



# **CARGO TRANSIT CHALLENGES IN ETHIOPIA**

**August 2000**

**For REDSO/ESA's Strategic Objective # 623-002-01:  
Increased Use of Critical Information  
by USAID and Other Decision-Makers in the Region**

**Rural and Agricultural Incomes with a Sustainable Environment (RAISE)  
IQC No. PCE-I-00-99-00001-00, Task Order 805:  
Regional Trade Analytical Agenda  
Implemented by TechnoServe-Kenya and ARD**

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By

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Ethiopian Transport Policy Country Committee**

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## ACRONYMS AND ABBREVIATIONS

CDE	Chemin de fer Djibouti–Ethiopien (Ethio-Djibouti Railway Transport)
CIF	cost, insurance and freight
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EFTC	Ethiopian Freight Transport Corporation
EPE	Ethiopian Petroleum Enterprise
ERA	Ethiopian Roads Authority
ERF	Ethiopian Road Fund
ERR	Economic Rate of Return
ERTA	Ethiopian Road Transport Authority
ESA	Equivalent Standard Axle
EU	European Union
FY	Fiscal Year
GDP	Gross Domestic Product
GVW	Gross Vehicle Weight
GOE	Government of Ethiopia
HGV	Heavy Goods Vehicle
HV	Heavy Vehicle
IGAD	Intergovernmental Authority for Development
ILO	International Labor Organization
km	kilometers
mm/km	millimeters per kilometer
NMT	Nonmotorized Means of Transport
Passenger–km	Passenger–kilometers
PTA	Preferential Trade Agreement (predecessor to COMESA)
RF	Road Fund
RMI	Road Maintenance Initiative
RSDP	Road Sector Development Program
RTA	Road Transport Authority
SSA	Sub-Saharan Africa
SSATP	Sub-Saharan African Transport Program
sq km	Square kilometers
SWOT	Strengths Weakness(es) Opportunities and Threats.
ton-km	ton-kilometers
TGE	Transitional Government of Ethiopia
UNECA	United Nations Economic Commission for Africa
US\$	US dollars
VOC	Vehicle Operating Cost

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## EXECUTIVE SUMMARY

Road and railway transport are the two leading means of transport in Ethiopia with road transport accounting for the movement of about 95 percent of total Ethiopian cargo. Railways account for only about five percent of the total cargo movement although it is currently the cheapest mode of transport. Factors leading to this disparity and to the inefficiency in cargo movement constitute the transit challenges addressed in the four chapters of this document. This study identifies the main problems leading to the low quality and high cost of both rail and road transit transport services in the country, particularly along the Addis Ababa-Djibouti corridor. Proposals for improving the efficiency of transit transport on a sustainable basis for the benefit of the country's economy are offered on the basis of the study's findings. Recommendations include actions at both national and regional levels.

The study notes that the problems in Ethiopia have been exacerbated by many years of civil wars, misguided economic policies prior to 1991, and more recently the independence of Eritrea in 1993, which virtually rendered the country landlocked, having lost her direct access to the seaports of Assab and Massawa, now located in Eritrea. In the case of road transport, a discussion of the Ethiopian Road Fund (ERF) and the management of axle load limits reflects the efforts being made by the Ethiopian government, in collaboration with Djibouti, to find a sustainable solution to the high road transport costs and to prevent further deterioration of the existing road network.

The main challenges in the road transport sector include high transport costs due to high transit charges imposed by littoral countries (both Eritrea and Djibouti), cumbersome port and customs procedures and poor road infrastructure. High transit costs start with numerous port charges that constitute a substantial proportion of the total transit costs. The aggregate transit cost for moving a container from Djibouti to Addis Ababa, for instance, ranges between US \$500 and US \$550 per 20-foot unit.

An inadequate supply of freight vehicles further adds to high transit costs. Due to previous policies pursued by the "Derg" regime that particularly discriminated against private investment, investment in heavy goods vehicles (HGVs) has been low, resulting in an aging, underutilized fleet of vehicles. The study observes that the current fleet of HGVs is unlikely to enable the country to effectively implement its development policies at planned productivity levels in several sectors such as agriculture, manufacturing, mining and services, unless the private sector investment is encouraged. Continued public sector domination of clearing and forwarding services and inadequate training for both local individuals and private firms in this business also hinder efficiency in cargo transit through delays. It is proposed (Chapter 1) that adoption of more liberal policies in the road transport sector and in the clearing and forwarding business, as well as the removal of restrictive procedures will improve efficiency through increased competition and promote a faster flow of transit traffic.

As for rail transport, the study reviews the background to the single-track railway line connecting the port of Djibouti to Addis Ababa (commonly known as CDE). It is noted that despite its critical importance to the economies of both Ethiopia and Djibouti, and despite its low tariffs, the railway has been carrying steadily declining levels of both freight and passenger traffic between

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FY 1986-1987 and FY 1994-1995. Consequently, its financial performance has also been deteriorating. CDE has accumulated losses for most of this period. While factors contributing to its poor operational and financial performance include technical constraints as well as competition from road transportation, the most important factors identified by the study are management and institutional constraints, some of which could be removed or minimized in the short to medium term. CDE has an excessive level of employees, lacks adequate managerial autonomy, lacks qualified manpower, has no commercial orientation, and is still subject to bureaucratic management procedures leading to corruption and inefficiency. Institutional constraints hinder its progress towards commercialization in the short to medium terms, and restructuring in the long term.

While acknowledging the goodwill of both Ethiopia and Djibouti towards CDE's restructuring, the study urges commercialization of the railway through privatization of its peripheral activities, a focus on core activities, retrenchment of redundant staff and the strengthening of management. In the long run, it is proposed that CDE should be restructured and eventually privatized, which will require wider reforms in the institutional framework in both countries, if long-term investment in the railway is to be attractive to strategic investors. It is also indicated that for the national initiatives to be successful, they should be harmonized through regional organizations such as the Intergovernmental Authority for Development (IGAD) and Common Market for Eastern and Southern Africa (COMESA).

Deterioration of roads (about 80 percent of the Ethiopian road network is in bad condition) is one of the causes of high freight transit costs through high vehicle operating costs (VOCs). Lack of a proper road maintenance policy and a bureaucratic approach to road maintenance funding and management are identified as the main causes of poor road maintenance. The ERF study traces origins of policy debates that involved key stakeholders in the road sector (private sector and federal and regional governments) in the acceptance of the need to establish a road fund (RF) outside the government's budgetary process to be fully dedicated to financing road maintenance. With a fuel levy as its main source of revenue, the ERF has been operating since 1997, managed by a Board dominated by government representatives, that does include key representatives of the private sector (i.e., road transporters).

After a strengths, weakness(es), opportunities, and threats (SWOT) analysis, the study proposes that the ERF Board be made more autonomous by incorporating additional private sector representatives to ensure long-term sustainability of the Fund. The analysis further proposes the introduction of economic criteria in the allocation of funds to the road agencies, based on studies that it also recommends. Later in this report, proposals are made to widen the Fund's revenue base. The idea is a stable source of funds managed in an accountable manner, based on the "four basic building blocks" under the Road Maintenance Initiative (RMI) should solve the problem of road maintenance management on a sustainable basis.

In line with proper road maintenance management, is the need to minimize the road deterioration through overloading (Chapter 4). The study finds that the current number of weighbridge stations (and weighbridges) in Ethiopia is inadequate. It also finds weaknesses in axle load limit enforcement. One finding is that overloading is common on certain transit routes where bulky commodities are carried and among specific vehicle categories. Recommendations include the



need for increased public awareness on the problem of overloading, privatization of weighbridge stations and deterrent penalties for offenders.

The four chapters of this study highlight cargo transit challenges that have been experienced by Ethiopia. The technical and policy issues addressed by the studies and the recommendations made herein may be useful to other Sub-Saharan African (SSA) countries currently at various stages in the implementation of road and railway transport policies to increase efficiency in cargo transit.

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## CHAPTER 1. ETHIOPIAN TRANSIT CARGO MOVEMENT: THE CASE OF ROAD TRANSPORT OPERATION

### 1.1 Introduction

This chapter discusses the main problems adversely affecting the movement of Ethiopian transit cargo and the related costs inhibiting the development of road freight transport as a result of the country's lack of its own seaport. It also attempts to identify problems relating to the structure of the freight transport industry, investment in the subsector, customs procedures and other transit services that have an impact on the total freight transit transport costs and competitiveness in Ethiopia.

While these problems arise from the recent experiences and challenges that Ethiopia has faced, it is hoped that they are common to other landlocked countries in the Southern and Eastern African region and that their solutions may be relevant, in varying degrees, to those countries.

Ethiopia became the only landlocked country in the Horn of Africa following the independence of Eritrea in 1993. Before that time, the country had access to the sea through the Red Sea ports of Assab and Massawa, both of which now belong to Eritrea, and through the port of Djibouti in the state of Djibouti. About 86 percent of Ethiopia's imports and exports were handled through the two major ports while only about 14 percent passed through Djibouti. Ethiopia's dependence on foreign ports was jeopardized, however, by the war with Eritrea in 1998, following a border dispute. Ethiopia was then forced to shift all import and export traffic, including transshipments, to the port of Djibouti.

The loss of direct access to the sea through its own ports has not substantially changed the country's proximity to the sea, since the distance by road between Addis Ababa and the port of Djibouti via Galafi (the new transit route) is only 925 km compared to 860 km from the port of Assab to Addis Ababa. The additional increase is only an extra 65 km. Despite continued proximity to a seaport, Ethiopia began experiencing problems as a result of loss access to two ports. These problems included high transit transport costs due to increased transit charges, restrictions and regulations imposed by littoral countries, inadequate infrastructure and poor port facilities, inefficient transport and a diminished bargaining power with littoral countries. The inefficiency of its own road and transport system, as evidenced by factors such as the aging fleet of road trucks, poor roads and other noninfrastructural constraints, have aggravated the increase in transit transport costs.

### 1.2 Macroeconomic Background

With an area of about 1.10 million sq km and an estimated population of 61 million, Ethiopia is one of the largest countries in Africa. It has a varied topography, ranging from rugged mountains reaching 4,600 meters above sea level to lowlands below sea level. The country's topography poses a challenge to the development of the road transport infrastructure. About 85 percent of the population live in the rural areas, with the majority of deriving their livelihood from peasant

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agriculture. Large parts of the country are vulnerable to frequent droughts, exposing the population in those areas to famine.

As a result of decades of protracted civil wars, recurrent droughts and inappropriate economic policies formulated by the “Derg” regime, the Ethiopian economy has been characterized by low per capita incomes, high rates of inflation, unemployment, inadequate and unreliable public services and recurrent shortages of essential commodities for the daily livelihood of the population. These factors have led to serious underutilization of the country’s resources resulting in the virtual collapse of its economy. Thus, Ethiopia is still one of poorest countries in the world with a gross domestic product (GDP) per capita of only US \$100 in 1993. Its average GDP growth rate remained below two percent per annum (p.a.) during the 1980s against an estimated population growth rate of 3.4 percent p.a., suggesting a continuous drop in per capita income. Much of the country’s poverty is attributed to excessive military expenditure and recurrent droughts, particularly during the years 1981-1982, 1984-1985 and 1987-1989.

The collapse of the “Derg” regime marked the end of command economic policy and saw the emergence of a new era. The installation of the Transitional Government of Ethiopia (TGE) in May 1991 led to the introduction of changes in the country’s political structure, including a wide range of market-oriented economic policies aimed at redressing the economic ills afflicting the country. In particular, the TGE and later the Federal Government of Ethiopia (GOE), formulated economic policy reform programs for reconstruction, rehabilitation and recovery of the national economy in the short and medium term, thereby laying a basis for long-term sustainable growth. The current program has set a medium-term target of attaining an average annual (GDP) growth rate of 7 percent p.a. with increased rates of saving and investment. This targeted GDP growth rate relies on a rapid growth rate for the agricultural GDP of 5.5 percent p.a. to be achieved through emphasis on increased production, based on improved agricultural practices.

Recognizing the failure of the excessively state-controlled economy under the “Derg” regime and its negative impact on growth and development, the TGE and later the GOE decided to adopt market-driven economic policies with an emphasis on enhancing private sector participation. The basic elements of the new economic policy include focusing the state’s role on policy formulation, planning, regulation and monitoring of service quality; withdrawal of public sector from provision of services so that the market can provide; participatory involvement of private capital; building confidence in the liberalized market; downsizing the public sector; and privatization of public enterprises.

### **1.3 Regional Agreements on Transit Road Traffic**

From the experience gained so far in the implementation of regional agreements relating to transit cargo movement, especially by road transport, it seems necessary that the agreements should be reviewed to make them focus on transit problems experienced by landlocked countries. The main objective of these agreements was the realization of regional integration in its many forms leading to the establishment of a free trade area. Almost all regional and subregional agreements under organizations such as the Intergovernmental Authority for Development (IGAD) and the Common Market for Eastern and Southern Africa (COMESA) have the enhancement of trade, industrial and agricultural development as primary objectives. The

development of transportation and communications were assumed merely to facilitate these main objectives. The agreements, however, did not take into account the political instability in certain member countries as a hindrance to a free flow of transit transport and were based on the assumption of political stability in all littoral countries — an assumption that has proved to be unrealistic in the case of Ethiopia.

It is also implicit in the transit agreements that all African agricultural and industrial products and inputs from member countries would originate from within each country. In practice, however, many of these goods and inputs originate from outside the African region and are vulnerable to high transit costs in the form of import duties, charges on sea freight, port handling charges, insurance and other costs besides the harmonized vehicle transit charges.

One provision requiring review due to an erroneous assumptions, especially on road transit charges, is the COMESA regulation stipulating that

*“The level of PTA (later named COMESA) harmonized road transit charge be US \$8 per 100 km for heavy goods vehicles of more than three axles and all articulated vehicles...”*

This standing charge does not take into account the fact that some transit vehicles return empty after delivering goods on the first trip and yet they still pay the charge. It is suggested that empty vehicles should be exempted from paying axle load charges. This would, at least, reduce the transit road transport costs for landlocked countries such as Ethiopia. The major regional and subregional agreements on transit transport should be reviewed to accommodate the problems of landlocked countries.

#### **1.4 Transit Cargo Transport Costs**

The main charges on Ethiopian transit cargo passing through the port of Djibouti comprise port charges related to cargo handling (measured in volumes and/or weights); clearing and forwarding charges, based on value and cost insurance and freight (CIF); the cost of road transportation; and weight. In addition to these costs there are a number of indirect costs associated with transit cargo. The port charges are levied at the rate of US \$1.30 per ton while delivery charges, including stevedoring, cost US \$6.70 per ton. A minimum flat rate of US \$6.25 per ton is levied as a transit charge for labor and equipment. This rate constitutes a major proportion of the total transit cost.

Other costs include vehicle insurance, port entrance and other road charges. Taking all these charges into account, the aggregate transit cost for moving a container ranges between US \$500 and US \$550 per 20-foot unit.

Table 1.1 presents the established cost regime, as adjusted on February 1, 1996, at the port of Djibouti while Table 1.2 shows a schedule of additional costs.

**Table 1.1. Established Cost Regimes for Transit Cargo 1996 and 1999, US\$ per Ton**

Cost Regime	1996	1991
Port charges (A)	-	176.00
(B)	-	6.25
CFA charges	48	51.00*
Inland freight (ton/km)	15.85	60.49
Additional costs	7.00	-

Source: Management Center, December 1996

\* Minimum flat rate irrespective of cargo weight.

Note: Since 1996 costs have been adjusted to the current exchange rate of US \$1 = Birr 8.20

**Table 1.2. Additional Transit Costs**

Item	Amount in US\$	Generalized Cost
Comprehensive insurance	1/trip/vehicle	\$ 4.00/trip/vehicle
Transit charge	0.50/ton	\$ 24.00/trip
Allowance for cost of living	26.60 person/day	\$ 26.60/person/day
Total official costs	-	\$ 137.60

Source: Management Centre 1996.

Assumptions:

1. Average load of 30 tons with a factor of 60 percent.
2. Average of 4 trips per vehicle.
3. A daily allowance for vehicle crew in Ethiopia at US \$4.9 per day per person.

Indirect additional transit costs in Ethiopia are due to other factors, including delays to transit vehicles caused by customs checks, time lost at weighbridge stations, overloading fines and other local but unofficial charges. Although the number of customs checks within the Ethiopian territory is often ignored, they adversely affect vehicle utilization rates and the number of turnaround trips, therefore constituting a major transit cost component. Transit vehicles are usually halted for about two hours per trip on each of the four checkpoints (at the Galafi border, Mille, Awash and Nazareth) within the Ethiopian territory, occasioning an average total delay of eight hours per vehicle.

The administration of the fuel levy as a source of revenue for road maintenance is another area of concern to transit transport. Because there is no clear distinction between road user charges and transit charges under the present conditions, it is difficult to establish appropriate cost structures for all traffic in Ethiopia, unfortunately leading to the possibility of excessive contribution towards the fuel levy fund by transit vehicles.

At the moment, because of ignorance of the road damage mechanism, penalties associated with axle loads are imposed on transit vehicles even if the vehicles do not contribute to pavement damage. Because of this, it is proposed that vehicles conforming to the legal gross vehicle weight (GVW) be exempted from these transit penalties.

## 1.5 Freight Transport in Ethiopia

Commercial road freight transport services were among those that suffered most from the misguided economic policies of the "Derg" regime. Prior to 1991, this subsector was excessively

regulated and centrally controlled with services provided only through the Ethiopian Freight Transport Corporation (EFTC), a publicly owned commercial transport entity. This parastatal operated under a cooperative system known as “ketena” whereby five “ketenas” catered for dry cargo transport while one “ketena” handled all bulk cargo transportation. The EFTC collected a five percent commission of total revenue generated by trucks of individual owners. Tariff rates were set and enforced without due consideration for the important need for investment in new vehicles. Nor was provision made for vehicle operating costs (VOCs). Controls were imposed on the allocation of vehicles and the routes on which they operated. Private vehicle owners had no direct control over their vehicles and were forced to rely on whatever remuneration was given to them by the state through the “ketenas”. The “Derg” regime created an unfavorable business environment that discouraged investment in road freight transport services, resulting in a continuous depletion of the stock of commercial vehicles and a severe shortage of spare parts.

The “ketena” system was dismantled through the new economic policy formulated by the TGE. Accordingly, tariffs were deregulated, operational mechanisms liberalized, and the private sector allowed free entry and exit in the provision of freight transport service. Despite these policy changes and the improved operating environment created by the GOE, road freight transport development still suffers from the neglect of the years prior to 1991. GOE’s efforts to develop services in this subsector have particularly been frustrated by the age of the vehicle fleet, their inadequate supply against an excessive demand and the underutilization of the existing stock of vehicles due to poor technical back-up. Deployment of freight transport vehicles during the war exacerbated the problem. There is an urgent need to stimulate investment in this subsector through private sector participation. This could be achieved by enhancing private sector access to credit, providing tax incentives and by privatizing parastatals still engaged in transit transport.

About 95 percent of Ethiopian cargo is transported by road. In order to meet the growing demand for freight transport services in the movement of exports, imports and domestic cargo, it is imperative that the country has a sufficient supply of new freight vehicles with adequate carrying capacity. As indicated, however, freight transport in Ethiopia is characterized by an inadequate supply and an aging fleet of vehicles with low carrying capacity and low utilization rates. Table 1.3 presents the number of freight transport vehicles in Ethiopia by vehicle size and ownership.

**Table 1.3. Freight Transport Vehicles of 9-Ton Capacity and Above, by Size and Ownership**

Ownership	Vehicle Capacity (Tons)									Total
	9-12	12-18	18-20	20-23	23-25	25-30	30-35	35-40	Over 40	
Parastatal	665	266	5	44	42	479	20	10	-	1531
Transport Associations	1,735	248	15	348	357	142	195	223	2	3,265
Share Limited Companies	72	33	4	153	101	341	194	252	3	1,153
Private Companies and Individuals	44	62	4	34	20	15	12	33	3	227
<b>Totals</b>	<b>2,516</b>	<b>609</b>	<b>28</b>	<b>579</b>	<b>520</b>	<b>977</b>	<b>421</b>	<b>518</b>	<b>8</b>	<b>6,176</b>

*Source: Ethiopian Road Transport Authority (ERTA), 1999*



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The table shows that the total number of freight transport vehicles with a carrying capacity of nine tons and above is 6,176, thus constituting about 61 percent of the total number of registered commercial freight vehicles in the country (the total number of registered freight vehicles is 10,127). The majority of the vehicles with a carrying capacity of nine tons and above have a carrying capacity of nine to twelve tons. This category numbers 2,516 vehicles, or nearly 25 percent of the total freight vehicle fleet and about 41 percent of all commercial freight vehicles with a capacity of nine tons and above. Since the majority of the vehicles shown in Table 1.3 are already owned by nonparastatals, the remaining 1,531 vehicles (about 25 percent of the total fleet of large commercial vehicles of nine tons and above) still owned by parastatals, should be privatized. Similarly, the large number of vehicles owned by “associations” (3,265 or about 53 percent) should be owned by “share companies” or “private companies and “individuals,” if they are not already owned by the private sector.

The shortage of freight road vehicles and the need to replace the aging fleet calls for urgent investment. Prospects for such investment by the public or private sector, however, are remote in the near future. Past trends of low investment in commercial vehicles need to be reversed. Between 1982 and 1991, when the economy performed poorly with a GDP growth rate of only two percent, and exports and imports declined (respectively at -0.1 percent and -4.7 percent p.a.), the fleet of commercial vehicles increased very slowly at only 0.63 percent p.a. against a population growth rate of 2.7 percent p.a. As the economy is now projected to grow at seven percent p.a. in the medium term, the growth rate of freight transport vehicles should be accelerated above its current level of five percent p.a.

For the public sector, while total capital expenditure on economic services has been increasing between FY 1995-1996 and FY 1997-1998, the proportion of expenditure on economic services to total expenditure remained static at 55.2 percent and 55.1 percent in FY 1995-1996 and FY 1996-1997 respectively, or declined (51.4 percent from 55.1 percent) during the period FY 1996-1997 to FY 1997-1998.

Although the bulk (80 percent) of economic sector public investment comprises transport infrastructure and natural resource development, this investment is likely to focus, in the future, on road development and may not necessarily have a direct impact on the vehicle stock. Investment in freight vehicles is expected to rely heavily on private sector investment.

The private sector, however, is still underdeveloped in Ethiopia. Despite the new economic policy initiatives, the domestic private sector, besides being still underdeveloped, is also starved of savings and investment funds while foreign investment is restricted and regulated. Several regulations promulgated between 1996 and 1998 reserve investment in road freight vehicles, *inter alia*, for Ethiopians and specifically exclude foreign capital from the transport and communications sector.

In view of the above constraints, it is proposed that the government revise the existing proclamations and remove restrictions/regulations so as to foster investment by both foreign and local investors in the transport sector, including investment in freight vehicles. This is important, considering the domestic private sector has been crowded out of the credit system by the domestic public sector borrowing. The urgent need for this policy change lies in the fact that

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currently it is estimated that over 40 percent of the total Ethiopian freight transport vehicles have an average age of about 16 years due to various restrictions imposed during the 1980s.

## **1.6 Transit Clearing and Forwarding Services**

Clearing and forwarding services in Ethiopia for transit cargo remains a virtual monopoly dominated by a single parastatal, although licenses have been issued to individuals in the private sector in an attempt to encourage competition. This monopoly is also reflected in the public ownership of freight vehicles, public operation and management of inland freight terminals, and in containerization.

There is an urgent need for the government to promote increased private sector participation in this area to improve competitiveness and efficiency. In addition to liberalizing the sector through privatization, the government should provide training opportunities for the private sector through exposure to international trade practices and procedures. To facilitate these, information should be disseminated to all clearing and forwarding agents on shipping movement through computerization of port activities. Similarly, the activities and roles of shipping agents and clearing and forwarding agents need to be clearly defined, since these roles are currently either vaguely defined or are played by the public sector.

## **1.7 Conclusions**

The above analysis shows that despite efforts made at regional and national levels to improve efficiency of transit cargo movements in Ethiopia, much remains to be done at both levels to achieve the goals of efficiency in the free flow of transit transport and its facilitation. At the regional level, it is necessary to review the existing agreements and other road transport arrangements to ensure that they adequately cater for the specific needs of landlocked countries from the ports to the inland destinations of transit goods. In particular, regional organizations such as IGAD, COMESA and the UN Economic Commission for Africa (UNECA) should ensure that each country actively implements its own national policies aimed at enhancing regional cooperation and integration through efficiency in trade facilitation.

At the national level, other tasks remain, such as liberalization of the economy, implementation of structural reform policies — especially privatization of public enterprises, and promotion of competition. The simplification of procedures and encouragement of private sector participation in clearing and forwarding are also necessary. It is also important that all littoral countries ensure efficient services in their ports and territories to facilitate the free flow of transit traffic for landlocked countries. Investment in the aging fleet of freight vehicles will depend greatly on the amendment of existing restrictive legislation to promote both domestic and foreign investment in modern HGVs.



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## CHAPTER 2. STANDARDIZATION OF TRANSPORT POLICY IN THE RAILWAY SUBSECTOR: ETHIO-DJIBOUTI RAILWAY TRANSPORT

### 2.1 Background

The Chemin de fer Djibouti–Ethiopien (Ethio-Djibouti Railway Transport), commonly known as the CDE, is a single-track railway line connecting Addis Ababa with the port of Djibouti on the Indian Ocean coast. This chapter provides the background to its origins in Sections 2.1 and 2.2 and thereafter discusses its socioeconomic importance to both Ethiopia and Djibouti as the only railway connection between the two countries. In Sections 2.3 and 2.4, a review of its operational and financial performance is undertaken and factors contributing to its poor performance are identified in detail. Efforts made by Ethiopia and Djibouti to improve the CDE's efficiency are discussed and evaluated. The regional aspects of the railway within the context of IGAD are presented in Section 2.6, while recommendations on the railway's future management and operation are made in the last section.

The CDE consists of a single-track one-meter gauge railway line that runs between the Ethiopian capital of Addis Ababa and the port of Djibouti, a total distance of 781 km. It is jointly owned and operated by two IGAD member states, Ethiopia and Djibouti. From the port of Djibouti (at sea level), the railway line climbs rapidly through undulating terrain to an altitude of 2,348 meters, at Addis Ababa, which adversely affects its haulage capacity. In the Republic of Djibouti, the line stretches for about 100 km while the remainder of the line lies within Ethiopia. The CDE employs over 2,500 persons, of whom over 2,100 are in Ethiopia while the rest are based in Djibouti.

The origin of CDE dates back to the year 1896 when a Swiss and French Engineer jointly formed a company in Ethiopia called *Compagnie Imperiale des Chemins de Fer Ethiopian* (Imperial Ethiopian Railway) that became operational in 1917 under a new name and status: *Chemin de Fer Franco–Ethiopien* (Ethio-French Railway). Construction of the railway saw a number of ups and downs. Because of a shortage of funds construction was discontinued for some time while its activities were disrupted in later years by the Italian Fascist occupation. Thereafter, the railway fell under the British administration until all foreign forces were withdrawn from Ethiopia in 1949. Smooth commercial operation was restored as Ethiopia and France signed a new treaty in 1952, transferring the railway headquarters from Paris to Addis Ababa.

Following political independence of Djibouti in 1978, a new treaty governing the operation of the railway was signed between the then Military Government of Ethiopia and the newly independent Republic of Djibouti in March 1981. The new Treaty established an Administrative Council (a Board of Directors) comprising 12 senior government officials (six from each country), and posts of Deputy Manager and four Directors (responsible for personnel, finance, commercial and technical issues) were created.

## 2.2 Socioeconomic Role of the CDE

Since its completion, the CDE has played very significant social, political, cultural and economic roles in both Ethiopia and Djibouti. Having enjoyed legal protection from road competition along a corridor where road transport services were scarce, this railway line was, for a long period, the most modern, safest, and cheapest mode of transportation for both passengers and goods. As it opened up economic activities in the Ethiopian hinterland while enhancing the socioeconomic importance of Djibouti as a port, the railway greatly facilitated Ethiopia's international trade and stimulated domestic trade. It is estimated that between 30 and 35 percent of the total population of Ethiopia (61 million) and 70 percent of the Djibouti population of 600,000 live along the railway line, where most of the two countries' key economic activities take place. The railway line has contributed considerably to the agricultural, industrial and commercial development of the Ethiopian hinterland between Addis Ababa and Djibouti. The Awash agricultural development conglomerate (which comprises 30 percent of the Ethiopian cultivated area, yielding some of the country's most valuable agricultural products such as fruits and vegetables, sugar and cotton), the industrial towns of Akaki, Debre Zeit, and Nazareth and important settlement areas of Modjo, Metehara, and Dire Dawa derive their growth and expansion from this railway line. The CDE has enhanced social and cultural integration among the populations of both countries, contributing particularly to the political integration of the far-flung eastern and central regions of Ethiopia. Potentially, it is Ethiopia's cheapest mode of transport for both imports and exports.

Despite its strategic importance to the economies of both countries, CDE's operational and financial performance has deteriorated considerably, resulting in the urgent need for its restructuring, reorganization and improved management.

## 2.3 Operational and Financial Performance of CDE

Table 2.1 presents CDE's passenger and freight traffic between FY 1986-1987 and FY 1994-1995. The railway is carrying a rapidly declining number of passengers and a steadily declining volume of freight. The number of passengers travelling on CDE declined from 1.2 million in FY 1986-1987 to only 514,000 passengers in FY 1994-1995. Similarly, the number of passenger-km has been declining rapidly from 314.7 million to 150.7 million during the same period. Total freight hauled by CDE has also been steadily decreasing, except for the period 1988 to 1991, when it temporarily rose from 299,000 tons to 315,400 tons before declining to 204,600 tons in FY 1994-1995. This decrease was reflected in the reduction (in ton-km) from 149.5 million to only 93.0 million ton-km during the same period.

**Table 2.1. CDE Passenger and Freight Traffic, FY 1986-1987 to FY 1994-1995**

	1986/87	1988/89	1990/91	1992/93	1994/95
<b>Passenger Traffic</b>					
Total Passengers ('000)	1,204.9	1,094.6	989.6	710.8	513.8
Passenger-km (millions)	314.7	297.6	291.2	229.6	150.7
<b>Freight Traffic</b>					
Tons ('000)	335.4	299.0	315.00	234.0	204.6
Ton-km (millions)	149.5	128.6	138.0	111.6	93.0

*Source: CDE*

The deteriorating operational performance of the railway has been further reflected in its poor financial performance, as shown in Table 2.2. Although both freight and passenger revenues increased slightly between FY 1988-1989 and FY 1992-1993, only to drop slightly during FY 1994-1995, total revenues have not generated adequate surpluses due to the high cost of operation. Consequently, CDE has been in the red most of the time. Between FY 1988-1989 and FY 1994-1995 the railway recorded annual deficits ranging between Ethiopian Birr. 2.3 and 7.6 million (except during FY 1992-1993 when a surplus of Birr. 3.6 million was realized). These deficits were primarily due to high operational costs. Prominent among these high operational costs is the high level of employment. Staff salaries and benefits accounted for an average 54 percent of total annual working expenditure, as Table 2.2 further indicates.

**Table 2.2. Financial Performance of CDE in Selected Years  
(FY 1986-1987 to FY 1994-1995)**

	1986/87	1988/89	1990/91	1992/93	1994/95
<b>1. Revenues</b>					
Freight	N/A	16.4	17.9	31.7	30.8
Passenger	N/A	11.4	11.9	13.6	12.7
Port Tracks	0.1	0.1	0.1	0.1	0.3
Sub-total	29.7	27.9	29.9	45.4	43.8
<b>Other revenues</b>	<b>0.5</b>	<b>0.6</b>	<b>0.6</b>	<b>1.0</b>	<b>1.6</b>
Total Revenues	30.2	28.5	30.5	46.4	45.4
<b>2. Expenditure (Operating Costs)</b>					
Staff salaries & benefits	16.4	16.3	16.4	24.4	28.9
Materials	8.6	8.3	10.0	8.7	13.2
Other	1.9	2.1	3.0	7.1	7.5
<b>Subtotal</b>	<b>26.9</b>	<b>26.7</b>	<b>29.4</b>	<b>40.2</b>	<b>49.6</b>
Interest	1.5	1.1	0.7	1.0	1.4
Depreciation	1.6	3.7	2.7	1.6	2.0
Total Expenditure	30.0	31.5	32.8	42.8	53.0
<b>3. Operating profit/(loss)</b>	<b>0.2</b>	<b>(3.0)</b>	<b>(2.3)</b>	<b>3.6</b>	<b>(7.6)</b>
<b>4. Salaries and benefits as % of total working expenses</b>	<b>54.7</b>	<b>51.7</b>	<b>50.0</b>	<b>57.0</b>	<b>54.5</b>

Source: CDE Statistics and ILO Report, June 1985

N/A = Data not available

## 2.4 Factors Contributing to CDE's Poor Performance

The main factors contributing to CDE's poor performance are common to most railways, varying only in degree, depending on local circumstances. They range from technical and financial to institutional constraints. However, many of them are due to bureaucratic and the noncommercial orientation of CDE's management. These factors include the following:

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### 2.4.1 Technical and Physical Constraints

CDE is highly constrained by the technical specifications of its track: a single line of one-meter gauge with rails weighing 20, 25, 30 and 36 kilograms/meter in various sections. Traversing a long difficult and rugged terrain with gradients as steep as 2.7 percent and curves with radii of less than 200 meters, the line has an average payload of less than 150 tons, which is equivalent to five loaded truck trailers or semi-trailers. Its unit freight costs are much higher than they would normally be on a terrain with lower gradients. Although the track could be realigned to remove geometric barriers, the cost of this on an extensive scale is currently prohibitive. A poor telecommunication system exacerbates the problems of line operation, leading to frequent train delays and unreliable safety.

### 2.4.2 Poor Maintenance of Infrastructure

Several studies have indicated that the overall condition of CDE's infrastructure installations (including the track, fills and cuts, bridges, tunnels, layers and sublayers) have deteriorated considerably, due primarily to poor maintenance. Similarly, locomotive wagons and coaches are inadequately maintained, leading to their low availability rates.

### 2.4.3 Management Constraints

Although CDE's poor performance is often attributed to stiff competition from road transport, especially modern trucks with high haulage capacity, a closer examination shows that its inability to effectively compete with road transport is largely due to inefficient management, which is in turn due to bureaucratic and noncommercial management practices, incompetent marketing, excessive employment, and manpower constraints, among other factors.

CDE continues to be managed like a bureaucracy despite the changing environment in which it operates and despite the goodwill of the two owner states. The railway management, for instance, has not taken advantage of many opportunities (such as an increased volume of business due to the closure of the port of Assab, the recent improvement of radio communication, and the expansion of facilities at the port of Djibouti) to improve its performance and productivity or the quality of its services. Even the recent addition of 11 reconditioned locomotives to its fleet has not made any appreciable impact on operations and services.

In addition to these factors, CDE's marketing strategies are outmoded. Although it has a comparative advantage over road transport on hauling large volumes of bulky goods for long distances, the railway has never concentrated on the transportation of such goods. Similarly, it has failed to focus on its core areas of competence by shedding off peripheral activities and operations. Even with its currently lower freight rates, CDE has failed to attract traffic from road trucks through aggressive marketing, and it still operates on the basis of outmoded and cumbersome methods of classification of commodities and tariff fixing.

The two governments have also partly contributed to the operational problems of the railway. Besides train delays due to operational problems, much time is often lost on customs checks on transit trains in several stations while searches are made for smuggled goods, especially at

Mehesso, Aouche, and Nazareth. Although both governments have recently agreed that trains should be checked only at two stations in Ethiopia, certain customs officials sometimes defy their instructions. Table 2.3 the total number of freight and passenger trains delayed, the number of hours lost during customs checks and the estimated cost due to the delays. During the two and one-half year period, CDE lost a total of 1,806 hours (worth US \$61,430) due to train delays for both passenger and freight traffic.

**Table 2.3. Train Delays and Time Lost (in Hours and Value)  
1997-1998 to 1998-1999**

Year	No. of Trains Delayed and Time Lost (Hrs)			Estimated Value	
	Freight	Passenger	Total	Eth. Birr	US\$
1997-1998	206	574	780	195,000	24,350
1998-1999	161	291	452	124,300	15,550
Jul-Dec 1999	355	219	574	172,200	21,530
<b>Total</b>	<b>722</b>	<b>1,084</b>	<b>1,806</b>	<b>491,500</b>	<b>61,430</b>

*Source: CDE*

#### 2.4.4 Manpower Constraints

CDE employed 2,474 people during FY 1995-1996. This level of employment was considered excessive, since the total wage bill (salaries and benefits) constituted an average of over 50 percent of total working expenditure during the period 1986 to 1995, when the level of employment averaged 2,070 employees each year. Although the number of employees had declined steadily from 2,662 in FY 1992-1993 to 2,582 in FY 1994-1995, the proportion of total staff costs to total expenditure remained high. This proportion fluctuated from 57 percent of total expenditure in FY 1992-1993 to 53 percent and 55 percent during FY 1993-1994 and FY 1994-1995, respectively. (There is no data on the total staff costs for FY 1995-1996). Overstaffing, which has led to low labor productivity, is largely due to a number of factors, including perceived historical notion of public railways as providers of jobs, political patronage, corruption and resistance by trade unions to retrenchment. Some of these factors are, of course, beyond the control of the management. CDE also suffers from weaknesses due to a shortage of qualified staff in its management cadre, although it has engaged more highly qualified personnel since FY 1992-1993.

#### 2.4.5 Financial Management

Although the railway's poor financial performance is due to unsatisfactory operational performance, this has been aggravated by its weakness in financial management. CDE lacks a traffic and train costing system. Its cash flow has been poor for a long period. Its assets have not been valued for many years and its liabilities and balance sheet have never been finalized, resulting in the lack of a legal balance sheet that could be used to secure even normal commercial credit or overdraft facilities. In addition to this, provision for depreciation is grossly inadequate. Although the railway has appeared to make profits, this impression is misleading since it is actually undercapitalized and financially unsound.

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## 2.4.6 Institutional Constraints

The cumbersome institutional framework under which CDE operates has been identified as one of its major problems. Like most public African railway organizations, it faces additional difficulties emanating from its dual ownership by Djibouti and Ethiopia. Because of the need to cater for an equitable power sharing arrangement between the two countries, the organizational structure of the railway is needlessly “top heavy” under the personnel, financial, commercial and technical Directors, with several assistants from each member country. Under this arrangement, CDE lacks clear and realistic commercially oriented corporate objectives save those defined in the 1981 Treaty. These are unsuitable for the efficient management of the railway because of the bureaucracy, leading to delays in decision making or in the implementation of policies. There are occasions when major decisions are delayed only to be ratified by the Board when they are already under implementation by the management.

## 2.5 Measures Towards Improved Efficiency

Despite the above constraints, the governments of Ethiopia and Djibouti, realizing the critical national and regional roles of CDE, have taken various measures aimed at improving its performance, including the modernization and expansion of the port of Djibouti’s loading and unloading facilities, increases in port working hours, removal of cumbersome port entry and exit regulations, and reduction of the number of customs checkpoints for both freight and passenger trains. These measures are expected to minimize train delays and facilitate higher levels of locomotive and wagon turnarounds.

Ethiopia has promulgated ambitious development policies that emphasize rapid development of agriculture, industries and mining as well as other sectors that will require increased railway transport services. The country has indicated that success in achieving development goals in these key sectors will heavily depend on the efficiency of railway transport. It has accordingly ratified amendments to the existing treaty with Djibouti, intended to remove CDE’s institutional and management constraints. The two countries have also accepted, in principle, the recommendations of consultancies on CDE commissioned by them and funded by the European Union (EU) to the tune of over Birr. 5 million. They concur that for CDE to improve its performance and play its critical role in regional integration, it has to be totally restructured. In this regard, funding possibilities are being explored through the European delegation in Addis Ababa.

Although both countries have shown goodwill towards the restructuring of the railway and have taken some short to medium-term measures to improve its efficiency, progress towards actual implementation of restructuring is rather slow. There seems to be some fear of privatization (e.g., as in the case of road freight transport) due to an apparent fear of the role of the private sector. Ethiopia’s previous railway transport policy limited the scope of private sector participation in this transport mode. It had reserved the responsibility for major railway development projects for the public sector, and indicated that the private sector would be encouraged to participate only in medium- or small-scale rail transport activities. Following studies by the EU, however, the government is now convinced that restructuring is inevitable.



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While both governments have accepted CDE's restructuring as a prerequisite to its improved efficiency, successful restructuring requires a high degree of commitment to win the confidence of donors and the private sector. This commitment needs to be reflected in the successful implementation of short- to medium-term measures prior to full restructuring, e.g., reforms in internal management have to be reflected in improved operational and financial performance. Factors contributing to the slow progress in the implementation of measures leading to CDE's restructuring need to be immediately addressed. In order that the joint owners may successfully embrace restructuring and proceed to implement it, they must create an enabling political, legal, and institutional environment for private sector participation.

## **2.6. Standardization of Railway Transport under IGAD**

Since 1986, IGAD (comprising Djibouti, Ethiopia Eritrea, Kenya, Somalia, Sudan and Uganda) expanded its mandate from food security and environmental protection in response to the droughts of the 1970s and 1980s to include economic cooperation and political and humanitarian issues. IGAD is now a well-established regional entity with regional responsibilities. One of its major challenges, however, is the improvement of an efficient transport system, as a vital factor in achieving regional cooperation and socioeconomic integration based on improved productivity and trade facilitation.

Besides modalities in which IGAD may facilitate improvement of efficiency in transit railway transport, a number of areas have been identified in which its standardizing role will promote efficiency. Such areas include cooperation in

- the sharing of dedicated and expensive facilities such as workshops (for maintenance of locomotives, coaches, etc. of similar makes), research and development, and training facilities;
- the exchange of technical experts in order to streamline operations and enhance benefits from shared experience and expertise;
- the establishment of a standardized stock management system as a basis for monitoring operations regionally to attain improved efficiency systemwide in the overall trade and transit facilitation;
- the establishment of a regional professional or specialized body that could act as a clearing house for information;
- standardization of technical certification and basic training for key cadres such as locomotive drivers and track inspectors;
- the coordination and standardization of shipping and customs documentation and other trade procedures to enhance faster flow of transit freight;

- the minimization and coordination of all transport and trade barriers along the main transit corridors for both road and railway transport to facilitate a faster flow of goods and services and promote intermodal flexibility; and
- the interconnection of member country railway systems, in the long run.

These areas of potential cooperation under IGAD are also the same areas in which member countries are already cooperating in the transit railway subsector and on other transport modes under COMESA, and under the East African Community (EAC) to which Kenya and Uganda belong. For Ethiopia and Djibouti and their neighboring countries, this apparent duplicity serves to emphasize the critical importance of cooperation nearer home, whereby the benefits of a body like COMESA could be realized on a smaller scale for a smaller number of countries.

For IGAD to successfully play a strong role in facilitating transit railway transport, it must have the goodwill of all its member states so that it has the necessary financial and manpower resources, as well as an efficient institutional framework based on good governance, the rule of law, transparency and accountability among all member states.

## 2.7 The Way Forward

The above review of CDE confirms that despite efforts made to improve its performance by both Ethiopia and Djibouti, the railway is unable to meet its corporate objectives and that there is a critical need for it to improve its operational and financial performance. The railway cannot generate an adequate annual surplus to cover its operational costs, depreciation interest on loans, pay dividends to its shareholders (the two governments) and fund its modernization. CDE must remove or minimize factors constraining the achievement of its long-term corporate objectives by reducing its employment to optimum levels, increasing the productivity of remaining staff, increasing the rate of its asset utilization, and improving the quality of its service to all its customers in terms of improved punctuality of trains through higher levels of locomotives and wagon availability. In this regard, it is necessary to focus on freight traffic, from which it derives over 60 percent of its annual total revenue, and put less emphasis on passenger traffic. These measures can be taken before the removal of the physical and technical constraints. The main goal is for CDE to make the best use of its existing resources to improve its operational and financial performance in the short to medium term, and to ensure that its real financial performance correctly reflects its actual performance.

The critical importance of these initial steps is to ensure that the railway meets the ever-growing cargo transit challenges in view of the reform policies being implemented by the GOE, to increase productivity in key sectors such as agriculture, manufacturing, mining and services. The CDE's increased efficiency and improved performance should be seen as augmenting the successful implementation of these policies as part of its contribution to socioeconomic development of the country, in view of fledgling performance of road transport in meeting those challenges. Moreover, for the railway to remain in business in the global context, it is essential that its services be provided efficiently and at the lowest cost.



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Considering the enormous institutional constraints facing CDE, the need for its restructuring cannot be overemphasized. Restructuring would involve a major decision by both governments to change their present commitment to acceptance of reforms that would ensure that CDE has an autonomous Board and management. This would be done through the accommodation of private sector ownership and management, possibly by contract management, sale of CDE's shares to a strategic partner and minimizing the influence of the government in both Board and management. Ethiopia needs to go beyond signing an agreement to change the 1981 Treaty, and actually show a commitment to supporting the private sector in operating and managing CDE. With this commitment and the introduction of autonomous management political interference, staff allocation and other management constraints would be removed. Other rigid regulations and delays due to bureaucracy would be considerably reduced if not altogether eliminated. Divestiture and privatization of various components of the railway (e.g., the management of workshops, track maintenance, restaurants and catering, passenger transport, etc.) should then be considered as measures that would enable the railway to concentrate on core activities of CDE. Revenues generated from privatization and divestiture including wagon lease fees, etc., could be used to finance infrastructure rehabilitation and modernization and procurement of essential spares.

These restructuring measures require serious involvement of all stakeholders and a high degree of transparency and accountability. CDE would have to open a dialogue with the government and trade unions on fair compensation for workers that are to be retrenched and on training schemes for both categories. The government should consider seeking donor assistance for such funds. Similarly, until financial performance of CDE adequately covers its debt repayment, an agreement should be reached as to whether the government can seek donor funding, or take over, or clear the railways' long-term debt. All these negotiations should involve all stakeholders — the trade unions, clearing and forwarding agents, shippers, representatives of farmers, manufacturers and other representatives of the business community.

Since the CDE is owned and managed by the two countries, restructuring must take place on the basis of a joint initiative by Ethiopia and Djibouti. After a successful restructuring has been undertaken in CDE and in other national railways in the region, such as Kenya Railways, Sudan Railways and Uganda Railways, IGAD's coordinating and standardization role may be successfully executed.

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## CHAPTER 3. A REVIEW OF THE ETHIOPIAN ROAD FUND

### 3.1 Introduction

This chapter reviews the ERF. After providing the conceptual background to the issues that led to the formulation of policies under which the road fund (RF) was established in 1997, it proceeds to describe steps taken by the government for its establishment and discuss the composition of its board, its functions, procedures for its operation and the management of its finances. An evaluation of the fund's management is undertaken in the form of a strengths, weakness(es), opportunities, and threats (SWOT) analysis. Recommendations are then made on the basis of issues that emerge from the analysis.

The leading transport mode in Ethiopia, as in most Sub-Saharan African (SSA) countries, is road transport. Deterioration of transit roads in the country, leading to high VOCs and high road transport costs, has been a matter of serious concern to the government because of the heavy dependence of the national economy on this mode. An efficient low-cost road transport system is of critical importance not only to the development of all sectors of the economy — including agriculture, mining, manufacturing and service sectors — but also to the stimulation of international trade and the integration of the national economy.

Currently, the total length of the Ethiopian road network is about 56,000 km, of which about 26,000 km consists of classified roads, while unclassified roads constitute the remaining 30,000 km. The unclassified roads include tracks, trails and paths. With estimated crude road densities for classified roads of about 4.3 km of roads per 10,000 population and 23 km per 1,000 sq km, the country's road densities are far below the average African road densities. In fact it has some of the lowest road densities in the world, with the majority of the rural population, for instance, living half a day's walking distance from the nearest all-weather road. Similarly, Ethiopia also has one of the world's lowest vehicle densities, even by African standards. The total vehicle population comprises about 150,000 vehicles of which 100,000 are operational, while the rest are not, although they are registered. Again, on the basis of crude measures, the country has only four vehicles per km of classified roads and two vehicles per thousand population.

Due to an accumulated backlog of road maintenance, it is estimated that at least 80 percent of the total road network is in bad condition. A substantial proportion of these poor roads requires rehabilitation and reconstruction at very high costs. As a result of this extensive road deterioration, road maintenance costs are now so high that in a number of cases those costs cannot be recovered from existing road user charges, forcing the government to resort to other sources of revenue. Until the government established the RF, the financing of road maintenance and rehabilitation was supported from budgetary allocations, which were subject to budgetary constraints. Moreover, revenues from road-related taxes and licenses were not necessarily channeled or dedicated to road maintenance. The rates at which they were levied were also unrelated to the extent of road use or damage. Thus, funds for road maintenance have been mostly inadequate.

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## 3.2 Policy Background

The establishment of the ERF was preceded by the formulation of a new policy for the roads sector, which involved raising public awareness and considerable consultations among all stakeholders including the government, the private sector and donors.

Despite its concern over the deteriorating road conditions and their negative impact on the economy prior to 1997, the government lacked an appropriate road maintenance policy for addressing this problem. It was not until sufficient awareness of the magnitude of the problem had been raised through joint efforts of the World Bank and the United Nations Economic Commission for Africa (UNECA) under the Road Maintenance Initiative (RMI) as part of the SSA Transport Policy Program (SSATP), that the government realized the urgent need for such a policy and adopted reform policies and strategies in the roads sector. The Road Sector Development Program (RSDP) was formulated by the government to outline programs incorporating the issues discussed under RMI.

Briefly, under RMI, the two multilateral and a number of bilateral donors worked with the governments of SSA countries to identify the main causes of poor road maintenance in the region to develop policies and strategies for removing those problems. After considerable consultations with all stakeholders (donors, road users, private sector and government agencies) through debates in national fora, a consensus emerged on the critical need to *commercialize* road management, i.e., to place them in the marketplace and operate roads on “a fee for service basis”. In this context, the identified actions using the “*four basic building blocks*” to facilitate commercialization of roads were (i) to create ownership (between the government and road users) by involving users in their management to ensure public funding and control of road agencies; (ii) clarification of responsibilities among various government and road agencies; (iii) establishment of an “adequate and stable flow of funds”; and (iv) strengthening road management through businesslike private-sector management styles. The basic idea was that road users should contribute towards road maintenance in accordance with the extent of road use (or damage) and that for this to happen, contributions toward road funding should be transparently managed and utilized solely for road maintenance.

In Ethiopia, after wide consultations and debate through a series of workshops at technical and policy levels and through public hearings, a consensus emerged on the establishment of the RF. The stakeholders that participated in this consultative process included representatives of farmers, manufacturers, freight and passenger road transport operators, other road users, and professional bodies. In view of the fact that only about 20 percent of the total demand for transport in Ethiopia was met by modern (motorized) transport, and of the low vehicle and road densities, it was considered that passing on the full cost of road rehabilitation and reconstruction to all users would be unduly burdensome to the public and that the cost burden should be shared between the government and the public. It was agreed that the levy rates should be established under the fund and set in such a manner that catered for full cost recovery only in respect to routine and part of periodic maintenance. The stakeholders also agreed that there should be a gradual approach towards full cost recovery as revenues to the RF increased over time.

### 3.3 The RF in Ethiopia

#### 3.3.1 Origin of the Fund

The RSDP was discussed and adopted by parliament as a policy document. On the basis of this, Parliament, through the *Road Fund Establishment Proclamation No. 66/1997*, enacted a law establishing the ERF in March 1997. The proclamation has 18 sections with relevant articles covering various issues, including the objectives, source and collection of funds, disbursement procedures, the management Board, the RF Secretariat, and auditing.

#### 3.3.2 Composition and Functions of the Board

Currently the RF Board is composed of federal and regional government representatives and representatives of the private sector, each with equal voting powers. Membership to the Board is either by appointment or election from the public or private sectors. Articles of the Proclamation however, provide that the composition and size of the Board is to be determined by the government. Board meetings are held quarterly although extraordinary meetings may be held as the need arises. The existing representation on the Board is as follows:

- Federal government representatives:
  - 1 Minister, acting as chairperson;
  - 3 Vice Ministers, acting as members;
  - 1 General Manager, acting as a member; and
  - 1 General Manager, acting as a member and Secretary.
- Regional government representatives:
  - 6 regional government Presidents, acting as members (includes the President of Addis Ababa).
- Representatives of private commercial transport owners, acting as members:
  - 2 from dry cargo transport owners;
  - 1 from liquid cargo transport owners; and
  - 1 from passenger transport owners.

The structure of the Board, with a mixture of private sector, federal and regional government representatives, is uncommon in most Ethiopian national institutions or agencies. Most institutions have boards that are more heavily dominated by government representatives.

The Board is autonomous and empowered to set its own administrative and financial procedures. Its program document is usually forwarded directly to the Prime Minister's Office but only for information and follow-up purposes. It has full responsibility for the management of the fund but mainly deals with policy matters, program review, budget approvals, and evaluation of performance reports from various road agencies and with the allocation of funds. The day-to-day administration of the fund is undertaken by a small technical Secretariat, which is responsible for routine matters, follow-up actions and implementation of Board decisions and recommendations.

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This Secretariat liaises with beneficiary road agencies on a regular basis, especially on their physical and financial performance reports and implementation of set programs.

### **3.3.3 Sources of Revenue**

Under provisions of the Proclamation, sources of the RF revenue include the fuel levy, axle-load charges, vehicle license renewal fees, overloading fines and other road tariffs that may be fixed from time to time. For the fuel levy, however, the law only ratified previous rates, which had been collected since September 1996 on both gasoline and diesel. Collection rates for the fuel levy are currently set at 9.5 cents per liter of gasoline and 8.0 cents per liter of diesel. All fuel-based revenues are collected by the Ethiopian Petroleum Enterprise (EPE) and transferred directly to a specially maintained central account of the RF. Other revenues deposited into the fund are municipality taxes on petroleum products charged at 2.0 cents per liter. These taxes, previously levied by municipalities for their own development programs, continue to be collected by municipalities but are now channeled to the RF. Although other taxes have been identified by the Proclamation, no rates have been set, primarily because of potential difficulties in their collection. Fuel taxes are currently preferred because of the simplicity in their collection and on the grounds of equity, since they readily reflect the extent of road use. There is a need, however, to study the elasticity of the fuel levy revenue on a regular basis and to relate the rates to the real costs of road utilization.

### **3.3.4 Allocation of Funds**

The allocation of funds from the ERF to road agencies is done proportionally, based on recommendations and guidelines contained in the road maintenance action plan formulated under the RSDP and endorsed by the Board. Currently, 70 percent of the total allocations go to the federal government, 20 percent to regional governments and 10 percent to municipalities. Criteria for the allocation of funds for the regional rural roads, however, is based on the proportion of each agency's share of the classified roads, i.e., its share of the road classes RR 30 and RR 50.

Fund allocations to municipal authorities are based on a set of criteria, which include traffic density, administrative centrality and other subjective factors based on the level of socioeconomic activity. Under these criteria, 50 percent of the total municipal budget is allocated to the capital city of Addis Ababa, thus accounting for five percent of the total RF budget, leaving the remaining five percent be shared among all other municipalities. Out of this, the second category of towns receives twice as much as the third category of towns from the total budget.

In addition to the above set proportions, other criteria for allocation of funds include the results of road condition surveys in each road agency, traffic volumes in terms of both density and composition, population densities, the number of registered vehicles in the area, road densities and other socioeconomic parameters that may be selected from time to time. Partial allocations to road agencies on the basis of these criteria started being distributed towards the end of FY 1997-1998. Full allocations, however, have been paid to each agency since FY 1998-1999 with an annual budget ceiling of Birr. 200 million.

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Notwithstanding these guidelines and criteria, designated road agencies are required to fulfill certain conditions before they can be allocated funds from the ERF. Each agency has to submit a budget to the Board Secretariat accompanied by a detailed, annual, road physical works program. In this regard, the agency is required to rank its projects according to their priorities. The budget and the program must include all road segments or road safety activities the agency wants to be incorporated in the allocation. It must also include a financial plan (cash flow) and be within the budget ceiling set for the agency. Road agencies are also required to submit performance reports on their previous projects before funds are released or new programs approved.

### **3.3.5 Audit and Accountability**

For disbursement to be effected, each road agency has to open a special recipient RF account, this being the only account recognized by the central RF account. It is operated solely in respect of RF transactions and incorporating transactions involving any other moneys is forbidden. These requirements are intended to ease auditing road agency funds by the ERF and to enhance accountability. Similarly, names of authorized signatories of the road agency bank account are communicated to the Secretariat. As a further measure for ensuring the Fund's autonomy and sustainability both the central ERF and the road agency budgets operate on a rollover basis, whereby, unlike budget accounts under the Ministry of Finance, the balance of funds from one financial year are automatically transferred to the next budget year.

## **3.4 SWOT Analysis**

Although the ERF has not been in operation long, it already generates funds for road maintenance and has developed procedures on the basis of which its SWOT can be evaluated. This evaluation may reveal certain weaknesses early enough to facilitate timely introduction of corrective measures. While admittedly some of the Fund's problems may be due to its lack of experience, the lessons learnt from its early evaluation will be of use to other new RFs in the SSA region. In certain areas, however, further investigations may be necessary to corroborate or clarify the findings of the SWOT analysis below.

### **3.4.1 Strengths**

One of the strengths of the ERF is that it was established as a complementary component of the broader policies formulated under the RSDP and is not operating in isolation from other government road reform policies. Its integration into the RSDP is important, as it facilitates a close monitoring of policy implementation in the road sector along with other reform programs. Wide consultations among the stakeholders prior to the formulation of the RSDP under which it was established has enhanced its acceptability among all stakeholders, including the private sector.

Although only four out of the 16 Board members are from the private sector, government representation, at both federal and regional levels and the private sector representation (elected representatives of transport owners) provide the Funds Board with a high degree of autonomy. Similarly, the Fund's management is protected from outside interference because of the Board's strength. The Board is directly accountable to the Prime Minister, which further strengthens its independence and enhances its accountability and degree of responsibility. Similarly, the fact



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that the Board is chaired by a government Minister and reports directly to the Prime Minister reflects the importance the government attaches to it and could seal its management from interference from other government agencies.

Since the ERF revenues are collected by EPE and paid directly into the fund rather than managed as part of the government's budget, they provide a stable and predictable source of funds. The Fund's ability to utilize funds generated in one fiscal year to another financial year makes budgeting not only predictable but also sustainable. Moreover, the dedication of the Fund and all accounts held by its road agencies solely for use in road maintenance ensures that, by and large, chances of their use otherwise than for this purpose are extremely remote. This arrangement, together with the provision that payments to road agency accounts are made directly and only for financing programs approved by the Fund, increase the level of accountability and simplify auditing.

### **3.4.2 Weaknesses**

The ERF has several weaknesses, despite the strengths listed above. These include uneconomic fund allocation criteria, weak implementation capacity among roads agencies, a narrow revenue base, lack of technical and financial audit procedures, absence of an active and influential consumer pressure group and the exclusion or absence of provisions for the funding of road safety projects.

Since current criteria for fund allocation are based on predetermined objective proportions (of 70, 20 and 10 percent, respectively) among federal, regional and municipal roads, they disregard economic criteria. Economic criteria would require that factors such as economic return on investment in respect of various road segments in each region should be taken into account and selection and priorities for each segment or road are based on the economic rates of return (ERRs) after a detailed cost benefit analysis.

One of the major weaknesses observed during the last two years in which the Fund has been in existence is the weak capacity of road agencies to execute road maintenance projects. Most of the agencies, including regional and municipal authorities, experience manpower, equipment, institutional and logistical constraints in handling projects from identification to implementation stages. Consequently, and despite considerable reform programs in place, most agencies are still unable to absorb all the allocated funds. Although the government, under the RSDP, is making efforts to meet this challenge through the extension of technical and financial support, the impact of those efforts is still small.

The ERF still depends mainly on revenue from fuel-based levies despite the provision in Proclamation 66/97 for additional revenue to be generated from axle-based vehicle licenses, overloading fines and other non-fuel charges. The government should explore, through the Board, the possibility of imposing other charges to widen the revenue base. Studies should be undertaken on appropriate rates on axle-based and other taxes and on their collection mechanisms.

The ERF lacks an established system of well-developed procedures and guidelines for undertaking technical and financial audits on the projects implemented by the road agencies.

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This weakens financial and technical accountability. In the latter case, the quality of road maintenance works may not be technically verified as conforming to contract specifications, resulting in uncertainty in verifying the viability of the projects undertaken.

The existence of an influential road user group, including the business community, civic or professional associations, is highly desirable in the promotion of RF objectives and in supporting the interests of all stakeholders outside the Fund's Board. In Ethiopia, the absence of such a group or consumer organization capable of influencing the composition and structure of the Board may be considered a weakness, in view of the current low Board representation of the private sector and the glaring absence of professional bodies and the civic society. One would expect that a professional body such as an association of engineers could be represented on the Fund's Board. The Board is heavily dominated by government representatives and this could, in the long run, compromise the civil society's or private sector's active participation and hence sustainability of the Fund's autonomy.

It is not clear at the moment as to whether the RF's maintenance programs include the financing of road safety infrastructure such as road signs, traffic lights and road safety projects and activities. In view of the high road accident rates in the country, it is necessary that the RF Proclamation specifically provide for the funding of road safety projects and activities.

### **3.4.3 Opportunities**

In view of the heavy dominance of non-motorized means of transport (NMT) activities in Ethiopia, the Fund should to widen its mandate to include maintenance of roads used by nonmotorized transport operators. These include track bridges and footpaths for bicycles, motorcycles, animal-drawn carts and carriages and pedestrians. (Currently, it appears that only classified roads are funded by the ERF). Community participation in the execution of such projects under the country's Rural Travel and Transport Program, supported by the World Bank, could greatly complement the technical and financial resources of the road agencies funded by the ERF. Incorporation of NMTs in community road maintenance would improve the productivity of rural economic activities such as agriculture and small-scale enterprises and create a wider sense of ownership of road maintenance of low-volume access roads among the beneficiaries. Most of them are usually poor.

The ERF has considerable potential to invest its surplus funds into profitable ventures, which have high and safe return on investment. With this in mind, the recent move by the Fund to participate in the purchase of government treasury bills appears to be a step in the right direction. As long as such short-term investments do not jeopardize or compromise its capacity to finance the road agencies, the Fund could explore similar investment opportunities. One would caution, however, that the ERF should wait until it has widened its revenue base and improved its own execution capacity and that of its road agencies before embarking on such ventures. Moreover, there is a more urgent need for the Fund to concentrate on its main objectives and win the confidence of its stakeholders and the public at large, than to invest in treasury bills. Instead, it should move quickly to reach a stage where its investments are based on ERRs through capacity building.



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### 3.4.4 Threats

Major threats to the ERF include inadequate or lack of up-to-date information on the road conditions in the country, the existing substantial road maintenance backlog, a weak institutional and organizational environment in which the road agencies operate, and low and varied levels of execution of road maintenance programs among the agencies.

Road condition survey databases and up-to-date information are very important inputs into the Fund's decision-making process, especially in determining budget allocation and priority setting. At the moment the absence of a reliable database and information on roads constitute a threat on decision making, both at the RF and road agency levels. Continued use of unreliable data makes a comprehensive road condition survey as well as a survey on the stock of roads necessary to ensure more realistic fund allocations and project priority ranking.

As in most SSA countries, Ethiopia has a huge road maintenance backlog that has accumulated over many years. This situation has been exacerbated by the continuing road deterioration. The cost of clearing this backlog exceeds financial resources of the ERF. Moreover, charging road users for the past road deterioration may not be feasible as well as not affordable. Immediate measures must be taken to arrest further road deterioration, while at the same time strengthening the Fund's capacity to execute road maintenance projects. Unless this is done, the application of commercial principles in the management of road maintenance based on ERR cannot be introduced in this sector. The continuing gap between the available financial resources for road maintenance and the total financial resources required to clear the total outstanding road maintenance backlog remains a threat, at least in the short to medium terms.

Since road maintenance is just one of the many responsibilities of the designated road agencies, few are in a position to give it top priority as the RF expects. Many of the agencies (e.g., local authorities) have such multifarious mandates and functions that road maintenance may not necessarily rank highly in their priorities. Resources allocated for road maintenance in terms of skilled manpower, equipment and complementary financial resources are often inadequate, since their allocation competes with allocation of resources in other portfolios.

Moreover, the efficiency of the agencies' management is normally weak. Under these conditions, reforms should be undertaken to strengthen internal efficiency of individual road agencies, especially sections dealing with road maintenance. More significantly, however, the public sector institutional reforms in regional governments and municipalities should be expeditiously undertaken along with the RSDP. An efficient and accountable RF should be matched with equally efficient road agencies if the RF's objectives are to be achieved and the agencies' programs expedited to remove this threat.

This threat arises from the weak institutional capacity of the various road agencies. Since they vary in size, population and resources, their efficiency also varies. Some have a low capacity to absorb their allocations due to resource constraints. Indeed this variation could be one of the main justifications for introducing economic criteria into the selection and ranking of the projects and eventual fund allocation for them. While there may be an initial difficulty in appreciating the critical need for economic criteria, it is worth making a start on a selective basis to apply them, especially on larger projects and then eventually on the basis of favorable results, expanding

their application to all road maintenance works. The need for a comprehensive approach to reform cannot be overemphasized in this context.

### 3.5 Summary, Conclusions and Recommendations

The ERF is one of the newest RFs in Africa compared to other RFs such as those implemented in South Africa (1935), Benin (1984), Ghana (1985) and those implemented during the late 1980s and early 1990s in the Central African Republic, Chad, Mozambique, Tanzania and Zambia. The lessons learned from the Fund from the time of its inception to the present date are of interest to other countries having newly established RFs or to those intending to establish one. The fact that its inception was part and parcel of the broader policy framework — the RSDP — augurs well for its sustainability since reforms needed for its strengthening are already covered under this program. It is essential, however, to ensure that those reforms are clearly identified and actually implemented.

A review of the Fund under the SWOT analysis, albeit during its short existence, reveals the need for a detailed study of the Fund's weaknesses, opportunities and threats based on its strengths, to make concrete recommendations for the future. As a young Fund, the ERF should take full advantage of the experiences of successful RFs elsewhere. On the basis of the above analysis, the following actions are recommended.

- (i) Considering the low representation of the private sector on the fund's Board (four out of 16), the government should show more confidence in the private sector's role in the Board by reducing its own representation and increasing that of the private sector. It is proposed that farmers, manufacturers, the chamber of commerce, the tourism sector and the service sector should be represented on the Board. Similarly, the Board should include representatives of professional bodies such as associations of (road) engineers, architects and surveyors as well as civil bodies such as consumer organizations.

At the moment, the Fund Board appears to survive mainly on the goodwill of the government and not necessarily on the strong stakeholder representation. Board autonomy and commercial management styles may thus be compromised in the long run, despite their critical importance in hastening the allocation of funds on the basis of economic criteria for road maintenance and the prevention of further road deterioration.

- (ii) A study should be conducted to review current sources of both fuel- and non-fuel-based revenue to determine the elasticity of the fuel-based revenues on which the fund is heavily dependent. The same study should also determine the possibility of introducing new levies on non-fuel-based road taxes. The main objective is to increase the revenue base to hasten capacity building and the introduction of economic criteria. With more funds, even allocation criteria could be quickly changed to reflect needs and affordability.
- (iii) Although the ERF is already investing its surplus funds in treasury bills one would caution it against such investments, as they tend to defeat the Fund's main objectives. Instead, the Fund should concentrate on widening its revenue base and strengthening its capacity. Any surplus funds should be utilized for these more immediate purposes.

- (iv) The review in this paper has identified the critical need for the ERF to strengthen its decision-making capacity in the allocation of funds and in ranking projects both at its Secretariat and at the road agency levels. In view of the importance of these issues, it is proposed that the Fund commission a national road survey with a view to determining in detail the quality of all roads in the country by administrative units, road density and classes. In addition, a socioeconomic study should also be undertaken on land use and population density in all regions. Another study should provide technical information on the condition of all roads by various segments. Data from these three studies will enable the Board to base its decisions on concrete data and introduce economic criteria in both allocation of funds and in monitoring performance by road agencies.

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## CHAPTER 4. AXLE LOAD MANAGEMENT IN ETHIOPIA

### 4.1 Background

This chapter presents an overview of problems of vehicle overloading and axle load management in Ethiopia and measures the government has taken to solve them at the national level. The first section provides a background to the main problems of overloading and the need for the establishment of axle load limits. This is followed by a review of the operation and management of axle load controls in Ethiopia in the context of the Harmonized Axle Load and Vehicle Dimensions formulated by COMESA (formerly the Preferential Trade Agreement [PTA]) in 1988. Current shortcomings in the application of the axle load controls are then identified and discussed. The chapter concludes by proposing measures for improving the existing axle load management in the country.

Considering that the road network in most SSA countries is a primary investment, the preservation of roads from undue deterioration has become one of the most important aspects of road sector development policies. In economic terms, the basic concept in the movement of goods is that a given load should be transported as economically as possible from its point of origin to the point of destination. This will ensure that transport is provided at a reasonable cost to enable road users to carry out their social and economic activities in a viable manner.

It is important to bear in mind, however, that roads are load bearing structures designed to carry predetermined loads related to a limited road design life. A given road is built to be utilized for a specific number of years without requiring major investments in terms of maintenance. The nature and volume of goods carried as well as the quality of the road network determines the design of vehicles to be used on the road. Accordingly, the types of roads and their upgrade or rehabilitation depend upon the anticipated traffic volume on roads during their lifetime.

The total cost of operating the road transport system, including the cost of building and maintaining all roads and the total VOCs in a country, is usually very expensive. In many countries it accounts for about 10 percent of total GDP. It is because of these high costs that governments have introduced axle load limits to regulate carrying capacities of road vehicles to minimize road deterioration through overloading and maintain efficiency of road transport.

Technically, the extent of road damage by various categories or volumes of vehicles can be estimated. Road pavement design methods begin with an estimate of expected traffic volume over the design life of a pavement. Road deterioration caused by different vehicles during the economic life of the pavement is usually expressed in terms of the number of equivalent standard axles (ESAs), with one ESA equivalent to 8.16 tons. The damage a vehicle causes on the road depends on vehicle axle loads. For pavement design purposes, the damaging power of axles is related to the standard axle (8.16 tons) using equivalency factors derived from empirical studies. All traffic may thus be converted to equivalent 8.16 tons single axle load applications (or one ESA). To determine the cumulative axle load damage that a pavement will sustain during its design life, it is necessary to estimate the total number of heavy vehicles (HVs) that will use the road over this period in terms of their cumulative number of ESAs. It is possible to calculate the cost per km of providing and maintaining a road pavement in terms of total ESAs designed to be

carried by the road. This makes it possible to calculate the damage caused by HGVs on the pavement by calculating the ESA for each type of HGV loaded to the maximum legal capacity.

The ESA of a vehicle can be expressed as:

$$\text{ESA} = \frac{(\text{Axle load (kg)})^n}{(8160)^n}$$

*where 8,160 kg is the reference standard axle load; and*

*n is a power by which a road damage may be caused by axle loads.*

*This varies from 2.4 to 6.6, depending on the axle loads, the latter figure being applied to axles of 16 tons and above on weak pavements.*

Available evidence shows that the life of a given road is approximately proportional to the fourth power of the axle load of vehicles using the road during its design life and that for design purposes, this power is 4.5. It is possible to calculate the damaging power of different axles. In general, the damaging power of an axle increases in a geometric progression. For instance, an axle with a weight of 13 tons will have a road damaging factor of about eight times as high as that of a standard axle. By the same token, few vehicles with high axle weights can damage a road designed to serve a large volume of traffic for a specific number of years. If vehicles are loaded above the designed axle limits, the cumulative standard axles increase faster than originally anticipated, resulting in rapid road deterioration and the need for rehabilitation or major maintenance works before reaching its useful design life. Since the damaging power of heavier axles increases by the power of four, it is clear that the useful economic life of a road pavement will be reduced accordingly.

More significantly, when vehicles are loaded well above their design capacity, the damage will not only be to the pavement but also to the vehicles themselves. High VOCs for both freight and passenger transportation affect the whole economy, constrain mobility of persons and goods and hinder trade through high freight rates and fares. Apart from damage to road pavements, overloading also has a significant effect on the life of bridges.

The need for establishing axle load limits arises from the critical role road transport plays in the Ethiopian economy. Currently road transport accounts, respectively, for 97 and 95 percent of total freight and passenger transport. Despite the importance of road transport, the bulk of the total road network is in poor condition.

Currently, only 3,600 km (24 percent) of the total Ethiopian classified road network are paved with asphalt while 11,400 km (76 percent) are unpaved (gravel) roads. There are 30,000 km of unclassified roads constructed by various nongovernmental and developmental agencies.

Since cumulative standard axles are based on the weight of each individual axle of a vehicle, each vehicle is expected to be loaded according to the limits set by the axle load regulations. Most transporters, however, are unaware of these limits and overloading is quite common in Ethiopia, especially among freight vehicles. They would rather have these limits increased, not realizing that the higher the axle limits, the greater the extent of road deterioration and hence the more expensive the construction and maintenance costs of roads.

A study by the Ethiopian Road Agency in 1999 revealed that when the axle load is increased by 30 percent from 10 to 13 tons, the annual maintenance cost will increase by 30 to 40 percent. For a rear axle, the same increase (10 to 13 tons) will correspondingly increase the construction cost of the road by Birr 277,000 (US\$ 33,530) per km. The same study also indicated that the cost of strengthening a pavement per km increased by 10 to 15 percent, depending on the type of pavement and traffic flow. Most of these costs are usually in scarce foreign exchange and their undue increase may not only raise transport costs in the economy but also lead to a misallocation of resources. Therefore, it is important to place a limit on road vehicle axle loads.

#### 4.2. Incidence of Overloading

The extent of road damage caused by overloading depends on the types of vehicles and their axle configuration. The 1999 study on the axle load management showed that the most heavily loaded trucks were those with single and tandem rear axles. Table 4.1 below presents some of the findings of that study. It indicates that heavy trucks with an axle configuration of

**Table 4.1. Range of Overloading of Vehicles by Configuration**

Vehicles	% of Vehicles Overloaded	% of Axles Overloaded	% of Rear Axles Overloaded	Maximum Axle Load Recorded (Tons)
Heavy Trucks 1.2	70	36	70	27.40
Heavy Trucks 1.22	Over 47	34	45	21.00
Articulated Trucks	Over 54	27	33	21.60

*Source: WSP International. Axle Load management Study, Draft Final Report, July 1999*

1.2 are the most heavily loaded with the number of overloaded vehicles recording a maximum axle weight of 27.4 tons, i.e., three times the legal axle limit. In this category of vehicles, 70 percent were overloaded, with 36 percent of the axles overloaded and 70 percent of the rear axles overloaded. This contrasts sharply with overloading recorded among heavy and articulated trucks.

A total of under 47 percent of the heavy trucks of configuration 1.22 were found to be overloaded, with 34 percent of the axles overloaded and only 45 percent of the rear axles overloaded. Articulated trucks recorded relatively lower levels of overloading (over 54 percent of the vehicles observed were overloaded in this category). Those recorded only 27 percent of the axles overloaded and 33 percent rear axles overloaded. The maximum axle load recorded for each of these last two vehicle categories was 21.60 tons (compared to 27.40 tons for heavy trucks of configuration 1.2). It is noteworthy that heavy trucks of configuration 1.2 constitute about 30 to 40 percent of all HGVs in the country.

Regarding the distribution of overloading throughout the country — it has been observed that, once again, the highest percentage of overloading has been recorded where the configuration 1.2 axle trucks are common. On roads where this kind of vehicle is not common, however, the incidence of overloading is relatively low. For instance, along the Awash-Gewane-Mille road (Awash station) on which HGVs comprise 70 percent of total traffic, records show the least incidence of overloading. The reason for this is that as an import-export transit corridor, most



trucks are fitted with multiple axles and higher payloads. Thus, although these vehicles have higher payloads, the weight distribution on individual axles (due to their configuration) minimizes the damage they exert on the pavement.

Because of other factors, overloading also varies by regions and the type of cargo transported. Table 4.2 indicates that although HGVs with an axle configuration of 1.2 are more prone to overloading, on certain road segments or regions, even articulated trucks are overloaded depending on the goods transported. High levels of overloading were recorded on roads on which trucks with axle configurations of 1.2. and 2.2 were common where the movement of dense goods such as salt, sugar and coffee was regular. Since the efficiency of administration of axle load regulations may also vary, this data is only indicative and should be regarded with caution.

**Table 4.2. Regional Variation in Overloading of HGVs by Average Percentage of Axles Overloaded**

Road segment	Station	Heavy Trucks	Articulated Trucks
Addis Ababa – Jima	Alemgena	18	19
Addis Ababa – Ambo	Holeta	23	17
Awash Mille	Awash	6	14
Addis Ababa – Modjo	Modjo	40	28

*Source: WSP International. Axle Load Management Study. Draft Final Report, July 1999*

These examples show the common assumption that only physically bigger trucks are prone to overloading and are therefore responsible for causing more road damage is misleading. Road damage by HGVs can be reduced through articulation, irrespective of the size of the vehicle.

Besides pavement damage, vehicle loading has a significant effect on the life of bridges. In particular, trucks with excessive GVW may contribute to the deterioration of bridge decks and their subsequent failure. While most bridges in Ethiopia were designed for higher GVWs and axle loads, old age and the introduction of HGVs with high GVWs have caused bridge failures in the last few years. The limits and controls should be set on both the axle loads and GVW. Under the COMESA Agreement, the maximum GVW for a truck and trailer and an articulated vehicle with six or more axles is 53 tons.

In Ethiopia, the RSDP shows that pavement damage, especially through overloading is very costly. On a road with a roughness of 3,000 mm/km, VOCs for a car were approximately US \$3.50/km while the VOC for an HGV was about US \$6.25/km. After the HVs had damaged the road by overloading, road roughness increased, and so did the VOCs. At this rate, if the road roughness rose to 9,000 mm/km, the VOC for a car on the same road would rise to US \$4.94/km. For HGVs, it would increase to US \$8.65/km.

### 4.3 Axle Load Operation in Ethiopia

The axle load regulation was enacted in 1962 as part of the Transport Act under the Vehicles Size and Weight Regulations and amended in 1990 by Regulation No. 11/90. It was not until late 1970s, however, that efforts were made by the government to make this regulation effective by

fixing legal limits to the vehicle size and weight. Weight control stations were also established in different locations.

Originally, the country had a total of 10 weighbridge stations established in 1976 and 1992 and were managed by the Ethiopian Road Transport Authority (ERTA). More recently, the Ethiopian Roads Authority (ERA) has taken over the responsibility for axle load control from ERTA on the grounds that it has a more direct interest in the collection of data for new road designs and the maintenance and rehabilitation of existing roads.

Acknowledging the increased capabilities of modern HGVs, Ethiopia raised the basic axle load limits of six and eight tons for steering and drives axles, respectively, to eight and ten tons in 1990, in conformity with the standardized regulations under COMESA (formerly the PTA). Ethiopia was among the first members of PTA to adopt the regulations. Table 4.3 shows the extent that Ethiopia has adopted COMESA regulations.

**Table 4.3: COMESA and Ethiopian Axle Load Limits**

Vehicle Configuration	Axle Load Limits (tons)	
	COMESA	Ethiopia
Single Steering Axle	8.0	8.0
Single Drive Axle	10.0	10.0
Tandem Axle Group	16.0	Up to 17.0
Triple Axle Group	24.0	Up to 10 tons each

*Source: WSP International. Axle Load Management Study, Draft Final Report, July 1999*

Ethiopia, as the table shows, has adopted the COMESA axle load regulations with a few modifications. Both COMESA and Ethiopian regulations are the same for single steering and single drive axle loads (eight and ten tons, respectively). Differences only occur in the cases of tandem axle groups. For tandem axles, both COMESA and Ethiopia have adopted a maximum distance of 1,300 mm between the axle centers. If the distance between the axles exceeds 1,300 mm, however, the Ethiopian law provides an allowance of up to 10 tons for each axle. For the triple axle group, COMESA provides for a maximum distance of 3,000 mm between the centers of the outermost axles. Under the tandem and triple axle group principle, the axles are required to be suspended and interconnected in such a manner that any load imposed on them will be distributed equally regardless of the road profile and condition. Ethiopian law also states that a gross weight with loads imposed on the highway on a group of three or more axles with a distance of more than 1,300 mm should not exceed 10 tons.

Although COMESA has also established penalty rates for overloading based on the fourth power rule, many member states have not so far adopted them. Instead, many states have developed their own penalty rates.

#### 4.4 Shortcomings in Axle Load Management

Although the weighbridges are strategically placed at major road junctions, the management of Ethiopian axle load regulations is still ineffective and has not saved her roads from deterioration through overloading. Shortcomings in this area include inadequate and old weighbridges, a low level of awareness, and low and nondeterrent penalties.



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The country's original 10 weighbridge stations have now been reduced to nine, of which eight are operating. Each of these stations has one weighbridge. As most of the stations are located on the main routes passing through Addis Ababa, several roads are still not covered, although the stations are required based on the traffic density. Additional areas requiring new stations include those on the borders with Djibouti and Kenya.

Because the existing weighbridges are old and outmoded, data generated through them in various stations is unreliable and can hardly be useful in evaluating the extent of overloading or for pavement design. Human factors related to the management of the stations, such as corruption, further reduce reliability of the data.

Because many freight transport operators and their drivers are unaware of the importance of the weighbridges and of the overloading problem, conformity to axle load regulations is weak. Increased awareness needs to be created among the truck operators, HGV drivers and the public in general.

Penalties for overloading usually vary from one court to another and are mostly so small that they neither discourage overloading nor reflect the amount of road damage caused by overloaded vehicles.

#### 4.5 Recommendations

Improvement in the management of axle load limits is critical to the effective reduction of road deterioration through overloading. While the recent study funded by the EU on axle load management is expected to come up with proposals and recommendations that may help the government in designing strategies for such improvements, a number of recommendations may be made on the basis of the shortcomings identified above. They include the following:

- (i) **Weighbridges.** Additional locations requiring weighbridges should be identified, possibly on the basis of the EU study, and more weighbridge stations opened as the existing eight stations seem to be inadequate. The existing aging machines should be properly maintained and provided with an adequate supply of spares. In view of the importance of enforcement of overloading regulations, the weighbridges should be modernized to improve reliability of data on overloading by minimizing human factors, such as corruption. In addition, the number of mobile load meters should be increased since at the moment there is only one such machine in the country. Fines collected in respect to overloading should be allocated for road and bridge maintenance.
- (ii) **Increased Awareness.** There is a need to increase awareness among all stakeholders (including freight transport operators and their drivers, farmers, manufactures, and other members of the public) on the critical importance of reducing overloading on the country's roads. This could be achieved through seminars, the media, demonstrations, workshops and exhibitions.

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At the same time, rules and regulations governing overloading should be made readily available to all transporters and other stakeholders. Importers of freight vehicles particularly should be made aware of the legal specifications under the overloading regulations, so that they avoid importation of vehicles that exceed the legal limits. In this manner an axle load certificate should be issued at the place of loading for all HGVs to avoid disagreements at checkpoints. This will also facilitate the weighing process since the driver will know the weight for each axle prior to checking. Consequently, the current practice where the certificate is issued for the gross weight of the vehicle and not for the weight of each axle should be discontinued.

- (iii) **Penalties.** The current low penalties for overloading should be reviewed so that they are more deterrent and capable of being more uniformly applied for similar offences. Moreover, the penalties should be made applicable per axle, measured on site, rather than on the basis of GVW, as the latter basis may disguise the road damaging effect of individual axles. For convenience, following the proposed improvements above, penalties should be imposed and collected on site.

To make enforcement more effective and to discourage overloading, the driver, and the vehicle and cargo owner should be charged with the overloading offence whenever there is an incident of overloading. This will ensure that these parties are all responsible for the overloading.

- (iv) **Privatization.** If all stakeholders are involved and adequate consultations are held with the stakeholders, as proposed, the possibility of privatizing the ownership and management of weighbridges should be explored to encourage the introduction of efficient private sector management styles in this area.
- (v) **Standardization of Axle Load Limits.** At the regional level, it is important that countries adopt the COMESA standardized axle load regulations so as to facilitate a free flow of HGVs and promote trade among the neighboring member states of COMESA and IGAD.

## **APPENDICES**

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## APPENDIX A. BIBLIOGRAPHY

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**APPENDIX B.  
LIST OF PERSONS CONSULTED**

	<b>Name</b>	<b>Organization</b>
1.	Mr. B. Abate	Ministry of Transport and Communications
2.	Mr. S. Abebe	Weyra Transport Enterprise
3.	Mr. T. Alemayehu	Selam Freight Transport Owners Association
4.	Mr. D. Aseffa	Maritime and Transit Services Enterprises
5.	Mr. T. Baye	Ministry of Economic Development and Co-operation
6.	Mr. A. Bebele	Misrak Freight Transport Owners Association
7.	Mr. A. Belachew	Smayaz Transport Enterprise
8.	Mr. B. Dagne	Ethiopian Shipping Lines
9.	Mr. T. Debebe	Ministry of Transport and Communications
10.	Mr. K. Desalegne	Ethiopian Telecommunication Agency
11.	Mr. W. Desita	Abas Freight Transport Owners Association
12.	Mr. T. Ejegu	Africa Freight Transport Owners Association
13.	Mr. S. Eshetu	Ethio-Djibouti Railway Enterprise
14.	Mr. A. Feleke	Addis Ababa Chamber of Commerce
15.	Mr. Z. Gedilu	United Forwarders PLC
16.	Mr. S. Geremew	Fetan Freight Transport Owners
17.	Mr. B. Getachew	Ethiopian Customs Authority
18.	Mr. A. Gezimu	Abyssinia Transport Share Company
19.	Mr. T. Harbtamu	Ethiopian Customs Authority
20.	Mr. T. Jemaneh	Buna Freight Transport Owners Association
21.	Mr. M. Kahisay	Waliya Freight Transport Owners Association
22.	Mr. L. Legesse	Ethiopian Telecommunication Agency
23.	Miss F. Lijalem	Ministry of Transport and Communications
24.	Mr. A. W. Mariam	Road Transport Authority (RTA)
25.	Mr. T. Mekonnen	Civil Aviation Authority
26.	Mr. B. W. Michael	Overseas Freighters Ethiopia
27.	Mr. M. Nure	United Freight Transport Owners Association
28.	Mr. S. Sahile	Nil Freight Transport Owners Association
29.	Mr. A. Teferi	Office of the Road Fund
30.	Mr. A. Teggor	Nib Transport Share Company
31.	Mr. M. Tekeste	Nohe Transport Share Company
32.	Mr. T. Wakjira	Tana Freight Transport Owners Association
33.	Mr. Bayu Wammi	Bekelcha Transport Enterprise
34.	Mr. B. Zenebe	Alfa Freight Transport Owners Association
35.	Mr. G. E. Zewoldi	Comet Transport Enterprise
36.	Mr. F. Yimer	Shebele Transport Enterprise