit from turmoil in Uganda. Since then, the situation has improved with the exception of disruptions due to political troubles in Uganda in 1986. In most countries through which the northern corridor passes (Rwanda, Uganda and Kenya), investments were made to improve maintenance and extend infrastructure. Direct transport costs are up to estimated to have gradually decreased in the northern corridor from US\$ 340/ton in 1979, at the peak of war conditions in Uganda, to US\$ 200/ton in 1988. Indirect costs have also fallen: transit times fell over the last decade from 35-45 days to 20-30 days in the northern corridor and from several months to 40-60 days in the central corridor. The central corridor (both the all road and road-rail alternatives) where unit transport costs are about US\$ 100/ton lower than via Mombasa would now be the cheapest alternative for Rwanda. Further improvements are necessary on the Tanzania Railway Corporation (TRC), while Dar-Es-Salaam port has markedly improved these last years and is now being preferred to Mombasa. To improve transport conditions further on the Central Corridor route, the Government has agreed with Tanzania to establish an intermodal terminal (rail/route) on the TRC line at Isaka. This would be a third alternative of the Central Corridor to enable the year-around use of the shorter access through Tanzania. Further reductions in costs are both possible and necessary but will require the full and effective implementation of multi-country agreements to facilitate transit procedures, such as the Northern Corridor Transit Agreement (NCTA) signed in 1985 but not yet fully effective (see below).

1.08 Transport security and reliability is a matter for concern. One of the main Government objectives is to increase revenues from exports, and of coffee in particular, through better quality and higher volumes. Therefore, reliability of transport has become a very important objective both within Rwanda and on export routes. Reliability of international transport has traditionally been an acute issue also for imports, with a strong-felt need for alternative access to provide the Government with a rapid solution whenever disruptions occur. In addition to shifts between the two main corridors, alternative transport options also include air transport.

1.09 Rwanda is in a relatively favored position in that it has several practical access routes to both Dar-es-Salaam and Mombasa. Given the availability of charter air-freight and over-capacity of the region's trucking fleet, it is clear that more transit routes, without improved management of infrastructure and retained flexibility by the shippers, will not solve the transit problem. For Rwanda, this means that over-investment, at least within the country, is probably more of a danger than inadequate infrastructure. Any additional road links other than the existing paved roads, including the more direct route via paved road to the new rail/road terminal at Isaka in Tanzania, would not be required for external transport.

The Road Network

1.10 Rwanda has a road network totaling about 12,500 km of which some 970 km national roads are paved or being improved to paved standard. Another 1,740 km national and provincial roads are mostly unengineered gravel roads (Table 1.1). In addition there is a network of communal earth roads totaling some 9,800 km. Thus, the coverage of the network is largely adequate. However, many of the earth roads are characterized by frequent and narrow curves, steep grades and uneven surfaces. In the mountainous terrain, heavy rainfall and poor soil conditions cause high maintenance costs of gravel and earth roads. Rwanda has concentrated its efforts on improving to paved standards the main international road links between Kigali and neighboring Uganda, Burundi and Tanzania and between its regional centers. The Government has also started to pay more attention to strengthening its road maintenance operations. This effort has resulted in a paved road network in good condition, but a network of earth roads at best in fair condition, largely passable year round, but with rutting and potholes common after each rainy season.

Table 1.1
Development of the Road Network
(in km)

	<u>1977</u>	<u>1984</u>	<u>1988</u>
A. Classified Roads			
National Roads		2,205	2,270
Provincial Roads		<u>1,855</u>	<u>3,575</u>
Total	2,400	4,060	5,845
B. Non-Classified Roads			
Local Roads	<u>3,900</u>	<u>8,010</u>	<u>6,640</u>
GRAND TOTAL	6,300	12,070	12,486
C. Classified Road Network			
by Surface Type			
Bitumen	350	627	971 (*)
Gravel	1,050	1,569	1,740
Earth	<u>1,000</u>	<u>1,864</u>	<u>3,134</u>
Total	2,400	4,060	5,845

(*) about 70 km of streets included

Source: Ministry of Public Works, Energy and Water

1.11 The general condition of the network is not satisfactory and varies from poor to good. However, the paved road network is relatively new and most of it remains in fair to good condition. Construction and maintenance costs are high due to the country's difficult topography, poor geotechnical conditions and heavy rains. Therefore, road maintenance operations have to be sustained to prevent past road investments from costly repairs and reconstruction in the future and to prevent vehicle operating costs (VOC) from rising excessively. Maintenance efforts, which started under the Second Highway Project, are emphasized under the ongoing Sixth Highway Project and are to continue under the proposed program.

Road Use

-- Vehicle Fleet and Traffic

1.12 The motor vehicle fleet reached 19,427 vehicles in 1988 (not counting motorcycles), of which about 4,000 were owned by the Government (Table 1.2 and Annex 1.2), and about 6,000 motorcycles. There were 3 vehicles per 1,000 inhabitants which is on the low side for East African countries. The annual growth rate has been decreasing since 1983 and now reaches about 3.0%, after growing at a high average annual rate of 14% over the 1976-1983 period. In 1988, the fleet situated mainly in Kigali, was dominated by passenger cars, making up 33%, with pick-ups and minibuses at 30%, trucks 14%, and tractors and special vehicles making up the difference. The major increases in the period were recorded for mini-buses, pick-up trucks and truck/trailer combination.

Table 1.2

Motor Vehicle Fleet

	<u>1976</u>	<u>1984</u>	<u>1988</u>
Passenger cars	2,713	6,448	7,986
Pick-up trucks	2,432	5,786	8,268
Minibuses			
Trucks	858	1,438	1,938
Truck/trailer combinations		471	837
Other	299	225	265
Bus		111	133
Total	<u>6,302</u>	<u>14,476</u>	<u>19,427</u>

1.13 Systematic traffic counts started on the national network in 1982. They now cover about 3,000 km of the road network and are carried out by the General Directorate of Roads and Bridges (DPC) of MINITRAPE. The traffic volumes rarely exceed 500 vehicles per day (vpd). The highest traffic volumes are found on paved roads. A significant part of the network (about 500 km) has however traffic volumes of more than 200 vpd (see Annex 1.3).

-- Fuel Consumption and Price

1.14 Over the period 1982-1987 the consumption of fuel increased at an average rate of 6% p.a.. Fuel is imported by several companies, mainly from the refinery in Mombasa. Fuel storage capacity exceeds 20 million liters and is adequate (representing approximately a five-month consumption reserve) (see Annex 1.4).

1.15 The retail fuel prices are high, partly due to the high transport cost caused by the country's distance from the ocean ports. The retail price is US\$0.84 per liter or US\$3.20 per US gallon for gasoline (super) and US\$0.80 per liter or US\$3.04 per US gallon for diesel fuel. There are no Government price subsidies and the internal taxation on fuel is rather high. Import duties and taxes on fuel are important sources of Government revenue from road users representing about 103% of CIF price for gasoline and 101% for diesel fuel coming from Nairobi.

-- Road Transport Industry

1.16 Road transport in Rwanda is dominated by private operators. At the same time as a result of improved road conditions there has been a substantial increase in the vehicle fleet, albeit with a slow down since 1983. About 600 ^{1/} trucks and 133 buses are owned by parastatals and the remainder is privately owned. The vehicle for passenger transport is typically a minibus, which has proven to be faster and more mobile and economical for private operators than large vehicles. More than 85% of the 1,500 buses used for public transport in 1988 were minibuses. The use of small vehicles largely the result of a country with short distances, also prevails for freight transport within Rwanda. Entry into the transport industry is free and domestic routes not regulated except for tariffs for urban passenger transport. The government owns two parastatals for road transport, STIR, mainly for external freight transport and ONATRACOM for internal passenger transport. A decision to privatize STIR has been taken by the Government. The Public Enterprise Reform project recently approved by IDA will include technical assistance to facilitate this process and establish a timetable for actions.

1.17 Concerning the parastatals, tariffs for ONATRACOM have been kept unchanged for too long a time and as a result the revenue collected does not cover operating cost. The government therefore has to subsidize the operations. For urban transport in Kigali, the ONATRACOM tariffs also apply to private operators. A performance contract between ONATRACOM and the Government has been under discussion in 1987-88 but would need to provide more consistency with the general objective of reducing subsidies to the PEs. A tariff increase, to compensate several years of inflationary cost changes, particularly for urban tariffs, is essential for ONATRACOM.

^{1/} out of 2,500 including truck/trailer combinations.

-- Vehicle Regulations

1.18 There are no major problems with vehicle weight and dimensions in regard to the road network, since trucks as indicated above tend to be small in size on most roads. Where the problem arises is for the long-distance traffic with heavy vehicles, where rules in one country affect the situation in others and the scope of practical enforcement differs between domestic and foreign vehicles. To control the weight, there are scales in Kigali and the two most important border crossings (though not yet in operation) and the customs clearance is done in Kigali. As part of the NCTA, new increased axle weight limits have been agreed between Burundi and Rwanda, Uganda and Kenya. Traffic safety, partly as a result of higher speeds and traffic due to improved roads, is a serious problem, which in part will be addressed through the project (see para. 3.17). An indication of the development of accidents is included in Annex 1.5.

Lake Transport

1.19 Lake Kivu allows commercial navigation between the towns of Gisenyi, Kibuye and Cyangugu. The main transport flows consist of beer from Gisenyi to Cyangugu and Kibuye with coffee being carried seasonally on the return journey. The yearly volume of traffic is estimated at some 33,000 tons for goods and 25,000 passengers. The lake fleet, owned by traders/operators, consists of some 60 units (including passenger transport craft and barges) with a carrying capacity of 10-20 tons for the self propelled craft and 50-120 tons for barges. The fleet is old and not well maintained. The berthing facilities are generally rudimentary and in poor condition but could be renovated at relatively low costs. Since lake transport is the most economical method of transportation between communities along the lake, there will be scope for its expansion as and when trade in agricultural and consumer goods increases, or if the methane gas resources under the lake are developed. One of the components under the project would improve vessel maintenance by financing a modest shipyard (see para. 3.16). Some of the jetties for loading lake vessels were improved under an Agriculture Project (1126-RWA).

Civil Aviation

1.20 In view of the small size of the country, air transport primarily serves external transport needs. The international airport near Kigali can handle wide-body aircraft and a new terminal building was completed in 1984. Five smaller airfields exist but the only one of some importance is Cyangugu in the south west. Kigali airport is equipped for 24-hour operations and provides service to Europe and the capitals of neighboring African countries. The airport is served by European and African airline companies. In the 1980s, passenger traffic has been slowly increasing, reaching about 73,000 passengers in 1988. Freight traffic has however been severely decreasing since 1982 and reached only close to 15,000 tons in 1988 (from more than 30,000 tons in 1982) (Annex 1.6). Domestic passengers have decreased from a peak of about 29,000 in 1982/83 to about 8,000 in 1988. Under the Action Plan (para. 6.01 and Annex 2.2) a review of responsibility for freight handling at Kigali airport would be done and a restructuring of Air Rwanda undertaken. Both airports and Air Rwanda are under the responsibility of the Ministry of Transport and Communications (MINITRANSCO).

1.21 Domestic scheduled flights are assured by Air Rwanda which operates three small aircraft while chartered flights are available from a few private companies. In 1979, to cope with the severe international transportation bottlenecks, Air Rwanda acquired a Boeing 707 cargo aircraft which initially flew to Europe and to Mombasa. Utilization of the aircraft has decreased following the improvement in the performance of the surface routes. Operation of the aircraft is not profitable despite flights to Europe. Its main justification would consist in that it provides diversification and some security in external transport. However, it is costly to operate, not adapted to noise-restrictions in Europe after 1990 and its market potential within Africa is very limited provided the restrictions of goods movement to Mombasa be lifted which is part of the project. MINITRANSCO, with bilateral assistance, is now reviewing the future direction of Air Rwanda after the UNDP-transport planning project (with the Bank as executing agency) has completed a study of air transport and a study of operational improvement is underway. In the Action plan (Annex 2.2), a program of financial restructuring of Air Rwanda is included.

C. Planning, Finance and Management

1.22 Infrastructure development, particularly in support of road transport, is very closely linked with the production of food and services and marketing of exports. Past expenditures in the sector have therefore been dominated by road infrastructure. The challenge for the future is to keep a relatively developed main network well maintained, improve the condition of many rural roads, and avoid unnecessary investment in extending the main network. With high rainfall and difficult topography, substantial maintenance costs are incurred for unpaved roads. All principal international access routes and links between Kigali and the main centers of each prefecture should be improved to and maintained in paved condition. Future programs ought to ensure that maintenance expenditures do not decline below 25-35% of total road expenditures, to ensure that important parts of the system are not allowed to deteriorate.

1.23 The proposed program (see Annex 1.7) reflects these priorities. Of a total for the road subsector of FRW 19.9 billion for 1989-92, FRW 7.3 billion is for road maintenance, of which about FRW 4.4 billion for the four years supported by the Road Fund and regular budget (para 1.34). About FRW 14.1 billion of the road program is externally financed. The program for the remainder of the transport sector is more modest, FRW 3.3 billion for 1989-92. The focus of the program is on transport terminals, particularly the Isaka terminal (FRW 605 million), new buses for ONATRACOM (FRW 476 million), and a shipyard on Lake Kivu (FRW 350 million). These are all externally financed.

Institutional Framework and Administration

1.24 Two ministries are directly involved in transport: (a) the Ministry of Public Works, Energy and Water (MINITRAPE) for road construction and maintenance; and (b) MINITRANSCO for the development of other modes and for utilization of the transport infrastructure in general. MINITRANSCO is also the ministry responsible for parastatal enterprises in the sector such as Onatracom for public passenger transport within Rwanda and Air Rwanda. In addition, the Ministries of Planning, of Finance, and of Interior

(MININTER) are indirectly concerned with transport. The first of these is determining sector priorities, the second is influencing the sector through taxation of inputs used in transport, such as fuel, and the third is responsible for the communes and therefore the maintenance of the large network of rural, unclassified roads. Finally the Central Bank has an influence on the functioning of the sector through its role in the allocation of foreign exchange. The Government has only recently begun to perceive the multifaceted character of the sector and the urgent need for improved coordination between the various parts of Government involved in transport.

1.25 MINITRAPE, through the Directorate of Roads and Bridges (DPC), has full responsibility for the design, construction and maintenance of a network of national roads. DPC is divided into the Maintenance Department (DE) which is in charge of new construction by contractor and of road/bridge maintenance and construction by force account and of the mechanical workshop (Chart 1) and a Planning and Programming Department. The organizational structure, which was updated in early 1984 and again in 1989, is adequate to administer the road subsector. The staff numbered some 6,100 in June 1989. Of these 92 were permanent, 1,155 under contract and the remaining were hired ad hoc and paid on a daily basis. Staffing, however, in particular of higher level positions still poses problems. A manpower development plan, particularly for key employees is clearly needed, but would have to be supported by incentives to retain trained staff. Training programs over an extended period, interspersed with long periods of work, may be one solution. To make up for the current shortage of qualified Rwandese higher level staff, DPC has the assistance of several expatriates financed by bilateral and multilateral sources. They are employed as advisors, training instructors or as part of project teams. Because of the lack of local counterparts, coordination of their activities has proven difficult. For middle and lower level staff, the shortages are less severe and certain functional categories are definitely overstaffed. Moreover, qualifications are uneven as the education system does not produce enough skilled workers and technicians and Government often hires employees without any vocational training.

1.26 MINITRAPE is responsible through DPC for planning, construction, and maintenance of the classified road network. Planning capacity remains relatively weak as substantiated in the past by the inadequate balance between new construction and maintenance of existing infrastructure, resulting in the increasing need for rehabilitation of existing paved roads. The Planning Department will be reinforced under the project to strengthen DPC planning capacity.

-- Road Maintenance and Equipment Management

1.27 DPC is responsible for planning and executing the maintenance on the network of 2,270 km of national roads and about 1,000 km of provincial roads, while the communes are responsible for the maintenance of some 9,000 km of largely unclassified roads and tracks. Since the latter serve an important function in the transport of agricultural produce, and since the communes lack the funds, equipment and skilled staff to maintain them, DPC occasionally undertakes emergency repair works on these roads. Road maintenance has improved over the past years. This is due to the strengthening of road maintenance operations, increased budgetary

allocations and the assistance provided by IDA and other foreign donors, principally the Federal Republic of Germany (FRG). An adequate administrative structure has been set up and procedures for maintaining the country's major network and improving the skills of local staff are in place. Periodic road maintenance is carried out by six mechanized brigades for the main classified gravel roads; routine maintenance operations are performed by 200 labor-intensive road gangs ("cantonniers"), composed of a foreman and 12 roadmen with responsibility for about 15 km of roads. In

addition, voluntary labor by Umuganda is supporting certain activities such as erosion control also on the classified roads. This organization has succeeded in adequately maintaining the road network and keeping it passable year round. Among Sub-saharan African states surveyed by IDA, Rwanda ranks in the most advanced group for road maintenance. However, the mechanized road maintenance brigades do not yet perform to satisfaction, partly due to limited experienced personnel, pending results of continuing training under the Sixth Highway project and other external assistance (UNDP and FRG), and partly due to poor planning and monitoring.

1.28 Equipment maintenance and repair is also the responsibility of DPC. It operates a central mechanical workshop and a spare parts store in Kigali and two regional workshops in Ruhengeri, and Kibuye. Major repairs are carried out at the central workshop and routine maintenance in the regional workshops. These operations are supported by technical assistance provided under IDA and German projects and staffed by local mechanics and helpers. As a result it is now operating satisfactorily. However, it will continue to depend on the assistance of the expatriate mechanics to carry out its operations satisfactorily for several years given the shortage of experienced local mechanics. The proposed project would provide the necessary technical assistance, equipment, materials and supplies for continued improvement of operations and will put emphasis on the training of necessary personnel (para. 4.22).

1.29 Overall, road maintenance is carried out reasonably well, but improvements are needed in the following areas:

- (i) availability of equipment remains low, mainly due to lack of skilled mechanics and delays in supply of spare parts, and should be increased;
- (ii) procurement of materials should be better planned and monitored;
- (iii) costs should be closely monitored and unit costs computed; for instance, fuel consumption although recently reduced remains too high and needs to be better controlled; and
- (iv) periodic maintenance and in particular grading on gravel roads should receive a greater priority than in the past and should be carried out systematically.

These operational issues will be addressed under the project through (a) recourse to gradual contracting out of road activities; (b) assistance to DPC in planning, cost accounting and setting up appropriate management information indicators; and (c) increased budgets for road maintenance, through the Road Fund.

1.30 DPC is responsible for engineering and supervising construction works. Due to limited number of experienced staff, it is supported by technical assistance staff from FRG. DPC can handle only minor engineering design and work supervision tasks. Engineering studies and supervision of major projects are entrusted to foreign consultants and occasionally the National Study Bureau (BUNEP) which is gaining expertise in this field. DPC also operates the Government Soils Laboratory "Laboratoire National des Travaux Publics" (LNTP). LNTP is carrying out most soil and material tests for design and construction supervision of civil works but has now to compete with the University Laboratory for works for the private sector. French and Belgian aid are expected to continue to provide technical assistance and training to LNTP in the next few years. As part of the ongoing program, LNTP's capacity will be expanded to cover certain study and supervision tasks of road maintenance operations and research in the utilization of local materials for road construction and maintenance. Construction projects are executed by contractors, following suitable pre-qualification and tendering procedures. Contracts are generally let on a unit-price basis following international competitive bidding. Rwanda has very few domestic road construction firms due to lack of skilled and experienced personnel, lack of financial resources and a small market for construction works. A few domestic firms work only in small building construction projects and as minor subcontractors to foreign firms for major building construction. The construction industry is dominated by foreign contractors using mostly equipment-based methods and domestic contractors carry out some building construction and minor road works, sometimes through joint venture and subcontracting arrangements. The Government has now decided to open road works to private contractors, besides the local contractors under sub-contract to major international firms. Labor-based methods have been used at times for construction of low traffic volume roads with mixed results, most recently, whereas they are presently encouraged under a UNDP project carried out with ILO support west of Kigali. It is expected that recourse to small and medium local construction firms would stimulate the increased utilization of labor in the construction industry.

1.31 So far, virtually all road maintenance works are carried out by force account by DPC, except resurfacing of paved roads. Regraveling and rehabilitation with spot improvements of earth roads are carried out by the six production brigades, but productivity can still be improved with lower unit costs also feasible. The equipment for the brigades was provided under financing by IDA, the OPEC Fund, United Nations Capital Development Fund and FRG. Patching and resealing works on paved roads are carried out by two brigades. Routine maintenance, including cleaning ditches, culverts and shoulders is carried out unevenly, under labor-based cantonnage explained above. Bridge maintenance is carried out by a bridge brigade.

-- Communal Roads

1.32 Institutional responsibility for roads in Rwanda has not always corresponded to actual practice. MINITRAPE is responsible for the construction and maintenance of all roads classified as national (presently some 2,270 km). Responsibility for more than 9,000 km of other unclassified roads is with the local governments (communes). In practice, however, the communes do not generally have the financial and technical resources to undertake regular road maintenance. Especially since the broad category "communal roads" encompasses roads of quite different economic importance, MINITRAPE has tried to lend a hand on a few of the more important of these roads. Overall results have been mixed, however, partly because the capacity of MINITRAPE on classified roads is already stretched and because the expectation of a MINITRAPE brigade arriving can lessen the communes' incentive to carry out maintenance on their own. The Government has recognized the need to re-categorize the road network to better reflect the distinction among roads of different types (para. 2.19), increasing the share of roads maintained by MINITRAPE.

Financing of Road Maintenance

1.33 Routine and periodic maintenance are financed so far through the recurrent budget and the donor community. New road and bridge construction and some periodic maintenance of paved roads is financed under the investment budget. The budget works as follows: budget proposals are prepared by the DPC during the third quarter and submitted to the Ministries of Finance and Planning during the fourth quarter. They decide jointly on the budget to be presented to the Cabinet for final approval. Budgets are normally approved by the Cabinet and Parliament in January.

1.34 Total annual expenditures for highway maintenance have averaged some FRW 1,400 million in recent years (Annex 1.8). Of these, about 40% was funded through the Government's recurrent budget and the remainder by multilateral and bilateral donors. The recurrent budget allocation to road maintenance has been stable at FRW 570 million in the 1986-1988 period. Total annual expenditures for highway construction have tended to fluctuate strongly over the years, due to the overlapping of major construction works. Construction expenditures have averaged FRW 2.5 billion in the 1986-1988 period. Maintenance needs have been growing steadily and faster than actual maintenance expenditures. The proposed Road Fund (see para 2.13) and other sources (Government and donors) should ensure that the funds available for road maintenance are adequate. Road maintenance costs and productivity are now beginning to be more closely monitored under the Sixth Highway Project through the set up of cost accounting and management information indicators.

