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ENVIRONMENTAL IMPACT ANALYSIS OF THE FIVE ROADS SELECTED FOR REHABILITATION AND/OR UPGRADING

AWASH-KULUBI-DIRE DAWA-HARAR ROAD

Final Report
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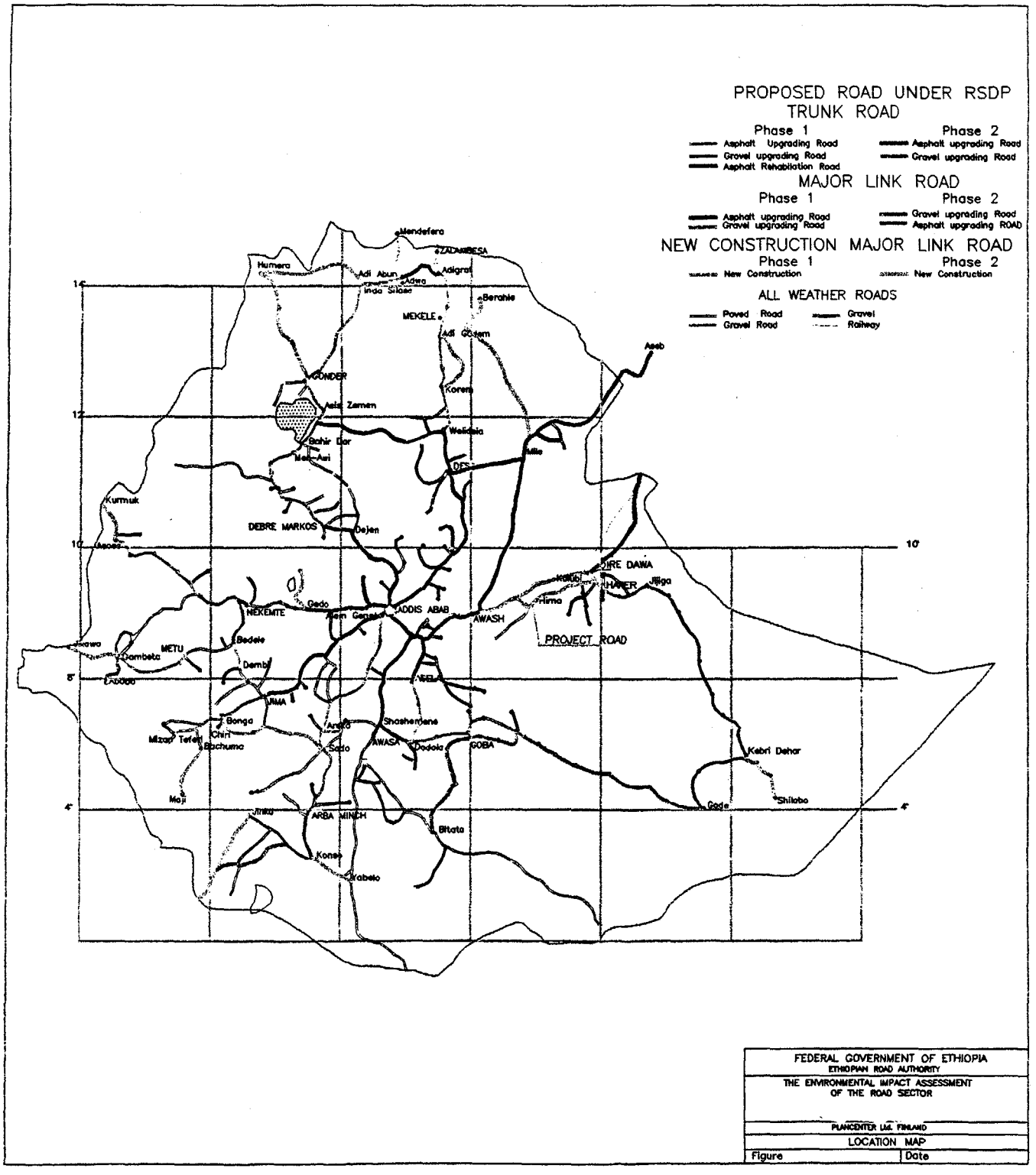
APPENDICES

ABBREVIATIONS AND ACRONYMS

ADLI	Agricultural-Development-Led-Industrialization
EA	Environmental Assessment
EELPA	Ethiopian Electric and Power Authority
EIA	Environmental Impact Assessment
EIRR	Economical Internal Rate of Return
EPA	Environmental Protection Authority
EPE	Environmental Protection of Ethiopia (Proclamation 1/1995)
ERA	Ethiopian Roads Authority
ETCA	Transport Construction Authority
EU	European Union
FA	Farmers Association
FDRE	Federal Democratic Republic of Ethiopia
m.a.s.l.	meters above sea level
MEDAC	Ministry of Economic Development and Cooperation
NGO	Non-governmental Organization
NPV	Net Present Value
PA	Peasants Association
RGRRO	Regional Government Rural Road Organization
RSDP	Road Sector Development Program
TCDE	Transport Construction Design Enterprise
TOR	Terms of Reference
TFR	Total Fertility Rate
TGE	Transitional Government of Ethiopia
UNESCO	United Nations Educational, Scientific and Cultural Organization



FEDERAL GOVERNMENT OF ETHIOPIA ETHIOPIAN ROAD AUTHORITY	
THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE ROAD SECTOR	
PLANCENTER Ltd. FINLAND	
LOCATION MAP	
Figure	Date

EXECUTIVE SUMMARY

Background

An Environmental Analysis of the Five Road Projects chosen for rehabilitation and/or upgrading as well as an Environmental Analysis of the Road Sector of Ethiopia, was commenced in May 1997. The Five Roads include Alemgena-Hossaina-SodoRoad, Woldiya-Adigrat-Zalambessa Road, Debre Markos-Gondar Road, Awash-Kulubi-Dire Dawa-Harar Road as well as Mojo-Awash-MilleRoad. This report includes the environmental analysis of the Awash - Kulubi - Dire Dawa - Harar Road.

The environmental analysis study was carried out by an expert team of Plancenter Ltd (Finland) consisting of Finnish and Ethiopian experts representing various expertise including environmental impact assessment (EIA) methodology, road engineering, environmental and natural sciences, sociology and hydrogeology. The consultant team was complemented by a counterpart person from the Ethiopian Roads Authority (ERA)

The objective of this EA study has been to identify and quantify - to the extent possible - the likely negative and positive physical, natural, human and social environmental impacts of the proposed road work as presently designed, and suggest and produce cost estimates regarding the required mitigating measures to be implemented to avoid or minimize these negative impacts.

The methodology used for carrying out the work include (1) collection and review of baseline data and relevant documents, including relevant World Bank directives, guidelines and other documents; relevant legislation, policy papers and guidelines of the Ethiopian road and environmental sector, as well as other relevant sectors; designs for the proposed road improvements; maps and literature; (2) interviewing organizations, institutions and persons relevant to the work; (3) site visits; the whole road section was studied by the team; and (4) carrying out a public consultation in Dire Dawa involving different governmental and non-governmental organizations relevant to the road section, interviews in various offices along the road as well as informal road side interviews during the above site visit. A questionnaire for NGO's was also prepared, although most of the information from NGO's was received during the public consultations.

Description of the Road

This trunk road is an important part of the surface route from Addis Ababa to the eastern and south-eastern parts of the country. It also serves as an international road through Dire Dawa to Djibuti and after Harar through Jijiga to Somalia. Through its national and international connections the road is very important for import/export transportation.

The Awash - Kulubi - Dire Dawa - Harar road passes through different administrative regions. The road start in Affar Region in the Zone 3 including Awash Sabat Kilo town and then enters to the Oromiya Region to the Mirab Hararge Zone including Arba Bordode town in the west and Hirna town in the east. Between Hirna and Karamile road enters to the Misrak Hararge Zone up to Dangego junction where the road joins the road between Dire Dawa and Harar. Also the southern part of the road near Harar belongs to the Misrak Hararge Zone, while the northern part enters the Dire Dawa Provisional Administration.

The road from Mieso through Dangego to Dire Dawa - Harar is regarded as one with great scenic value and hence as a prospective tourist attraction. It is also interesting due to its historical and socio-cultural background.

Along this road there are many religiously important places for the Christians and the Muslims alike. In the first part of the road in the north near Asebot town one can see Asebot Mountain, at the top of which one of the most famous Orthodox monasteries is located. The St. Gabriel Church in Kulubi is one of the most important pilgrimage places for the Orthodox Christians in Ethiopia. The St.Gabriel Church receives tens of thousands of pilgrims from all over the country during December and July. In the Public Consultation the representative from the church welcomed the improvement of the road, because the poor condition of the road has been a major cause for numerous accidents during the pilgrimage times. During the improvement also the road going to the church site should be redesigned.

Policy Framework

The overall economic policy objective of the Federal Democratic Republic of Ethiopia (FDRE) rests on promoting economic growth through a market-based economy with greater private sector participation in the economy and the Government's role limited to providing the necessary services through a decentralized system.

The declared policy of Agricultural-Development-Led-Industrialization (ADLI) has the main objective of improving agricultural productivity of small holder agriculture and related industrialization based on increased provision of domestic raw materials to the industrial sector. These objectives are in conformity to the Road Sector Development Program (RSDP) of the Ethiopian Roads Authority (ERA).

The major policy framework document with respect to environmental management of Ethiopia is the Environmental Policy of the FDRE prepared by the Environmental Protection Authority (EPA). Among the major policy issues contained in the policy document is the requirement of Environmental Impact Assessment (EIA) of programmes and projects carried out both by the public and private sectors.

The most important step in setting up the legal framework for the environment in Ethiopia has been the establishment of the Environmental Protection Authority (EPA) by Proclamation 9/1995. EPA has already prepared regulations for EIA of development projects and a framework environmental legislation (to be issued in very near future). They have also drafted guidelines for EIA procedure in development projects and EIA for Transport Sector Projects.

Institutional Setting

The Ethiopian Roads Authority, ERA, has the responsibility for overall planning of the national network development and maintenance and construction of trunk and major link roads while the responsibility of rural roads construction and maintenance has been decentralized and given to the regional states having their own Regional Government Rural Roads Organizations (RGRRO).

Previous practice shows that apart from routine engineering requirements little attention has been given to incorporate environmental considerations in road sector activities. However, the RSDP has given due attention to the environmental impacts that may arise under the programme and the need for capacity building within the sector both at federal and regional levels has been remarked. In line with this, the new organizational structure of ERA has incorporated an environmental branch which is expected to be responsible for the carrying out of EAs of road sector activities.

Major Environmental Impacts

The major negative impact of the upgrading/rehabilitation project are caused by the detour construction during the construction period and widening of the existing road particularly between Dangego and Harar where there are significant permanent cash crops like coffee, *chat,* eucalyptus and some other trees.

The adverse impacts of the proposed road improvement are mainly related to the construction period and therefore temporary. These impacts are small compared to the positive economic and environmental benefits of the road upgrading/rehabilitation. Even the impacts can be minimized by including the technical, operational and phasing procedures in the tender document for the contractor.

Physical environment

The major adverse impacts during construction stages are erosion, stability of slopes, material use, change in surface water hydrology and quality and sedimentation/siltation.

Erosion will most probably be enhanced especially on hilly terrain due to cuts in soil and rock and construction of embankment (widening of the road), borrow pits and quarries if they are located along a river bank, excavation of foundation for replacement and/or additional drainage's bridges and culverts. However, upgrading and/or rehabilitation of the road shall decrease the erosion rate along the road compared to the existing road condition.

Clearing and grabbing by earth equipment destabilise slope stability of the road section especially on hilly terrain. Blasting of rocks for widening and quarries shall destabilise the steep slopes of the area. The section of the road on hilly terrain and volcanic geological formation is relatively unstable section of the road (Mieso-Asebe Teferi, around Hirna, Border, Karamile). The vegetation cover is dense and have increased the slope stability of the road along the hill cuts.

Pollution hazards which may occur if oily products from engines are spilled along the road sides and at compounds or due to improper disposal of used oils and lubricants. Upgrading and/or rehabilitation of the road will increase the traffic on the road.

Along the road perennial rivers which can be used during construction are few and far apart (Awash, Medbedu etc.). Using these streams and springs will completely deplete them and there may be no flow downstream (except the Awash River).

Natural environment

The impact on natural vegetation would be associated with operating the quarry and borrow areas, and constructing detour and access road to the borrow material pits and quarry sites.

Construction of the road will not significantly affect areas which support conservation worthy terrestrial ecosystem or natural or semi-natural forest all along the project area. The project component will not involve in any encroachment into known and designated ecologically sensitive areas and nature reserves.

Human and Social Environment

The major human and social impacts of road construction are those related to social acceptability, resettlement, change of way of life, impacts on indigenous peoples, induced development and conflicts between locals and immigrants.

Social acceptability of the project to rehabilitate/ upgrade the present road is very high. All people and organizations interviewed and the participants in the Dire Dawa public consultation gave a clear acceptance to the project. The only concerns are related to the construction period. Especially business communities are worried about the detours which might by-pass their present business. However, the pavement was seen as an improvement and benefit the business on the long run.

Resettlement question will arise in many towns located on the hills. Some displacement of people/ households in the towns such as Asebe Teferi, Hirna, Karamile and Kulubi, and many other small towns seems inevitable, while in Dangego resettlement may be avoided (depending on the design of the road, however). The removal of many houses and other buildings seems unavoidable also between Dangego and Harar. Many (if not most) of these buildings are located within the right of way. About 120 houses must be removed along the road. This is a rough estimate since the designs of the roads were not available during the study. The compensation is paid according to the price of a new similar house, not on the present value of a house. However, it would be advisable, if the wood & mud houses will be compensated by ERA according to the price of hollow block houses. This would be environmentally sustainable, and especially saving the scarce tree resources in the area.

There will be temporary losses of agricultural land (for detours, construction camps, storage sites, asphalt plants etc.) In this case the compensation is based on the value of the lost crop for one or two years depending on the time detour is used. With the grain crops the estimation can be based on yearly value, but in the case of coffee and chat plants, which are plenty in this area, the estimation should be based on many years' production.

There will be few places where the trees would be affected. Only between Dangego and Harar some commercially valuable eucalyptus trees are near the road, and depending on the road design might be affected/ cut down. The compensation will be estimated using market value.

The construction camps will have both short and long lasting impacts on the local communities. Although the construction camps/sites are planned to be temporary, the experience show that many camps turn out to be permanent settlement places after the construction period is over; many ERA camps have developed with time into real towns. The

arrival of 150-250 workers, mainly men, to the construction camps will have several impacts to the local communities. Besides these, some 300-400 daily laborers will be hired locally for construction work.

There will be no permanent losses of the agricultural or grazing land due to this project; only temporary losses due to the detours, quarry and storage sites. Although ERA has the right to occupy any sites needed for the road construction, it has also the responsibility to compensate all lost property. The land is not considered as a property, but the crop or trees growing on it are considered to be property when with commercial value.

The potential impact of the project upon cultural, religious and historical sites was assessed and there are no sites to be directly impacted by project construction and operation.

Road Safety

The better pavement and road shoulders will make road safer for both pedestrians and transitory traffic, especially in the towns. On the other hand the better pavement without potholes will also increase the speed of traffic increasing the risks of accidents. There are no traffic signs to warn drivers about animal crossing places. The present truck drivers are more or less aware of them due to the familiarity with the road. However, anticipated new drivers on the road are not aware of these places.

Analysis of Alternatives

The upgrading of this road to the proposed standard compared to the "zero alternative" (no project) is environmentally more sound solution. The benefits can be justified by the following environmental and safety points: (i) by upgrading the erosion problems due to the low standard of the road will be mitigated; (ii) the new pavements will tremendously reduce the dust and thereby the amount of accidents caused by dust which blocks the visibility from drivers and pedestrians alike will be diminished; reduced dust problem improves the living standards and health status especially in the towns; (iii) the problem of vehicles tending to change their courses of driving from the carriage way to shoulders and ditches and sometimes outside of the road itself, will be solved by upgrading/rehabilitating the road; and (iv) during the rainy season the paved road will not be as slippery as the present gravel road.

Mitigation and Monitoring Measures

Mitigation Measures/Physical and Natural Environment

The bidding document for construction should include technical specifications for the prevention of environmental hazards and pollution related for example to borrow material sites and soil contamination by spills of hazardous material.

Construction activities in and around perennial rivers should be conducted during dry season to minimize sediment loading. In order to prevent accident spillage of pollutants to water sources or leakage to the ground, all temporary and permanent storage facilities should be located away from these sites and in a bounded enclosure with an impermeable liners.

Once the construction of the project is complete, the contractor is required to remove all equipment from the site and clear the site from potentially hazardous materials. Reclamation of sites exposed during construction will include re-grading and re-vegetation.

There shall be also some mitigation measures to avoid excessive noise during construction and to avoid excessive air pollution due to emissions from heavy vehicles, although these are not considered major problems by people. Dust is generally felt a nuisance, but is not a major problem in this road project.

For preserving the natural environment, the locations of mature trees during route selection for the detour should be considered to minimize destruction of trees. Rehabilitation plans should also be provided every quarry and borrow pit area.

Mitigation Measures/Human and Social Environment

The good information before the construction should be available to all stakeholders. The public consultations held along the road would be the best way to do that. Clear information about the compensation system should be given to those who might be affected. According to the previous practice the temporary ERA Compensation Committee is always established for all road projects at the project level. At the project level the main role of this Committee is to set compensations for the lost property due to the project.

The needed areas for construction should be planned as to minimize the effects on the growing crop, coffee and chat plants, and trees. The value of the lost crop should be estimated according to market prizes. Demolished houses are compensated by ERA according to the costs of a new house. Due to the environmental reasons it is recommended that wood & mud & thatch houses are compensated according to the costs of a hollow block house.

The ERA Compensation Committee should see that the displacements and resettlements are concluded in a sustainable manner.

The information to the drivers of the transitory traffic should be increased in order to mitigate the problems in case of accidents. There should also be speed limits in the traditional crossing places of cattle.

To induce planned development, the sites should be selected in a way which take into consideration the available natural resources (such as availability of water, fuel etc.) for potential permanent settlement after the construction camps are removed.

The local religious places, graves and funeral places as well as holy trees or springs must be taken into consideration when the detours, quarry and other construction sites are designed.

Monitoring

It is recommended that an environmental inspector would be assigned to this project. The inspector should have a number of short inputs from the commencement of the construction through to its completion and until cleanup has been finalized. After finalizing the cleanup, the responsibilities of the environmental inspector will be to ensure that the mitigation and monitoring requirements outlined in the report are carried out effectively and that good construction practices are followed to minimize impacts to the environment.

Monitoring is carried out to assess any disturbance to the environment and to protect both ERA and the affected parties from false charges. It is recommended that ERA would take a pictorial record of the critical sites before any construction commences. This can be used to ensure that preconstruction conditions have been restored after clean up, specially at quarry and borrow sites, detours and temporary access roads and construction camp sites.

1. INTRODUCTION

1.1 Background

The need to include environment impact consideration during the planning and implementation phases of road works has become a pressing issue to reduce the adverse effects on the environment. According to the strategic objectives of the Road Sector Development Program (RSDP) of Ethiopia, prepared by the Ethiopian Roads Authority (ERA) for the years 1997-2001, the reduction of adverse effects of road works on the physical, natural, human and social environment is encouraged.

In the RSDP ERA has reviewed the current status of the road network of Ethiopia identifying the key issues of Road Sector and the set strategic objectives for the sector. As the major policy the RSDP proposed that the environmental effects of road infrastructure will be addressed by taking measures to ensure conformity of design standards with environmental protection requirements, in addition to facilitating promotion of vegetation coverages (e.g. for borrow pits) and other measures to reduce adverse impacts of existing and earlier road works.

On the line of the above mentioned recommendations of the RSDP, an Environmental Analysis of the Five Road Projects chosen for rehabilitation and/or upgrading as well as an Environmental Analysis of the Road Sector of Ethiopia, was commenced in May 1997. The Five Roads include Alemgena-Hossaina-Sodo Road, Woldiya-Adigrat-Zalambessa Road, Debre Markos-Gondar Road, Awash-Kulubi-Dire Dawa-Harar Road as well as Mojo-Awash-Mille Road.

The environmental analysis study was carried out by an expert team of Plancenter Ltd (Finland) consisting of Finnish and Ethiopian experts representing various expertise including environmental impact assessment (EIA) methodology, road engineering, environmental and natural sciences, sociology and hydrogeology. The consultant team was complemented by a counterpart person from the Ethiopian Roads Authority (ERA). The composition of the team is presented in the Appendix 1.

This report is the environmental analysis of the Awash - Kulubi - Dire Dawa - Harar Road .

1.2 Location of the Study Area

The Awash - Kulubi - Dire Dawa - Harar road passes through different administrative regions. The road start in Affar Region in the Zone 3 including Awash Sabat Kilo town and then enters to the Oromiya Region to the Mirab Hararge Zone including Arba Bordode town in the west and Hirna town in the east. Between Hirna and Karamile road enters to the Misrak Hararge Zone up to Dangego junction where the road joins the road between Dire Dawa and Harar. Also the southern part of the road near Harar belongs to the Misrak Hararge Zone, while the northern part enters the Dire Dawa Provisional Administration.

1.3 Objective of the Study

The objective of an Environmental Assessment of an individual road as stipulated in the Terms of Reference prepared by ERA in September 1996 for this study is to identify and quantify - to the extent possible - the likely negative and positive environmental impacts of the proposed road work as presently designed and suggest and produce cost estimates regarding the required mitigating measures to be implemented to avoid these negative impacts.

1.4 Approach and Methodology of the Study

It has been the approach of the consultant to fulfill the ambitious requirements of the Terms of Reference as well as possible within the relatively limited time given to the study. The EAs for the five roads have been carried out in three months, during June-August 1997. In addition to identifying the potential impacts of the road construction to the physical and natural environment, a special emphasis has been given to the potential human and social impacts. The intention has been to provide some insights to people's perceptions of road improvement plans as well as the impacts of these types of projects to their economic and social life. Mitigation and monitoring measures for the identified adverse impacts have also been developed.

The methodology used for carrying out the work include:

- collection and review of baseline data and relevant documents, including relevant World Bank directives, guidelines and other documents; relevant legislation, policy papers and guidelines of the Ethiopian road and environmental sector, as well as other relevant sectors; designs for the proposed road improvements; maps; other literature (listed in Appendix 2)

- interviewing organizations, institutions and persons relevant to the work (listed in Appendix 3)

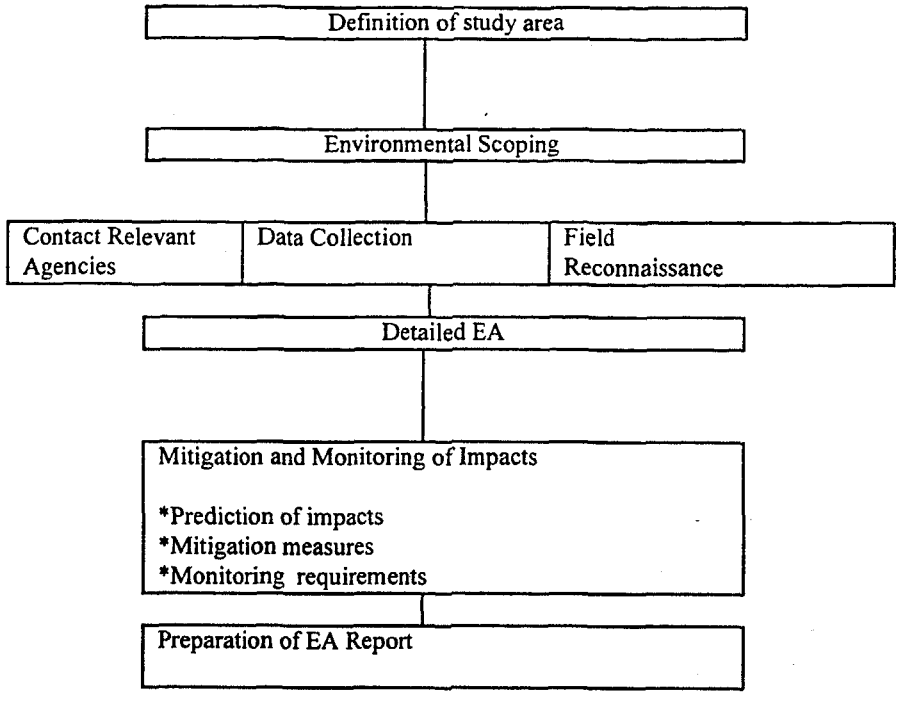
- site visits; the whole road section was studied by the team (see site visit programme; Appendix 4)

- carrying out a public consultation involving different governmental and non-governmental organizations relevant to the road section, interviews in various offices along the road as well as informal road side interviews during the above site visit (minutes of the public consultation is presented in Appendix 5)

- a questionnaire for NGO's was also prepared, although most of the information from NGO's was received during the public consultations (questionnaire in Appendix 6)

The process of the work is illustrated by the following figure. The first step was delineation of the study area. The scoping was done together with the Client (ERA) (the list of scoping is presented in Appendix 7). Following this, a field visit was made for the purpose of public hearing, contacting relevant agencies, obtaining data, and carrying out a field reconnaissance of the study area. An environmental analysis of this route was carried out and a detailed impact assessment of the proposed road was carried out.

Figure: Process of the EA Study



1.5 Contents of the Report

This EA report consists, in addition to this introductory chapter, of a description of the existing situation including policy, legal and institutional set up related to the environmental aspects of the road sector in Ethiopia (Chapter 2), description of the proposed road project (Chapter 3) and present status of the road environment both from physical and natural as well as human and social point of view (baseline data, Chapter 4). The description of the present road (Chapter 4.1) and issues/concerns are all related to the planned project to rehabilitate it. The description/issues and concerns include direct observations of the consultants and in the available/relevant literature/statistics on the impact area of this road. The issues described here were expressed also in the Public Consultation in Dire Dawa by different participants and by interviewed local people by the road.

The potential environmental impacts (chapter 5) likely to result from the proposed road project are evaluated based on data collected from field investigations and available information reported in the literature and visits made to different Government offices and in the public consultation. The classification of the impacts in this report does not strictly follow the scoping list prepared in the early stage of the study area presented in Appendix 7.

An analysis of alternatives (proposed improvement vs. no improvement) and recommendations for mitigation measures and monitoring activities are given in Chapters 6, 7 and 8 respectively. Training needs are only briefly discussed in Chapter 9 of this report. They will be handled more thoroughly in a separate EA report for the road sector.

2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Policy Framework

Macro Policy Framework

The overall economic policy objective of the Federal Democratic Republic of Ethiopia (FDRE) rests on promoting economic growth through a market-based economy with greater private sector participation in the economy and the Government's role limited to providing the necessary services through a decentralized system.

The declared policy of Agricultural-Development-Led-Industrialization(ADLI) has the main objective of improving agricultural productivity of small holder agriculture and related industrialization based on increased provision of domestic raw materials to the industrial sector. These objectives are in conformity to the Road Sector Development Program(RSDP) of ERA (Chapter II, Second Draft Final Report, pp. 15-17)

The Constitution

As a measure of achieving decentralization, the 1995 Constitution of the FDRE provides for two levels of organs of the state - the Federal Government, and nine Regional States with their respective legislative, executive and judicial powers and responsibilities (Articles 40, 47, 50).

Ownership of land-both rural and urban-as well as other natural resources is vested in the State [Article 40(3)]. Therefore, land is not subject to sale or otherwise transferred and can only create use rights. The issue of security of tenure is also addressed to some extent when the Constitution guarantees Ethiopian peasants against eviction from their possessory rights [Article 40(4)].

The enactment of laws for the utilization and conservation of land and other natural resources, historical sites and objects is also vested in the Federal Government while the regional states are given the responsibility to administer land and other natural resources in accordance with Federal Laws [Articles 51(5)-2(d)]

The development, administration and regulation of major roads linking two or more states is also the responsibility of the Federal Government [Article 51(9)]. It is in line with this provision and the policy of decentralization that ERA is currently responsible mainly for trunk and major link roads while regional (rural) roads are under the jurisdiction of regional states, namely, the Regional Government Rural Road Organizations(RGRRO). The supreme organ of the Federal state is the House of Peoples Representatives and has the power, inter alia to enact specific laws relating to major roads linking two or more states [Article 55(2)(c)].

Of direct relevance to the country's environmental policy, Article 44 of the Constitution provides that "All persons have the right to a clean and healthy environment". It also provides that state programmes which result in displacement of people or adversely affect the livelihood of the local population shall give the right to commensurate monetary or other means of compensation including relocation (resettlement) with adequate state assistance [Article 44(2)].

With regard to participation and consultations of the local community, the Constitution provides that nationals have the right to participate in national development and in particular, to be consulted with respect to policies and projects affecting their community [Article 43(2)].

The rights of women to full consultations in the formulation of national development policies and in designing and execution of projects especially when such projects are likely to affect their interests is also stipulated in the Constitution [Article 35 (6)].

In sum, the Constitution of the FDRE, as the supreme law of the country, provides the basic policy framework showing the Government's commitment to environmental protection and sustainable management of the country's resources. It sets the framework upon which subsequent sectoral and cross sectoral policies, legislation and institutions are to be devised. All stakeholders are also assured to participate and be consulted in any government or private development programmes or projects that are likely to have an impact on them which, of course, include environmental impacts.

Environmental Policy of the FDRE

The major policy framework document with respect to environmental management of Ethiopia is the "Environmental Policy of the FDRE" approved by the Council of Ministers in April, 1997. The policy was prepared by the Environmental Protection Authority(EPA) in collaboration with the Ministry of Economic Development and Cooperation (MEDAC).

The environmental policy is quite comprehensive and provides the overall policy goals, objectives and guiding principles, sectoral environmental policies, cross-sectoral environmental policies and the institutional, legislative, monitoring and evaluation mechanisms for the implementation of the environmental policy.

Among the major policy issues contained in the policy document is the requirement of Environmental Impact Assessment (EIA) of programmes and projects carried out both by the public and private sectors.

The section dealing with Government Policy regarding EIA provides:

- to ensure that EIAs consider not only physical and biological impacts but also address social, socio-economic, political and cultural conditions;
- to ensure that public and private sector development programmes and projects recognize any environmental impacts early and incorporate their containment into the development design process;
- to recognize that public consultation is an integral part of EIA and ensure that EIA procedure make provision for both an independent review and public comment before consideration by decision makers,
- to ensure that an environmental impact statement always includes mitigation plans for environmental management problems and contingency plans in case of accidents;
- to ensure that, at specified intervals during project implementation, environmental audits regarding monitoring, inspection and record keeping take place for activities where these have been required by the Environmental Impact Statement;

- to ensure that preliminary and full EIAs are undertaken by the relevant sectoral ministries or departments, if in the public sector, and by the developer if in the private sector;
- to create by law an EIA process which requires appropriate environmental impact statements and environmental audits for private and state development projects;
- to establish the necessary institutional framework and determine the linkages of its parts for undertaking, coordinating and approving EIAs and the subsequent system of environmental audits required to ensure compliance with conditionalities;
- to develop detailed sectoral technical guidelines in EIAs and environmental audits;
- to ensure that social, socio-economic, political and cultural conditions are considered in EIA procedures and included in sectoral guidelines; and
- to develop EIA and environmental audit capacity and capability in the Environmental Protection Authority, sectoral ministries and agencies as well as in regions;

The above, detailed provisions with respect to Environmental Impact Assessment of programmes and projects show that an adequate policy framework has been put in place at the national level for conducting EAs both by the public and private sectors.

2.2 Legal Framework

It has already been mentioned that the Constitution of the FDRE has laid down basic provisions that provide both the policy and legal foundation upon which appropriate subsidiary laws and regulations for the sustainable environmental management of the country's resources are to be issued.

The most important step in setting up the legal framework for the environment in Ethiopia is the establishment of the Environmental Protection Authority (EPA) by Proclamation 9/1995.

The Authority is an autonomous body responsible to the Council of Ministers of the FDRE. This enables it to act as an independent oversight body to all other development sectors both public and private, and to evaluate and monitor whether the activities undertaken by these sectors are environmentally sound and sustainable and in line with the environmental policies, laws, regulations and guidelines of the country.

Among the powers and duties given to the EPA under the proclamation and relevant to the present study are:

- to prepare environmental protection policy and laws; and upon approval follow-up their implementation;
- to prepare directives and systems necessary for evaluating the impact of social and economic development projects on the environment; follow-up and supervise their implementation;
- to prepare standards that help in the protection of soil, water and air as well as the biological systems they support, and follow up their implementation.

In line with the above cited powers and duties, EPA has already prepared two draft guidelines and a regulations for EIA of development projects and a framework environmental legislation which are currently under review both in-house and by other stakeholders and are expected to be issued in the very near future.

The four draft documents under review are:

- Environmental Impact Considerations for Transport Sector Projects;
- Procedural Guidelines for EIA; and
- Environmental Impact Assessment Regulations;
- Framework Environmental Legislation.

Assessment of the Legal Framework

The legal framework currently being developed in Ethiopia for environmental assessment of development projects shows that a more or less adequate and detailed laws, regulations and guidelines have been drafted and can serve as a framework for conducting EAs in both the public and private sectors once adopted by the Government.

The documents have been subject to discussion or will be discussed by all relevant stakeholders usually in workshops to incorporate the ideas of the stakeholders before they are issued. The regulations and guidelines also seem to have taken due account and incorporated the necessary elements provided in EU guidelines and that of the World Bank requiring EA.

Some issues which might need to be addressed with respect to the guidelines and regulations are:

- the regulations and guidelines need to be reviewed together to create compatibility among themselves;

- a time limit should be provided within which EPA or the competent agency give their decision during the screening of a project or when reviewing the environmental impact study. Otherwise, the screening or review process might hamper the implementation of projects;

- the guidelines prepared by EPA require the approval of the Environmental Council. Since the Environmental Council does not function to date the legal status of the guidelines will be weakened and therefore can serve only as optional guidelines;

- The Ethiopian Roads Authority should adopt the national EA guidelines and regulations but may also define more specific procedural guidelines to its sectoral activities which can be used for inclusion in contractual documents.

- the most important issue to be addressed with respect to the legal framework is how to make it implementable. This involves the building of capacity within ERA so that it will be able to incorporate the EA process in all road sector projects from planning to implementation stage. The Environmental Protection Authority should also increase its capacity of adequately screening, reviewing and monitoring EAs conducted by sector agencies once the regulations and guidelines are issued because it may be burdened with demands from sector agencies both at the federal and regional level.

2.3 Institutional Framework

General

ERA, as the organ of the federal government, has the responsibility for overall planning of the national network development and maintenance and construction of trunk and major link roads while the responsibility of rural roads construction and maintenance has been decentralized and given to the regional states having their own RGRROS. For the specific road under consideration, ERA has the responsibility to conduct or commission the carrying out of EAs. ERA's relationship with the regional agencies is mainly in giving advice and technical assistance. For this purpose it has a Rural Roads Division within its current organizational structure.

In order to adequately address the possible environmental impacts that are likely to arise as a result of the project and meet national requirement, ERA has to strengthen its environmental capability in carrying out environmental assessment from project planning to implementation and monitoring stage. Previous practice shows that apart from routine engineering requirements little attention has been given to incorporate environmental considerations in road sector activities. However, the RSDP has given due attention to the environmental impacts that may arise under the programme and the need for capacity building within the sector both at federal and regional level. In line with this, the new organizational structure of ERA has incorporated an environmental unit which is expected to be responsible for the carrying out of EA of road sector activities.

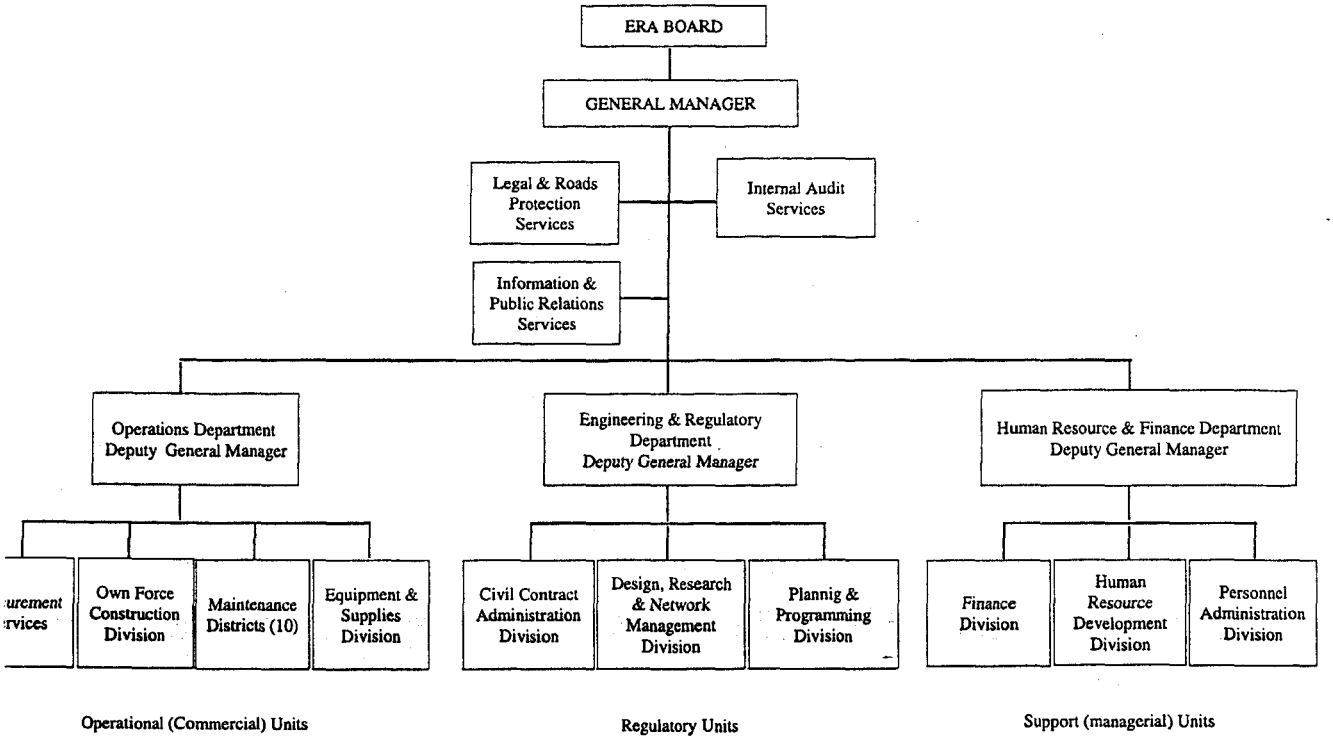
ERA's Institutional Setup

The Ethiopian Roads Authority has undergone several re-establishing and renaming since its first establishment in 1951 as Imperial Highway Authority. As of the latest re-establishment of the authority it retains the name ERA and its power and duties are stipulated in proclamation No. 63/1993 and further amended by proclamation No. 122/1995. The changes in the authority are initiated due to the fact that its coherent with the government's policy and strengthening the performance of the authority at large. As per the latest proclamation, the power and duties of ERA in general could be summarized as an authority vested with responsibilities for the construction, improvement, maintenance of the country's roads and the registration, licensing and regulation of construction machinery without prejudice to the powers vested in the National/Regional self Governments by law.

The present ERA organization chart (see following page) has three distinct units according to the functionality of each body. These are operational (commercial) unit, regulatory unit and support (managerial) unit. These units are led by deputy general managers accountable to the General Manager. The highest body of ERA is the Board. Under the operation department which is led by DGM, own force maintenance districts operate and have authority over all services, sections and other units which are under the district office. There are ten district offices in Ethiopia.

The Awash - Kulubi - Harar and Dengego - Dire Dawa upgrading project road falls under the Dire Dawa District office. The district office located in the town of Dire Dawa. Under the Dire Dawa District there are sections responsible for the maintenance of this road, and these are Awash, Asbe Teferie, Gelemso and Dire Dawa sections.

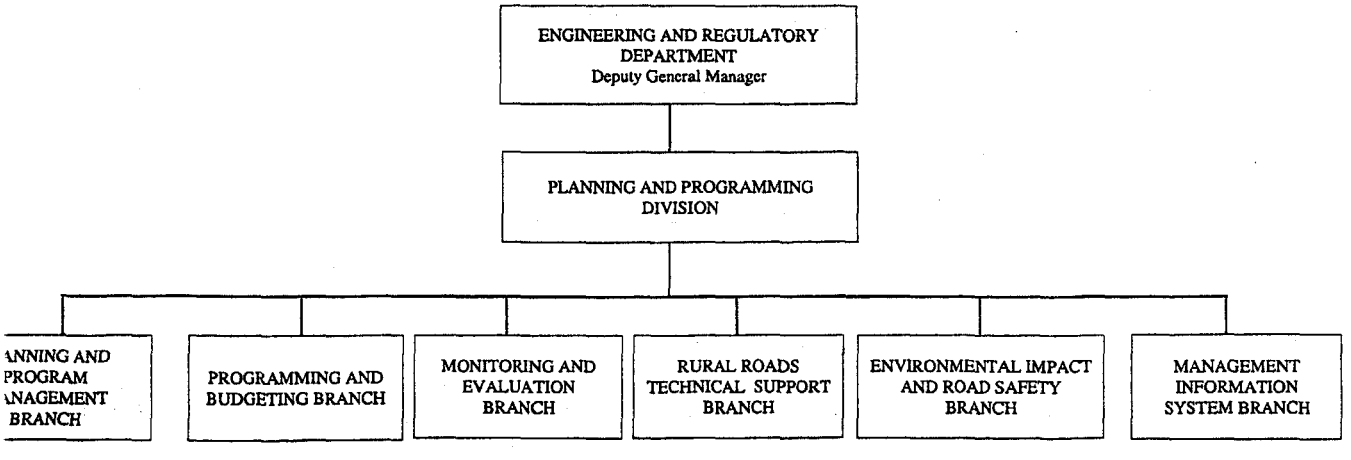
ETHIOPIAN ROADS AUTHORITY
ORGANIZATIONAL CHART



Source: ERA-REFORM STUDY REPORT, REVISED SUMMARY- MAY 1997

ETHIOPIAN ROADS AUTHORITY
ORGANIZATION CHART

Planning and Programming Division



Source: ERA - REFORM STUDY REPORT, REVISED SUMMARY - MAY, 1997

The Environmental Unit of ERA

As mentioned above, the new organizational structure of ERA has an environmental unit placed under the planning and programming division of the engineering and regulatory department headed by a deputy general manager.

The need for having an environmental unit within ERA is justified because of the huge task facing it as the programme coordinator of the RSDP and also its responsibility for the overall planning of the national road network development. As such, its role for overall environmental management of road sector activities and for carrying out or commissioning the carrying out of EAs and ensuring the incorporation of EA findings into design and mitigation plans and for supervision of same call for the establishment and adequate staffing of an environmental unit.

There are three main tasks envisaged for the environmental unit. Firstly, the environmental unit should have an advisory role to the top management thereby assisting the latter in decision making on all environmental and institutional issues within the road sector. Secondly, it should have a coordinating role by ensuring the incorporation of environmental issues in activities of all other departments and divisions within ERA. It could also play the role of a focal point for coordinating cross-sectoral environmental issues and ensuring their incorporation in the EA process. Thirdly, the environmental unit will be responsible for carrying out or supervising the carrying out of actual EAs.

In light of the above overall responsibilities envisaged for the environmental unit, having it under the planning and programming division which itself is accountable to the DGM of the engineering and regulatory department seems well placed. The DGM is close to the top management and therefore has access to report and play an advisory role to the General Manager on all environmental issues. More importantly, the environmental unit is placed directly under the planning and programming division which is responsible to oversee all road sector programmes and plans and overall supervision and follow up. Consequently, the environmental unit would have adequate opportunity to participate, evaluate and follow-up each activities in all phases of the planning process and ensure the requirement of EA has been incorporated in the project under consideration.

The environmental unit will have at its disposal the laws, regulations, and procedural and sectoral guidelines once they are finalized by EPA and will serve it to meet the national requirements in the road sector development programmes. More specific guidelines can be developed within the national requirements and will be dealt with in a later part of this study.

Cross-Sectoral Coordination

At the federal level, EPA is the responsible body for ensuring that all sectors, both public and private, engaged in development activities adequately consider that environmental concerns are incorporated throughout their planning, project development, implementation, monitoring and enforcement activities.

For this purpose it has already been mentioned that EPA has the mandate to prepare environmental policies, laws, regulations and guidelines that have to be followed by all sectoral agencies.

EPA should also be in a position to deal with cross-sectoral environmental issues and coordination so that all sectoral programmes and sub-projects are integrated and incorporated at all stages of the EA process. It will also assist it in monitoring and follow-up of all sectoral activities.

To deal with cross-sectoral issues and coordination, EPA has an Environmental Council composed of:

- An official to be designated by the Government - Chairperson
- The Minister of Agriculture
- The Minister of Trade and Industry
- The Minister of Health
- The Minister of Mines and Energy
- The Minister of Water Resources
- The Commissioner of Science and Technology Commission, and
- The General Manager of EPA

The mandate of the Council is to deliberate upon policy matters concerning environmental protection and to make recommendations and evaluate and approve directives and standards to be issued by EPA.

Although most of the relevant sector agencies are represented in the Environmental Council, there is no representation of the Transport sector. It is suggested here that in order to deal with the overall environmental issues of the transport sector, a member of the Board of ERA be represented in EPA's Environmental Council.

Currently, ERA board is composed of the Minister of Economic Development and Cooperation (Chairperson), Ministers of Works and Urban Development, Transport and Communications, two representatives from the Prime Minister's Office and the General Manager of ERA.

However, it would also be necessary that cross sectoral cooperation be made at the technical level in the form of a technical committee in which experts from each sector can be represented and cross-sectoral environmental issues and activities can be discussed. The focal points for this type of technical committee can be the environmental units established within sectoral agencies where these are already established or are going to be established such as in ERA and participation can also be extended to representatives of the private sectors and the relevant public.

At the regional level, there are already Regional Environmental Coordinating Committees chaired by the Vice President of the regional state and represented by relevant bureaus which can serve as a coordinating committee and liaison with EPA at the federal level.

In the EA-process, ERA can coordinate its activities with the environmental coordinating committees at the regional, woreda and local levels so that the environmental concerns at all levels can be incorporated. Moreover, public consultations which is an important part of the EA process can also be organized by the coordinating committee with which ERA, can make the necessary contacts.

2.4 Compensation and Resettlement

Right of Way

Since the 1951 Law ERA has had total displacement rights for people, houses or any other property in the case of construction or maintenance of roads. The law is still from that year but there have been several proclamations after that stating the same right. According to that law ERA can occupy any site for quarries or camps for road construction and maintenance purposes.

The area reserved or Right of Way for roads is 30 meters wide. In case of the new road or new road alignments any property within this area can be removed/demolished by ERA. After road construction nobody is allowed to build houses or shops within this area. The ERA maintenance section is responsible to see that nobody builds anything within this area.

Compensation

Compensation for the lost property is paid if new lands are occupied in the places where no road existed earlier or if the upgrading of the existing road requires new lands from outside the previous Right of Way. The property on these sites/lands is compensated. Compensation is paid for the property lost permanently, and/or for temporary losses as the case might be.

In case somebody has built residential or any other houses such as shops etc. within the Right of Way space these houses are considered to be illegally built and there will be no compensation for loss of property from ERA's side.

The owners of these houses (legally or illegally build) are allowed to remove their property before the construction activities starts. Usually the owners whose property will be removed/demolished receive this information about one or two months before the construction work starts.

Property to be compensated

The land is not considered to be property which can or need to be compensated. All land belongs to the government and it can not be sold or bought. The present tenure system gives people the right to use land but no individual ownership.

Residential or any other type of buildings are considered as property and will be compensated according to their market value. In case of the demolished residential house ERA will compensate the old property not based on its present market value but according to the cost of constructing a similar new house. In case of the wood and mud houses, it is recommended by the consultants, that the compensation price would be that of the hollow block house due to the environmental reason. The block houses are not very much more expensive and would save the decreasing resources of trees and forests.

The costs created by removing transmission/distribution lines or removing//breaking water pipes, drainage systems, telephone lines etc. are compensated by ERA to the owner of these utilities.

Trees with commercial value are considered as property and are compensated according to their market price.

In case of the detours or other temporary occupations of agricultural lands, the growing crops so lost, are compensated according to their market value. In the case where crops are lost for several years due to non-cultivation the average value of the lost crops is estimated at the project level by the compensation committee coordinated by ERA.

Compensation is paid only for any physical property, no compensation is paid for lost economic activities in case of shops and bars or, in case tenants live in a house, the owner is not compensated for lost rents.

Owner receiving compensation

Compensation is paid to owner of the property, private or public.

The lost crop is paid to the cultivator who can be a private farmer, a cooperative, a state farm etc. The trees with commercial value are compensated by their market value to the owners which can be private persons, the Ministry of Agriculture or Municipality/Peasant Association.

The costs caused to the public utilities, the concerned authority/entity gets the compensation, in case of electric lines compensation is paid to the Ethiopian Electric and Power Authority (EELPA), telephone lines to the Ethiopian Telecommunication Corporation, sewage systems to the concerned Municipal Authorities etc.

Compensation is paid to the owner of the house not depending if owner lives in a house or not. In a case a kebele owns a house it will receive compensation. The tenants have no rights to any type of compensation.

ERA Compensation Committee

When the road construction works are decided to start in a certain area, ERA sets a Committee at the project level. The Committee is mainly established for compensation and resettlement purposes. There is no law that require to set any Committee, but this is a permanent practice. The members of the Committee get no money compensation for their work.

Committee includes representatives from

- ERA as a coordinator
- Woreda administration to represent the concerned region
- Bureau of Agriculture mainly to estimate value of lost crops or trees
- Bureau of Urban Development & Public Works in case of the concerned Municipality
- Kebele or Peasant Association represented by local elders

The people affected by the road construction do not belong to the committee, but are informed and consulted about the compensation. The consent of all stakeholders must be received. If the consent does not come or the owner is not happy with compensation, the

property will be removed anyway and compensation decided by the committee is paid by ERA.

In the public consultations that were held in different parts of the country for the EIA of the five roads, participants wanted to see a committee to be established to handle the cases where the loss of farmland or any other property belonging to the individuals or the community happens due to the road construction. ERA compensation committee fulfill this requirement. However, the committee appointed should not be "a group of unprepared appointed by the unwilling to do the unnecessary".

The most important thing is to implement the compensation and displacement and resettlement issues with fairness and with transparency to prevent negative issues among the locals. There have been problems in the past, when compensation/resettlement were not implemented as promised at the beginning and the social issues have been relegated to the side and more importance was given to the technical than social issues.

Resettlement

The people who are displaced due to the new roads or new alignments of old roads outside the reserved area, as well as those residing illegally inside it, must find a new place to live.

Although local communities are commonly kept responsible to resettle people, there are no legal regulations requiring them to do so. In practice the local communities resettle people and/or appoint new agricultural lands to the farmers who have lost their lands due to the road construction.

This 'responsibility' is based on the long historical practice on the common idea of justice for an individual right to use agricultural land. In the Abessinya proper (present Amhara and Tigray regions) a person had a right to use land under the *rest/resti* system according to which the agricultural lands were divided at the certain intervals among the families having this (rest/resti) right. This system was based on the ownership of a kinship group, not an individual ownership. The community had the responsibility to redistribute agricultural lands among the families already cultivating land but also to the new families formed by marriage after last redistribution. Redistributions usually happened about every tenth year.

In the southern part of the present Ethiopia rest system never existed. However, land was not 'owned' by individuals in the south either. After these lands were annexed to the present Ethiopia, many big plantations were established in this area, and no communal land distributions existed in this part of the country. Under this system the peasants had more permanent tenure for the land they cultivated. After the monarchic period part of the lands were distributed among the peasants but no communal redistributions happen in this area.

The rest/resti system in itself has presently no legality in the country and the people who have the tenure rights have expanded over the previous rest/resti families also in the north. However, the last redistribution of lands was finalized in Amhara Region last year. If this system will get (regional) legality, the people who should be resettled have to wait resettlement to the next redistribution, maybe up to nine years.

Resettlement is still felt to be the responsibility of the community represented by kebele administration or peasant association. ERA compensation committee with the woreda/kebele

administration try to find a satisfactory solution to resettle displaced people. However, no evaluations have been done about compensations or resettlement after consent of the committee and the real practice after it is not known.

The land allocation for residential buildings in urban areas is still relatively easy. The kebele owned houses are rented to the households, in many towns to a half of all households.

In many rural places the scarcity of agricultural land may lead soon to the situation where all people losing farmland will not receive new agricultural land. The big issue in the future will be the mode of resettlement and especially the compensation of the lost agricultural lands.

Already now it seems that different alternative practices are born. For example, the lands needed by EELPA (which also has the same right as ERA to occupy any land) for the Alamata Substation the farmers were compensated for the permanent loss of land in a form of loss of crop. Those who lost more than one hectare were compensated by the average value of the ten years' crop. The minimum compensation was estimated from three years' crop and the rest between these two extremes. The similar experience comes from the construction of Mekele International Airport.

However, farmers who get cash compensation lose also their occupation with lost agricultural lands. If the resettlement to the agricultural lands is impossible, there should be training and/or other employment possibilities to the displaced people. In some cases displaced people have been employed by the projects to construction work.

There should be a clear national policy on this matter to avoid the situations to be biased from case to case. So far there is no law or regulations about resettlement or compensation of the lost agricultural lands. In the national policy also the local circumstances including physical, social and economic environment must be taken into consideration. Also the question about who are responsible to resettle displaced people is not settled by law. The constitution, however, states that the relocation/resettlement could be provided with "adequate state assistance".

2.5 Public Consultation

The Environmental Policy of the FDRE recognize that public consultation is an integral part of EIA and that it should be ensured that EIA procedure include public comments before consideration by decision makers.

With regard to participation and consultations of the local community, the Constitution provides that nationals have the right to participate in national development and to be consulted with respect to policies and projects affecting the community. Also many donor assisted programs and projects require different consultations to ensure people's participation.

Consultation and communication with various interest groups should be as an integral part of the process used for gathering environmental data, understanding community and individual preferences, selecting project alternatives, and designing viable and sustainable mitigation and compensation plans. This means that consultations should be included in the planning and design phases as well as during implementation.

Participation involves a dialogue with interested parties before major project decisions are made. It is also desirable to use several different consultation activities, such as public meetings, expert seminars, interview surveys etc. ERA compensation committee forms one official consultation channel which, however, has very limited purpose and do not substitute public consultations.

3 DESCRIPTION OF THE PROPOSED ROAD PROJECT

The Awash - Mieso - Asbe Teferi was constructed by the ERA to primary road standard (the former ERA road classification) and Asbe Teferi - Kulubi and Dire Dawa - Harar by an international road contractor in the early 1960's. The pavement of both sections was natural gravel with a width of 7 m. in average. Since then, except for periodical and routine maintenance activities, the road did not have major changes.

Later on the sections Kulubi - Dengego and Dire Dawa - Harar were upgraded by asphalt double surface treatment. Subsequently, the road from Dengego to Dire Dawa was further upgraded, including shoulder and pavement widening, and overlaid with asphalt concrete by ERA in the late 1980's.

The ERA had studied the feasibility of the section from Awash - Kulubi in 1977 for upgrading, however, the design of part of this section for upgrading was considered later on, in 1989. TCDE was appointed by ERA to investigate the road condition and pavement design for the section between Mieso and Kulubi. The design considered the existing pavement thickness and without major realignment.
The design also recommended double asphalt treatment pavement on top of 200 mm. base material, and beneath this layer, subbase material of varying thickness in consideration of the residual natural and existing pavement thickness.

As part of the appraisal projects for the RSDP, the Awash - Kulubi - Dengego - Dire Dawa and Dengego - Harar road has been evaluated in a feasibility study by TecnEcon. The Consultant has already submitted its draft final findings in a report issued to ERA and the World Bank in May 1997. According to the report, the project is subdivided into five sections and the recommended treatment is as follows;

a. Awash - Arbereketi	Reconstructed 50mm. AC surface + 500mm granular base &subbase
b. Arbereketi - Kulubi	Reconstructed 50mm. AC surface + 450mm granular base &subbase
c. Kulubi - Dengego	Reconstructed 50mm. AC surface + 250mm granular base &subbase
d. Dengego - Harar	Reconstructed 50mm. AC surface + 500mm granular base &subbase
e. Dengego - Dire Dawa	AC overlay 70mm thick.

Considering the treatment recommended, the cost benefit analysis for the project for each section well exceeded the required 12 %, and the economic internal rate of return is between 22.8 % and 28.1%.

Presently a Dutch Consultant DHV has conducted the detail engineering design and preparation of tender documents for the project. The contract award date was June 96 and the expected completion time was March 1997. So far the geometric design has not been submitted, however, not much changes are expected from the existing alignment, except the widening and easement of sharp curves.

Traffic frequency

This 313 km road is in two distinct parts:

- A lightly trafficked, predominantly gravel road from Awash, through Kulubi to Dengego, part of the route which connects Addis Ababa with the east and

south eastern parts of the country (as well as forming a strategic link to the borders with Djibouti and Somalia), and

- A more heavily trafficked paved road between Dire Dawa and Harar, part of a wider international route between Djibouti and Somalia.

Condition of the road

On the gravel road sections the main defect appears to stem from a general loss of shape of the road. The existing pavement is not adequate for even the low levels of traffic being carried by the road. As a result, the vehicles mainly use only the central portion of the carriageway, resulting in overstressing the subgrade and higher than normal rates of gravel loss.

From Dengego to Dire Dawa, the pavement is in good condition except for a few localised defects such as areas of cracking and base failure. Some repairs are needed to minor subgrade failures over this section but the surface is still in very reasonable condition and the road is suitable to be overlaid if traffic conditions demand strengthening. The remaining paved road sections from Kulubi to Dengego and from Dengego to Harar are in very poor condition, all types of pavement failure being observed.

There are approximately 256 culverts on the road. Most are of a box construction. The average dimension of these boxes is 2 - 3 metres span by 1 - 1.5 metres height. There are few larger structures.

Proposed Activities

Preliminary designs assumed that the upgrading could be carried out without changing the vertical or horizontal alignment of the road. However, it may be more appropriate to modify the standards through the mountainous section to avoid excessive construction costs.

The future rehabilitation and upgrading consists mainly of putting some new layers of gravel or crushed stone and a new asphalt layer on top of the old road.

There are 27 bridges in this section, all wide enough for the proposed rehabilitation. Many require new parapets and minor maintenance work but they all appear to be structurally sound.

4 BASELINE DATA

4.1 Description of the Road Environment

This trunk road is an important part of the surface route from Addis Ababa to the eastern and south-eastern parts of the country. It also serves as an international road through Dire Dawa to Djibuti and after Harar through Jijiga to Somalia. Through its national and international connections the road is very important for import/export transportation.

The Awash - Kulubi - Dire Dawa - Harar road passes through different administrative regions. The road start in Affar Region in the Zone 3 including Awash Sabat Kilo town and then enters to the Oromiya Region to the Mirab Hararge Zone including Arba Bordode town in the west and Hirna town in the east. Between Hirna and Karamile road enters to the Misrak Hararge Zone up to Dangego junction where the road joins the road between Dire Dawa and Harar. Also the southern part of the road near Harar belongs to the Misrak Hararge Zone, while the northern part enters the Dire Dawa Provisional Administration.

The road up to Mieso follows closely the Ethio-Djibouti railroad, and the two ways of transportation are competitive. There has been different committees to see the benefits of both, and the improvement of the road has got an official preference. Also from Mieso an alternative, but less used, road goes to Dire Dawa along the plains.

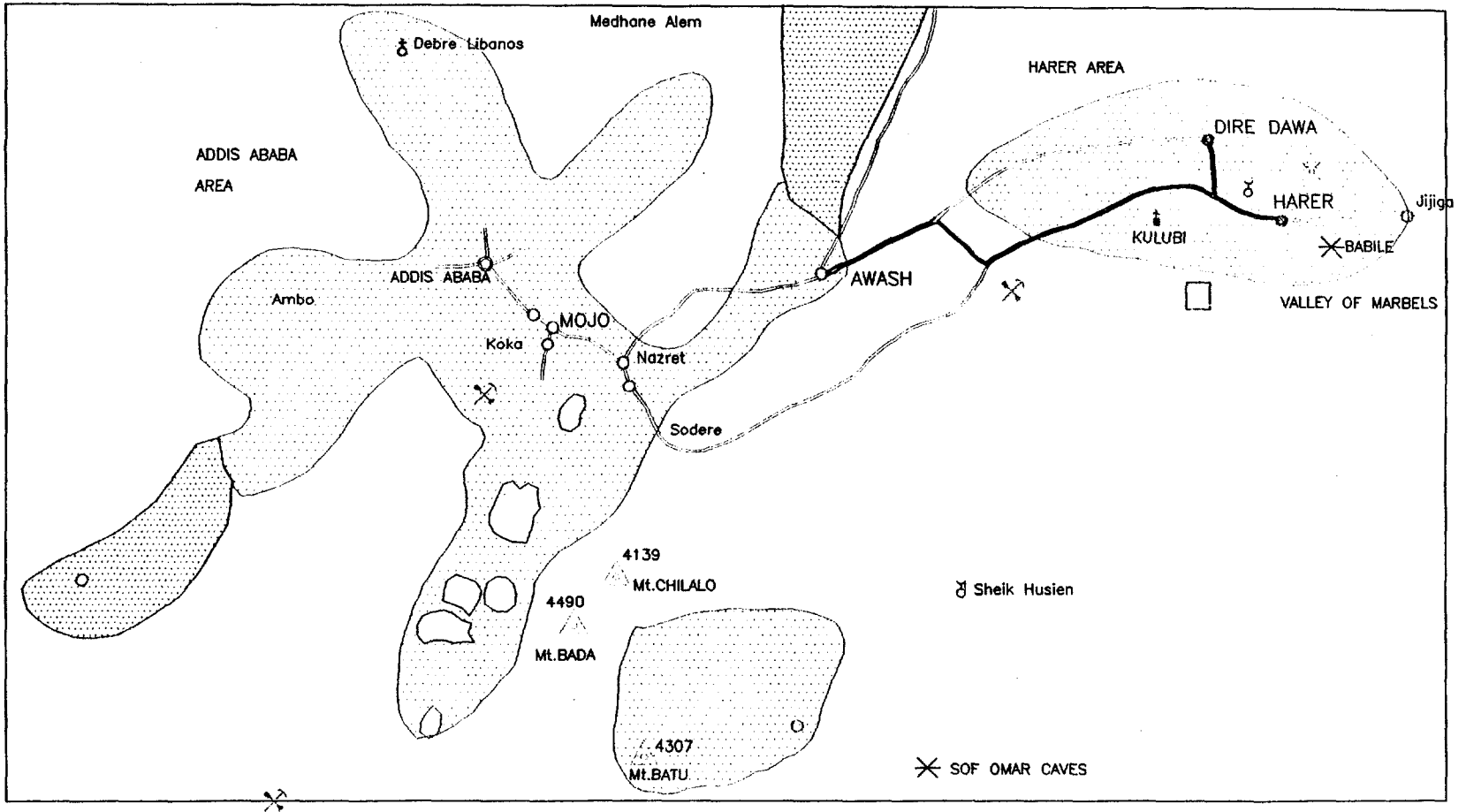
The road from Awash to Kulubi is a gravel road while the road between Dire Dawa and Harar is asphalted but in a very poor condition with lots of potholes. In some sections of the road, especially near Adele the road is flooded during the rainy season due to drainage problems and lack of proper maintenance. The flood is blocking traffic and the complaints by the local people are many.

Scenic Route

The road from Mieso through Dangego to Dire Dawa - Harar is also regarded as one with great scenic value and hence as a prospective tourist attraction (see Figure 4.1). It is also interesting due to its historical and socio-cultural background.

Along this road there are many religiously important places for the Christians and the Muslims alike. In the first part of the road in north near Asebot town one can see Asebot Mountain, at the top of which one of the most famous Orthodox monasteries is located. The St. Gabrial Church in Kulubi is one of the most important pilgrimage places for the Orthodox Christians in Ethiopia. The St.Gabriel Church receives tens of thousands of pilgrims from all over the country during December and July. In the Public Consultation the representative from the church welcomed the improvement of the road, because the poor condition of the road has been a major cause for numerous accidents during the pilgrimage times. During the improvement also the road going to the church site should be redesigned.

Harar in itself has been one of the most holy places for the eastern African Muslims for centuries (when the Christians were not even allowed to enter the town) and also on the road one of the most important pilgrimage places for the Ethiopian Orthodox Christians is the Saint Gabriel Church in Kulubi where each year at the end of December, the annual renewal of the miracle of Saint Gabriel is held. Also in the end of July people visit the



LEGEND

- Major Tourist Areas
- Minor Tourist Areas
- Eastern Route/Project Road
- Other Roads
- Archeological SDite
- Major Batte Site
- Monastery
- Mosque
- Mountain Peak
- Natural Wonder
- Ruin
- Capital City
- Regional City
- Other Towns

FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

AWASH–KULUBI–DIRE DAWA–HARER ROAD

PLANCENTER Ltd. Finland

TOURIST SITES

Figure 4.1 | Date

place in Saint Gabriels day. Tens of thousands of pilgrims visit the church annually usually either in fulfilment of a vow or in hope of miraculous cure from sickness. (18 kilometers west from Asebe Tefere there is the Kuni-Muktar Mountain Nyala Sanctuary, established to provide a conservation area for the endemic mountain Nyala.)

Especially the road between Dire Dawa and Harar is said to be one of the most scenic in the world. It follows the stream up a large valley where camels are seen bearing their loads. The road climbs up almost 800 meters in less than 25 kilometers and from the top of Dangego one can see Rift Valley plains below. In Dire Dawa one can find also prehistoric paintings, evidence that humans have inhabited this part of Africa for more than 20,000 years.

29 kilometers out of Dire Dawa the road passes by Lake Adele and after 5 kilometers by Lake Alem Maya. It takes another 20 kilometers to reach Harar, the capital of Harari Regional State.

The (project) road ends in Harar town, which is listed as one of the World Heritage Site by UNESCO. The walls and gates of this centuries old city are an attraction in themselves but Harar is also one of the most important places of Islamic faith on the African continent including the sixteenth-century Grand Mosque and the tomb of Abu Said, an early Muslim ruler.

Traditional transportation means

The road has been planned to serve as an important corridor linking different parts of the country for all kind of transportation needs. However, most people using this road, use it only locally. Traditional transportation methods are many and various also on this road.

Local social and economic activities require people to use the road mainly as pedestrians and also the most common way of transportation is people, and especially women, carrying the loads in their back between the home compounds and agricultural fields, water points, market places or any other destination. Along this road there are hundreds of women every morning heading to the nearest town to sell fuel wood for urban households. Due to the absence of other type of local transportation, especially in rural areas, also sick people are carried to the health centers etc.

Different types of wheelbarrows, often with local designs, are used especially in town areas. Barrels of water, or whatever can be rolled, are rolled on the road etc. Many of these traditional means of transportation are not very quick to react to approaching heavy trucks, and/or remove them quickly from the road.

Also different pack animals are plenty on this road; donkeys and camels, and to the lesser extent also horses are used on this road for transportation. Especially on the flat terrain, the horse charts transport both people and products.

Minibuses form a part of public transportation systems on all asphalted roads. However, many people regard the fees too high and many loads camped or rolled (such as fuel wood, animals, water barrels) are too spacey or heavy for minibuses. This means that even after the rehabilitation most of the transportation needs will be met by traditional means. This fact should also be taken into consideration when designing the rehabilitation/upgrading.

4.2 Physical Environment

The following text provides an overview of the baseline physical environment of the project area and vicinity.

4.2.1 Climate and hydrology

Climate

The climate along the road varies from hot arid climate for the road section in the Rift valley (Awash-Mieso and Dire Dawa) and temperate to humid in the highlands of Ahmar ridge and Harar plateau.

The Oscillation of the Inter-Tropical convergence zone (ITCZ) governs the climate along the road. There are two distinct rainy seasons along the road the main rainy season (June to September) and Belg (March to May).

The mean annual rainfall varies along the road from less than 600 mm at Awash to about 1000 mm at Kulubi and about 600-800 mm at Harar and less than 600 at Dire Dawa (Appendix 8).

Climate is the principal causes of floods and sedimentation. High rainfall produces high floods and sedimentation. Human activity have shifted the flood intensities to maximum and decreased low flows at some sections of the road (especially from Dengego to Harar). Example can be sedimentation of the road section at Adele due to deforestation at the upper catchment.

Rainfall

The Awash town has a tropical semi-arid or *Kola* climate. The rainfall pattern is biannual. The small rain usually begin in February and go to the end of April, but they are unreliable and usually bring only light rain. The big rains are more dependable and fall from July through September. The Awash Town receives an annual rainfall between 400 and 700mm. Table 1 in the Appendix 8 depicts yearly rainfall at Dire Dawa Town.

The mean annual rainfall of Alemaya town which is located close to Harar town is 880mm. Some rain falls in most months except December and January.

Temperature

The mean annual temperature at Awash station is 25.6°C with a mean minimum and maximum of 18.2 °C and 33.1 °C respectively and at Alemaya, the mean annual temperature is 17.1 °C with a mean minimum and maximum of 10.9 °C and 23.2 °C.

Surface water hydrology and quality

The primary sources of water is rainfall and Awash and Hirna are the only two perennial rivers along the road. Flow characteristics of the river Awash is presented in Table 2. Water quality data of the Awash is presented in Table 3 in Appendix 8.

Groundwater

The ground water occurrence, distribution and abundance is governed dominantly by the geological formation, geomorphology and climate.

The road section from Awash to Asebe Teferi crosses extensive granular and fracture aquifer from high to medium productivity with static water level about 80 meters and greater.

From Asebe Teferi to Dengego the road is mainly aligned along a water shed divide (Ahmar ridge) of Awash and Wabi Shebelle rivers basins. Here no actual ground water table can be observed. Perched groundwater and small springs originates downstream of the road on both sides. In some places of the road where the road deviates from the water shed divide line, like Hirna, Chelenko and etc. with perennial rivers crossing depressional valley, ground water may occur with static water level about 20 meters.

From Dengego to Harar the road mainly crosses Precambrian granites which are practically aquiclude except at some places where thick alluvial are developed and highly faulted zones.

From Dengego to Dire Dawa it is a steep scarp of the Ethiopian Rift escarpment composed of Precambrian granite and limestone. It is highly drained practically with no groundwater except at some places with small springs of perched groundwater. Around Dire Dawa (at the fault of the escarpment) thick alluvial fans and Bajadas are developed with abundant groundwater, static water level about 30 meters.

4.2.2 Physiography

The road crosses different major physiographic division of the eastern part of the county. Mainly the road traverses along the central lava high lands and the Harar plateau, and at two sections the road crosses the transitional scarp slopes of the Ethiopian Right Valley Escarpment (Meiso-Asebe Teferi and Dengego-Dire Dawa).

4.2.3 Topography and hydrography

The major part of the road traverses along the Ahmar ridge or the water shed divide of Awash and Wabi Shebelle rivers basin drainage (from Asebe Teferi to Dengego) elevation varying from 1750 to 2400 m.a.s.l. From Awash to Meiso the road traverses along the Ethiopian Rift valley floor of flat plains. From Meiso to Asebe Teferi and from Dengego to Dire Dawa the road traverses steep hilly mountainous sides. The elevations of the terrain that the road traverses are Awash 920 m.a.s.l, Asebe Teferi 1750 m.a.s.l., Dengego 2400 m.a.s.l and Dire Dawa- 1000 m.a.s.l. The section of the road from Awash to Asebe Teferi traverses the Awash river basin. This section of the road is crossed by a very few perennial rivers and numerous seasonal streams.

From Asebe Teferi to Dengego the road is dominantly aligned along a water shed divide except at Hirna, Karamile, Chelenko and other few places. This section of the road is crossed by few perennial and seasonal streams and flood paths, since most of the rivers originates downstream of the road on both sides.

The road section from Dangego to Dire Dawa is aligned parallel to the river systems of the area and crosses few seasonal streams and cross drainage at mountainous sides. The section

of the road from Dengego to Harar traverses the Harar plateau of step faulted area and crosses few streams and flood paths.

The streams and flood paths crossing the road have very high flood during the main rainy season from June to September and March to May during Belg season. In the other period of the year they have very low discharge or no flow.

4.2.4 Geology

The road traverses the major geological formation of the county from recent volcanic lava to Precambrian formation (see Figure 4.2).

The road section from Awash to Mieso traverses the Afar group of Quaternary basalt. Subordinate acidic lava, ignimbrites etc. From Mieso to Chelenko the road traverses the Trap series of Ashangi group composed of alkaline olivine basalt and tuffs. On the water shed divide the basalt is highly weathered and can be used for sub-base material. At some places the road traverses the upper sandstone and the Hamanlei series limestone.

From Chelenko to Harar the road traverses the sedimentary formation of the Hamanlei series of limestone and the Precambrian granites and quartz-dionte. Similarly the road from Dangego to Dire Dawa traverse the Precambrian granites and the sedimentary formation of Hamanlei series lime stones.

4.2.5 Soils and geomorphology

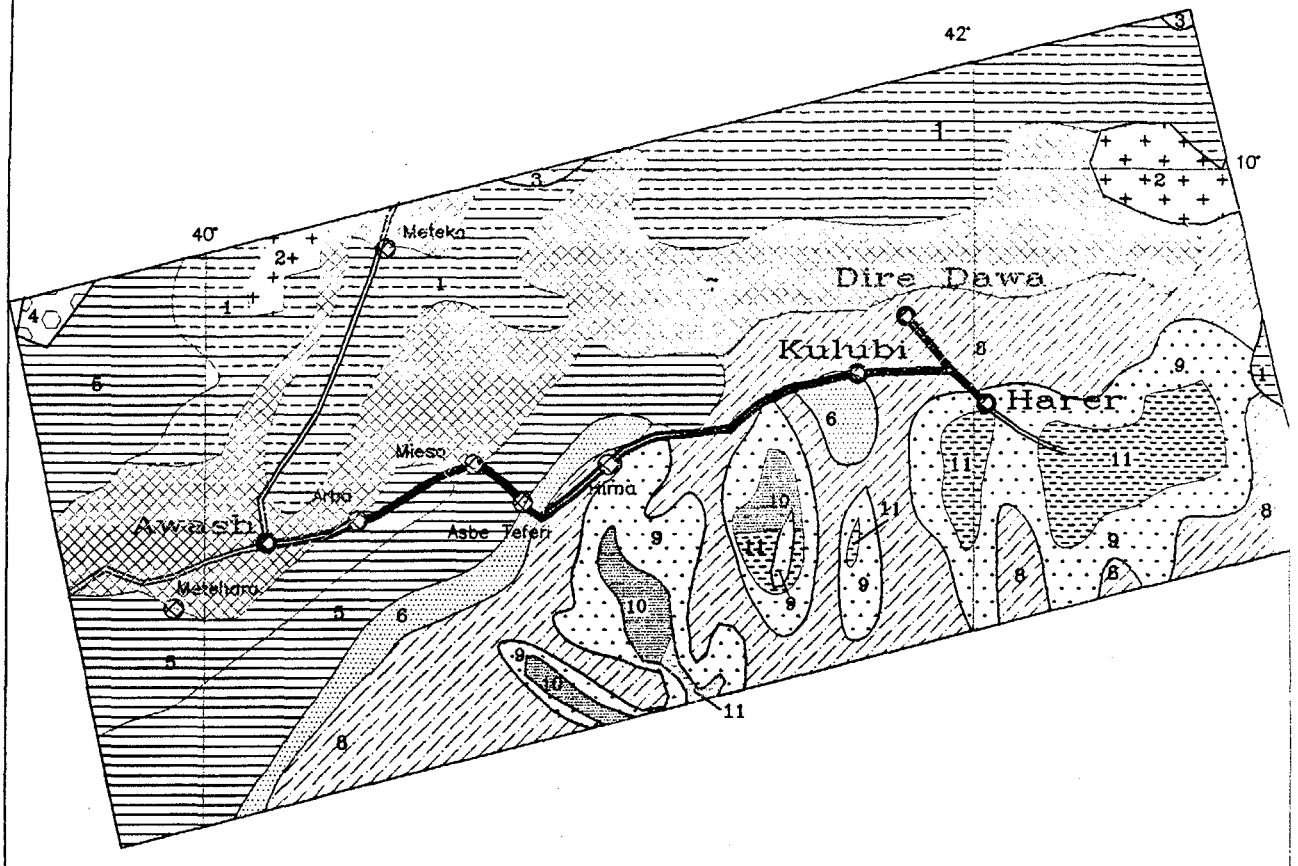
The characteristics for the different road sections are as follows (see Figure 4.3):

- *Awash to Mieso*: A few kilometer stretches from Awash to Mieso the road cross thick soils of alluvial fans and bajads of pebbles, gravel and sand of a very porous media. Here gullies are not developed. Most part of the road crosses volcanic piedmont plains, lava platforms and associated cones and crater remnants. The volcanic plains along the banks of streams and flood paths easily erodes. The volcanic ashes on slightly steep plains is highly eroded along the side ditches of the existing road and downstream of culverts.

- *Mieso-Asebe Teferi*: Here is developed thick residual soils on moderately dissected side slopes and piedmont zones of volcanic rocks. Soil erosion along the side ditches of the existing road and scouring downstream of culverts is a common phenomenon.

- *Asebe Teferi-Kulubi*: Thin residual soils on the water shed divide of mountainous relief parallel ridges of volcanic rocks. Except at Hirna, Karamile and at few places (which are not at water shad divide) soils erosion is negligible. At Hirna, Karamile and at few places the road crosses steep hills and scouring along side ditches and down streams of culverts are dominant along the existing road.

- *Kulubi-Harar*: Moderately thick residual soils on undulating to rolling high plateaux and rolling to hilly plateaux of Precambrian granite. Here soil



L E G E N D

1	Quaternary Sediments		CENOZOIC
2	Basaltic flows and related Spatter Cones	QUATERNARY VOLCANICS	
3	Basaltic intermediate and felsic Volcanic		
4	Magdala Group	TERTIARY VOLCANICS	
5	Trap Series		
6	Amba Aradam Formation	CENTRAL PLATEAU SEDIMENTS	MESOZOIC
7	Antalo group		
8	Hamanlei Series, Arandab Series, Gaberdar Series Main Gypsum	EASTERN & WESTERN OGADEN SEDIMENTS	
9	Adigrat Sandstone		
10	Upper Complex	PRECAMBRIAN	
11	Lower Complex		
	Project Road		
	Other Roads		

FEDERAL GOVERNMENT OF ETHIOPIA

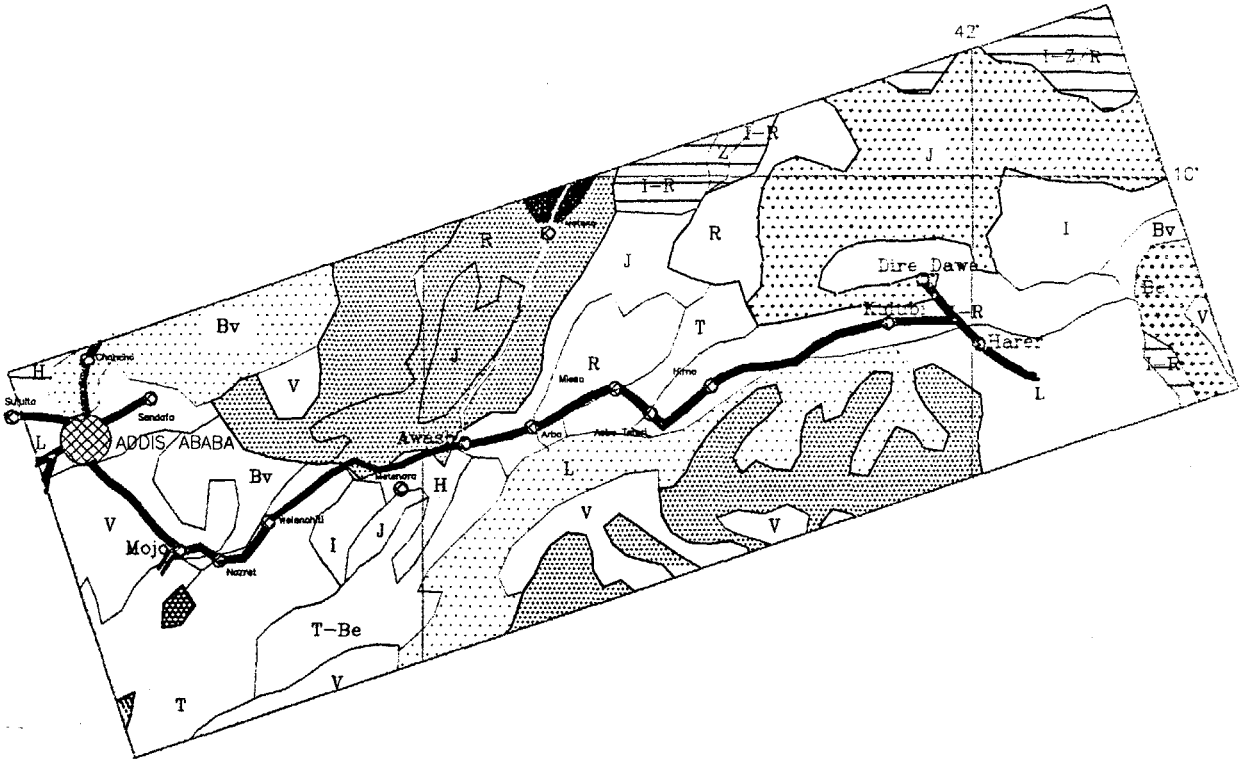
THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND/OR UPGRADING

AWASH–KULUBI–DIRE DAWA–HARER ROAD

PLANCENTER Ltd. Finland

GEOLOGICAL MAP

Figure 4.2 | Date



L E G E N D

Be	Chromic Eutric and Calcic Cambisols	R	Calcaric and Eutric Regosols
Bv	Vetric Cambisols and Vetric Luvisols	T	Humic,Mollic and Vetric Andosols
I	Lithosols	V	Chromic and Pellic Vetrosols
J	CalcRIC and Eutric Fluvisols	Z	Gleyic and Orthic Solonchaks
L	Chromic and Orthric Luvisols		Project Road
			Other Roads

P H A S E S

- Lithic
- Stoney
- Petrocalcic
- Saline
- Flooding

FEDERAL GOVERNMENT OF ETHIOPIA

THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND/OR UPGRADING

AWASH–KULUBI–DIRE DAWA–HARER ROAD

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SOIL MAP

Figure 4.3 | Date

erosion and scouring along the existing road is observed at few places with steep slopes and thick transported soils.

- *Dengego-Dire Dawa*: Very thin to non-residual soils on high to mountainous relief parallel ridges of Precambrian granites and limestone.

Erosion

Sensitive sections of the road are along:

- *Awash-Meiso* on relatively steep plains composed of friable volcanic ash which are easily eroded. On this section of the road at some places are observed deep scouring along the side ditches and down stream of culverts.

- *Meiso-Asebe Teferi* mountainous hilly terrain the road cuts the side hills of weathered basalt. Side ditches erosion and scouring at culverts are observed.

- *Around Hirna, Karamile and Chelenko* areas side ditches erosion and scouring of culverts.

- *Dengego-Dire Dawa* - This section of the road crosses the Ethiopian Rift escarpment composed of Precambrian granites and limestone. In spite of favorable topographical and geomorphologic conditions for erosion, this section of the road is resistant to erosion due to its geological formation and climatic condition (semi-arid).

Soil stability-along the existing road is not a problem in cutting or embankment even the hilly section of Meiso-Asebe Teferi, around Hirna, etc.

4.2.6 Seismicity and earthquakes

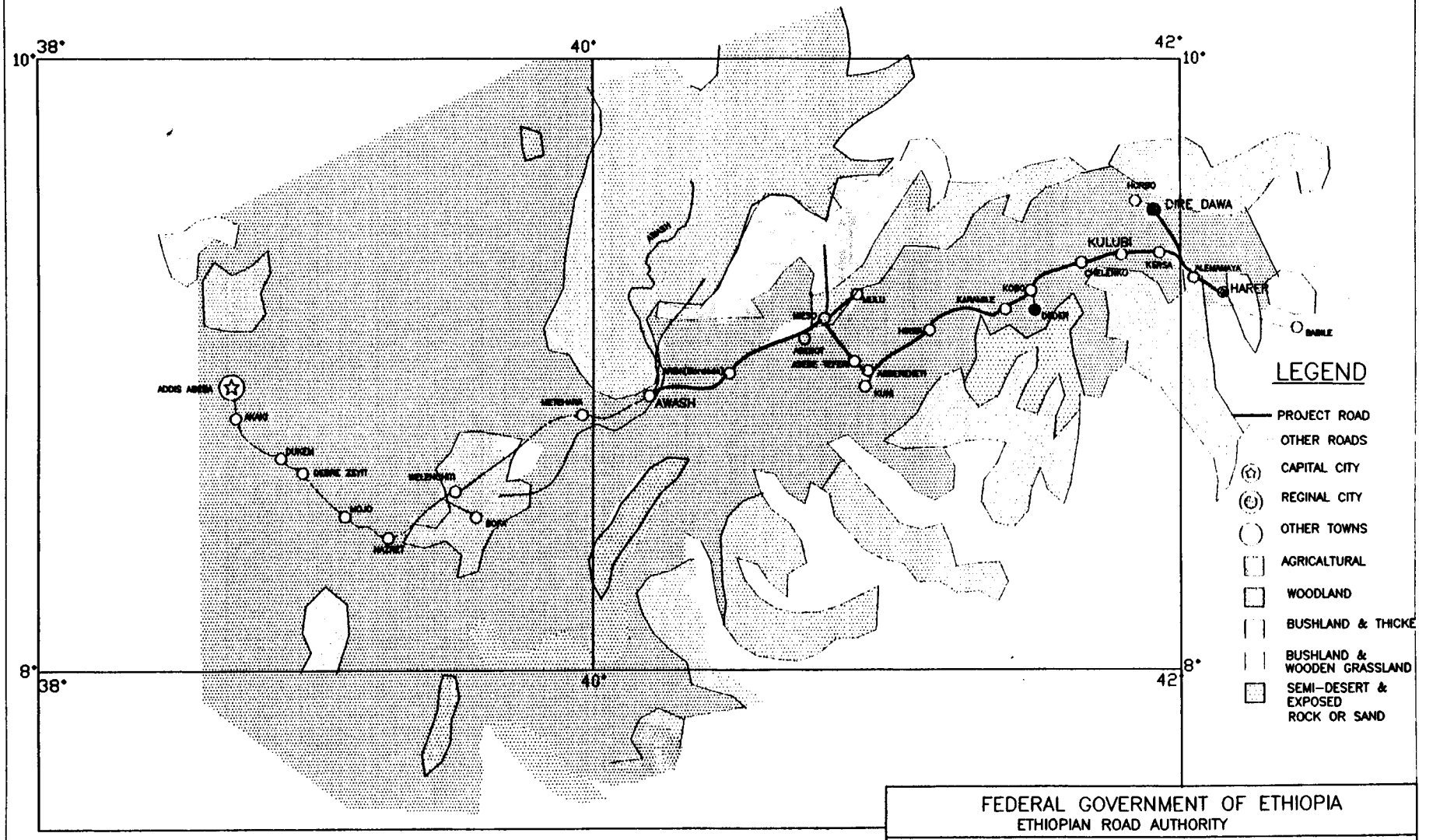
The most seismically active of all tectonic component of the country is the eastern margin of the main Ethiopian Rift. The largest earthquake ever recorded in Ethiopia had a magnitude of 6-8 Richter's.

Some section of the road especially on the hilly terrain (Meiso-Assebe Teferi and Dengego-Dire Dawa) are found in seismic active part of the country.

4.3 Biological Environment

4.3.1 Land Use

The present land use of the road corridor between Awash - Kulubi - Dire Dawa - Harar is dominated by intensive traditional rainfed subsistence peasant farming and grazing. Major crops in the project area include Sorghum, maize, chat (Catha edulis) and coffee. Figure 4.4 shows the general land use along the road. Next to cultivation, current land use include grazing and browsing by domestic livestock.



FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

AWASH–KULUBI–DIRE DAWA–HARER ROAD

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LAND USE

Figure

Forest coverage comprise very little percentage of the total land of the study area. There are also some eucalyptus trees between Alemaya and Harar. Most households plant trees in adjacent agricultural plots.

4.3.2 Flora

The area along the road between Awash - Kulubi - Dire Dawa - Harar has suffered considerably from over exploitation of forest resources due to human intervention in the area. Increased demand for agricultural land due to population growth, encroachment for grazing, fuelwood and construction practices has significantly affected the original vegetation cover all along this section of the project area. However, areas with steep slopes, gorges and areas that are unsuitable for cultivation are less disturbed and have a higher species diversity.

There are two National Forest Priority Areas Butugi-Melka Jebdu and Jalo Muktar-Metakesha-Add which are located within the project area between Kuni - Asebe Teferi - Kulubi. Podocarpus, Juniperus Procera, Croton, Olea, Schefflera and Hagenia are the main species (see Figure 4.5).

There are plantation forest along the road corridor and thē main species commonly planted under this programme were identified as Eucalyptus and Cupressus. Community plantation and farm forestry in this area contains mainly of Eucalyptus camaldulensis and Eucalyptus globulus.

4.3.3 Fauna

Wildlife population and native wildlife habitat have been significantly impacted by rapid population growth and subsistence agricultural practices in the project area.

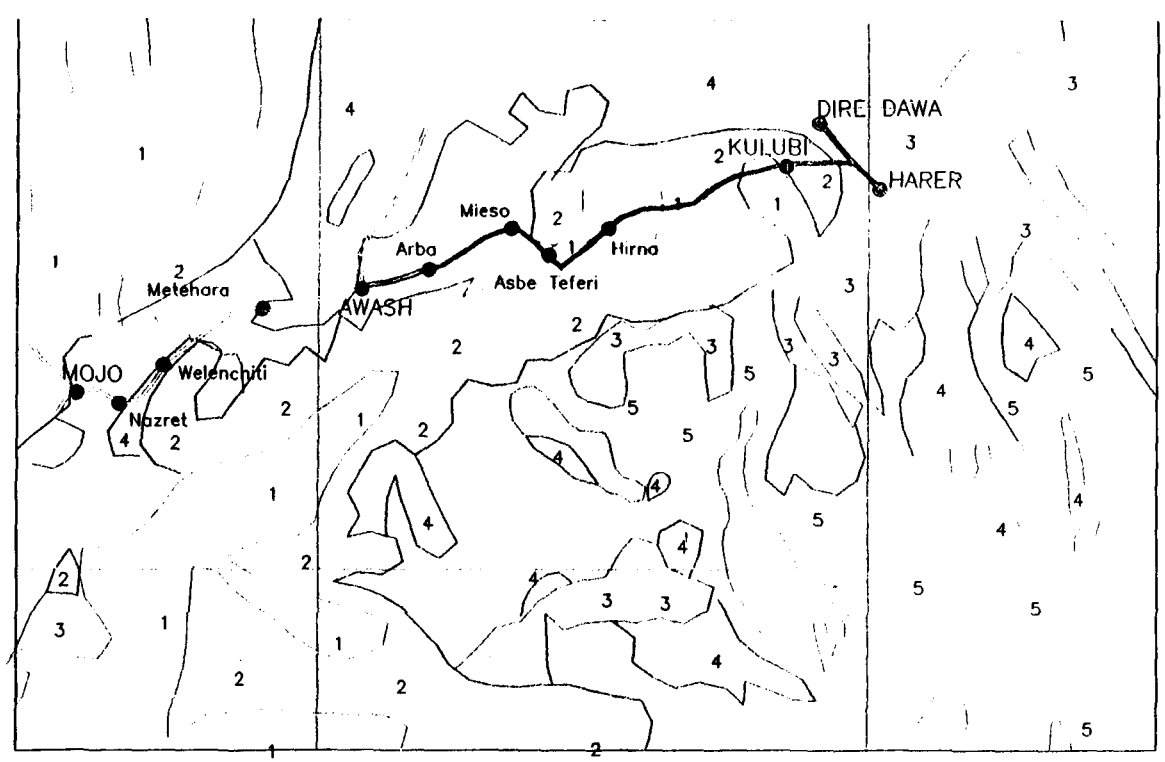
Observation of wildlife making use of habitat along the route and adjacent land indicates that the area is utilized by birds, small mammals but that relic populations of larger mammals are few. Wildlife species are occasionally and accidentally seen in the area.

The discussion indicate that the abundance of wildlife has decreased considerably in recent years, largely due to human activities. In particular, many habitats have been degraded by encroachment into the National Forest Priority Areas.

Lake Alemaya located about 21 km west of the city of Harar and to the north of the project road to Harar is within an Important Bird Area (IBA) known as Alemaya IBA. This is one of 63 IBA sites designated in Ethiopia in 1996 by the Ethiopian Wildlife and Natural History Society in association with the Ethiopian Wildlife and Conservation Organization and Birdlife International - the world's leading authority on the status of the world's birds.

The Alemaya lake and surrounding area supports a conservation-worthy array of birds, including migrant birds.

The construction activity, even if it does not seem to have a marked effect, there will be disturbance of birds. Although the project area is within the IBA, site surveys have revealed that no critical habitats exist within the project area vicinity which will be disturbed during road construction.



LEGEND

AFROALPINE AND SUBAFROALPINE

CONIFEROUS FOREST

1 Juniperst

2 Podocarpus

WOODLAND & SAVANNAH

3 Juniperus

4 Acacia

GRASSLANDS

Chrysopogon Aucheria

Project Road

Other Roads

Towns

FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

MOJO–KULUBI–DIRE DAWA–HARER ROAD

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CLIMATIC CLIMAX VEGETATION MAP

Although four categories of protected areas, namely National Park, Sanctuary, Wildlife Reserves and Controlled Hunting Area, are Known to exist in Ethiopia, the project area accommodates none of these. However, Alledeghi Wildlife reserve and Afdem Gewane controlled hunting areas are located close to the project site and are shown in Figure 4.6. There are also wildlife conservation areas located close to the project road (see Figure 4.7).

The road section between Awash - Kulubi - Dire Dawa- Harar is classified as part of the Eastern Route and the place between Kulubi - Dire Dawa- Harar is a major tourist area of the country (see Figure 4.1).

4.4 Human and Social Environment

4.4.1 Characteristics of the population living by/along the road

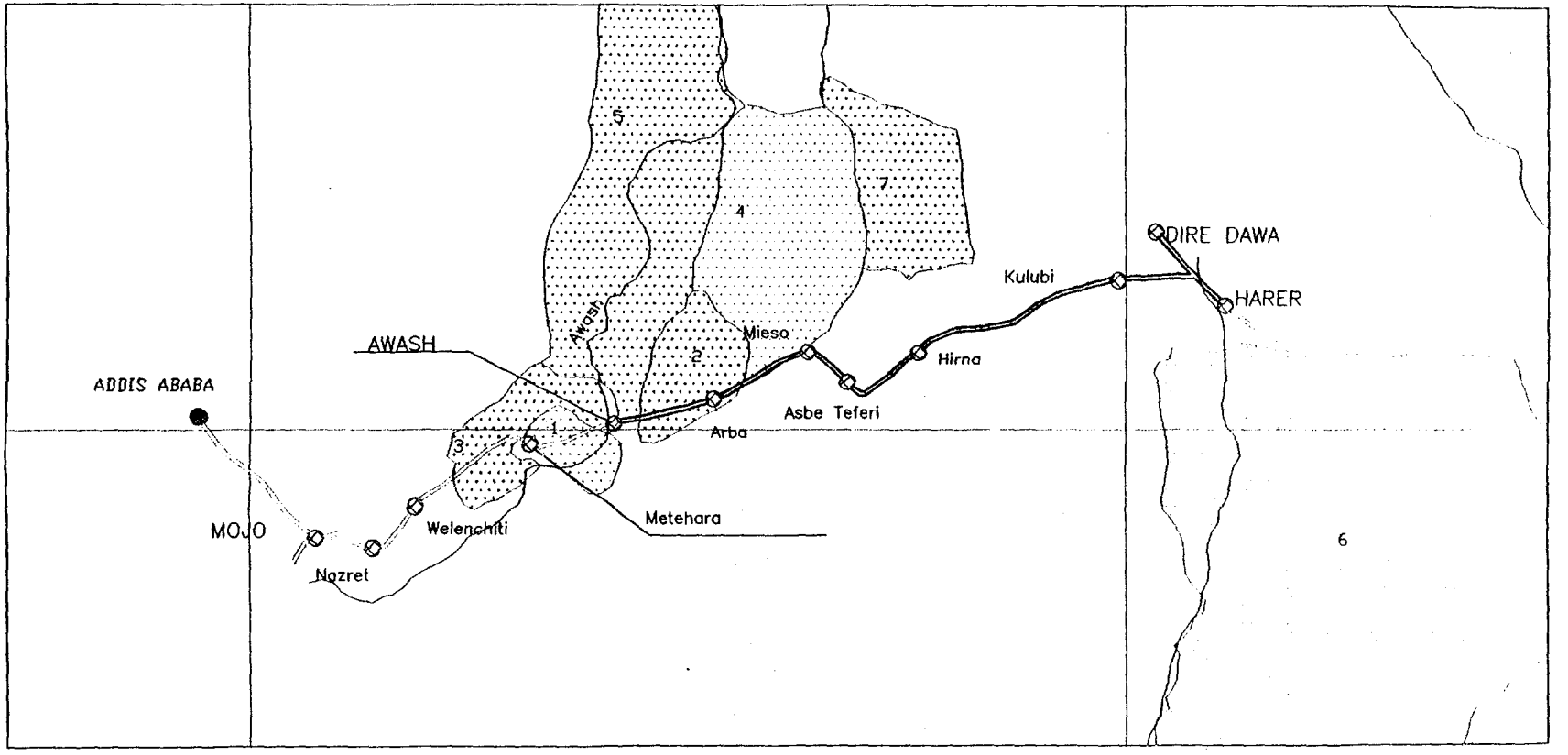
Settlement pattern

The road from Awash to Mieso goes through sparsely populated area. This area is mainly grazing land and inhabited by nomads and semi-nomads. This area belongs to Amibara and Mieso woredas with the population which constitutes 10 percent of the all woreda population along the road. The rate of urbanization is highest in these two woredas; In Amibara woreda half of population and in Mieso woreda one fifth of population are urban. Inside these two woredas the road passes near by Arba Bordore and Asebot towns not entering the town centers. However, the road has a direct impact also on these towns and their economies.

After twelve kilometers after Asebot the road goes through Mieso town where it also crosses the Etho-Djibouti railroad. In Mieso the road turns to the south through Asebe Teferi town which is the biggest town along the road in the survey area and is located between the low and high lands. This part of the road is located in Chiro woreda which is the most populated woreda with the population of 300,000 persons out of which only seven percent are urban. The share between the urban and rural population also shows that road goes through agricultural area.

After Asebe Teferi the agricultured hill area is very densely populated, the next five woredas constituting more than half of the population in the survey area (54%). There are several towns in the hills and often very close to the road and often on the steep slopes. Altogether there are 16 town/village settlements along the road between Mieso and Dangego. After Asebe Teferi the road passes first Kuni town and then goes through Hirna town, both still within the Mirab Hararge Zone, and then the road enters the Misrak Hararge Zone going through Karamile, Kobo, Chelenko, Kulubi and Kersa towns.

After about 8 kilometers from Kersa the road has a junction with the Dire Dawa - Harar road in Dangego. From Dangego to north up to Dire Dawa there are no towns along the road and the whole area is very sparsely populated with only some small farms (mainly chat cultivation) here and there. To the south from Dangego road goes to Haro Maya woreda where 13 percent of the population in the survey area lives. Eleven percent of the woreda population are urban out of which nearly all live in Adele, Alem Maya and Aweday towns. This part of the road goes through densely populated area with some places used, however, only for grazing.



LEGEND

1. Awash National Park
2. Alledeghi Wildlife Reserve
3. Awash West Wildlife Reserve
4. Afdem-Gewane Controlled Hanting Area
5. Awash West Controlled Hunting Area
6. Easter Hararghe Controlled Hunting Area
7. Erer-Gota Controlled Hunting Area

Project Road
Other Roads
River

FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

AWASH–KULUBI–DIRE DAWA–HARER ROAD

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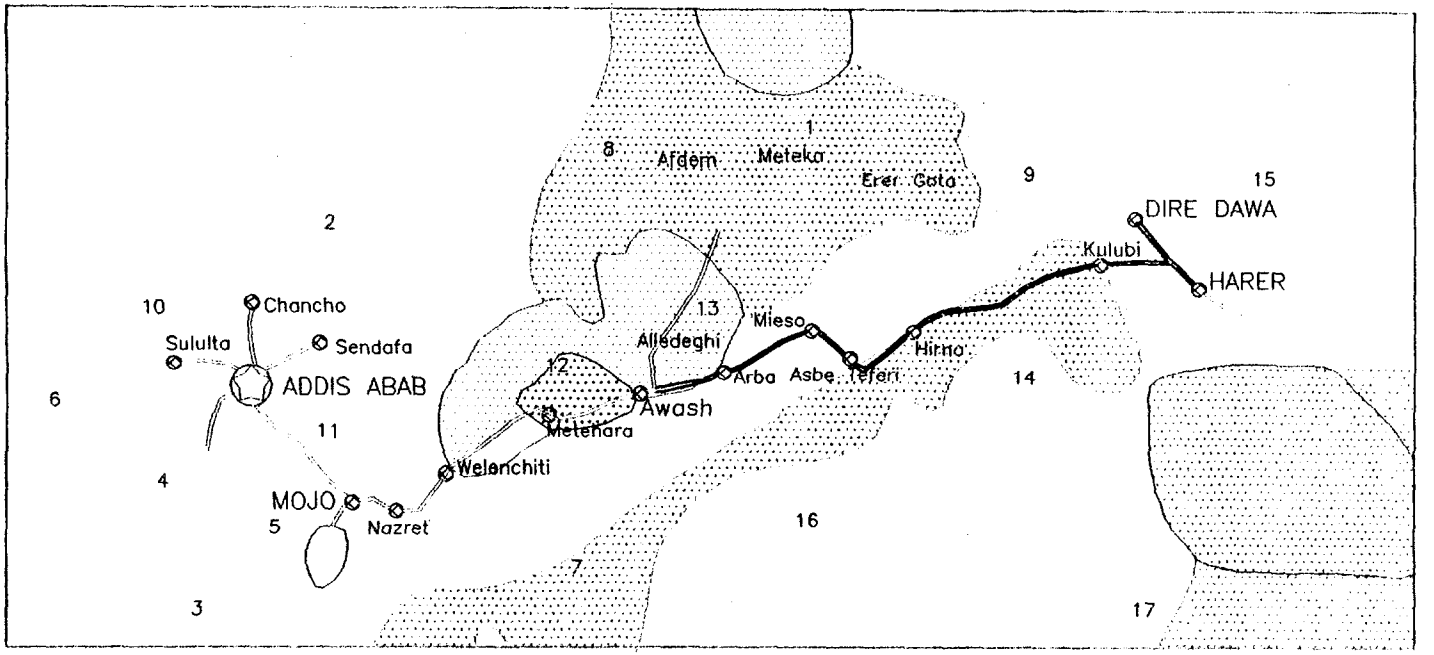
PROTECTED AREAS



LEGEND

1. Speke's Gazelle
2. Warthog
3. Aardvark
4. Klipspringer
5. Gelada Baboon
6. *Mountain Reedbuck*
7. Guenther's Dikdik
8. Defassa Waterbuck
9. Dorcas Gazelle
10. Gerenuk
11. Caracal
12. Oryx
13. Soemmering's Gazelle
14. Mountain Nyala
15. Beira Antelope
16. Grevy's Zebra
17. Menelik's Bushbuck

WILDLIFE SANCTUARIES
WILDLIFE RESERVES
CONTROLLED AREAS
Project Road
Project Road

Capital City
Other TOWNS

FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

AWASH–KULUBI–DIRE DAWA–HARER

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WILDLIFE CONSERVATION AREAS

On the hilly area between Kuni and Dangego the road area is quite narrow especially in the towns and many houses are very near/too near to the road area (reserved for ERA). It seems inevitable that quite many houses must be removed/demolished if the road will be widened/broadened. The road is also very narrow and in Adele and Alem Maya with the houses and shops too near the reserved area.

Size of Population along the road

The present road has the direct impacts on the people living by the road, and especially in the towns where many activities are dependant on the road. The urban population along the road totals to more than 80,000 persons who will be directly affected by the upgrading/rehabilitationproject during the construction period in the towns. The road also serves Harar and Dire Dawa with population of 76,000 and 165,000, respectively, but the impacts are felt indirectly.

The present road and the future construction will affect also people living in the woredas through which the road goes. In these woredas live 1.3 million people (excluding Harar and Dire Dawa).

Urban population within woredas vary. In Mirab and Misrak Hararge urban population constitute 7.5 and 5.4 percent, respectively.

The counted and estimated total population by regions, by zones, by woredas and by towns by sex, and the rate of urbanization by sex are shown in the Table 1 in the Appendix 9.

Sex Ratio

Although the zonal sex ratios are balanced (except in Afar Zone 3) only in Mieso Woreda sex ratio is balanced. All the other woredas have more men than women. The situation is not changing much among the urban population differing in this respect from the other parts of the country where the ratio is in favor of women. Only in the two biggest and fast growing towns in the hills, Asebe Teferi, Hirna, Alem Maya and Adele have more women than men.

Traditionally many (divorced/widow) women move to the towns to find work possibilities there. Many road side activities such as food, lodging and other services to the road users are often run by women. Migration pattern during the last years explains some of the sex ratio.

In every town there are more Amhara women than men, while the opposite is true among the Oromos.

Female headed households

In Afar Region 26 percent of urban households are headed by women; in the rural areas 12 percent. The share of female headed households is bigger in Oromiya Region where 33 percent of urban households are headed by women; in the rural areas 20 percent. There is no information available for the zonal shares. However, the regional urban averages show that in Afar region one quarter and in Oromiya region one third of families are dependant

on women who very often run their activities by/along the road (bars, trading, fuel wood etc.).

Fertility and the population under 15 years of age

Total Fertility Rate (TFR) for Oromiya Region is 4.9 (3.4 urban; 5.1 rural). The TFR for the Mirab Hararge Zone is the same as the regional average but taken only major urban centers it goes down to 2.9 and is further lowered to 2.2 in Asebe Teferi which is the biggest town along the road following the universal trend (fertility rates decrease with the increase of town size). Also in the Misrak Hararge Zone TFR is less than regional average being 3.5 (3.0 urban; 3.6 rural). In Afar Region TFR is for urban areas 3.1 and for rural 3.3

In Afar Region 43 percent of population is under 15 in Zone 3 going down to 38 percent in Amibara woreda and still decreasing to 31 percent in Awash town.

The population under 15 years of age (Table 2 in Appendix 9) for the whole Oromiya Region is 46.6 percent. In Mirab and Misrak Hararge Zones the share is little more being 47 percent in both. Among the woredas only Mieso woreda has higher rate (48%) and in Kersa woreda lower (44%). All other woredas the share varies between 46 and 47.

The urban population under 15 years of age in Mirab and Misrak Hararge Zones 40 and 41 percent, respectively. In Mirab Harage only Asebe Teferi (33%) and Hirna (36%) have lower than average share of persons under 15 years the others are above average. In the Misrak Zone, Chelenko, Kulubi, Kersa and Alem Maya towns have less than average (39, 35, 38 and 39% respectively) while Karamile, Kobo, Adele and Aweday have more (44, 42, 43 and 47% respectively).

Average household size

In the Afar regional State the average household size is 4 persons per urban and 6 persons per rural households.

Average household size in Oromiya Region is 4.5 persons per urban and 4.9 for rural households. The average household size is slightly lower than regional average being in both Mirab and Misrak Hararge 4.3 persons in urban households and 4.8 in rural households in Mirab and 4.7 in Misrak Hararge.

Ethnicity

The road between Awash and Mieso are inhabited mainly by the Oromo, the Afar and the Isa/Somali. Awash is the capital of one of the zones of Afar Region, but mainly habited by the Amara and the Oromo. Only 3 percent of Afars are urban. Many Somalies/Isas are also still semi-nomads but are more prone to settle down and they use the road extensively for trade (charcoal, fuel wood, animals etc.)

The hills have traditionally been inhabited by the Oromo. However, in the towns along the road many other ethnicities can be found as well. The Amara people have settled mainly in the town areas; very few reside in rural areas.

In all woredas along the road the Oromos form a clear majority, which increases towards east. The shares varies from 79 percent in Tulo woreda to 96 percent of population in Kersa and Alem Maya woredas. The Amharas form the second biggest ethnic group having the lowest shares in the first woreda (3% in Mieso) and in the last two (3% in Kersa and Alem Maya woredas). In Tulo woreda the Amhara form 20 percent of total population. In the survey area there are additional 44 other ethnicities, some represented by few persons, some by tens or hundreds. However, in most cases there shares do not reach even one percent of the total woreda population. Only Somalies reach 6 percent in Mieso woreda.

In the urban areas the share of Oromos decreases while the share of Amharas increases. The Oromos still form the biggest urban ethnic groups in other towns except in Asebe Teferi, Hirna and Kulubi, where the share of Amharas are 47, 47 and 49 percent of population, respectively. In towns also the share of Guragies increases being highest with 8 percent share in Asebe Teferi. The Somalies have the highest urban share in Arba Bordode where they form more than one third of town population, and in Mieso Argobas form 6 per cent of town population. (Table 3, Appendix 9).

Religion

The survey area is predominantly Muslim area. In Mirab Hararge the woreda populations along the road are mainly Muslims. Only in Tulo woreda their share goes down to 77 percent and in Chiro to 82 percent of total population. In Mieso the share of Muslims go up to 95 percent and stays over 90 percent in the Misrak Hararge where more than 90 percent of the population are Muslims. Although religion and ethnicity do not coincide with each other, most Oromoes (especially in rural areas) and all Afars and Somalis are Muslims in this area. Most Amharas are Orthodox Christians. Although the share of Muslims increase when going to east, in the first part of the road (in Mieso) the share of Muslims is high due to Somalis in this area. After that part Somalis are few in the hills.

In the area there are also Protestants and Catholics, but also followers of traditional religions. However, the shares of the other creeds are so small that they together form usually less than one percent of the total population.

In rural areas nearly all are Muslims, while the share of Muslims goes down in every town in the survey area and the share of Orthodox people is increasing considerably mainly due to the concentration of Amharas in the towns. The share of Orthodox Christians is bigger than that of Muslims in Asebe Teferi, Kuni, Hirna, Karamile and Kulubi. In Kuni the share of Orthodox go as high as to 70 percent of population. (Table 4, Appendix 9).

Literacy rate

Literacy rate for the Mirab Hararge is in urban areas for male 68 and for women 52 and for Misrak Hararge 63 for men and 45 for women. The literacy rate varies among the woredas from 26 percent in Tulo to 13 percent in Meta. Men are more literate than women. Women's literacy rate increases with the size of town, the highest rates for women can be found in Asebe Tefari (69%) and in Hirna (62%) and the lowest rates for women in Arba Bordode (23%) and Aweday (30%). The highest rates for men are in Hirna (81%) and Asebe Teferi (80%) and the lowest in Arba Bordode (44%) and Aweday (47%) (Table 5, Appendix 9).

With the creation of the National Oromiya Regional State, also the status of Oromigna has changed. It is thought to all children attending school. The Oromigna was changed to be written with Latin letters instead of using Amharic scripture. With this change many people earlier counted during the 1994 Census as literate are no more able to read Oromigna. Also the road signs and many other signs along the road when written with Latin letters are not yet understandable to most Oromos, less so to people using Amarigna or other national languages.

The traffic signs are however, mostly symbols with no written message.

Migration

About one third of migrants settle down in urban areas in Hararge Zones. Nearly half had their previous residence also in urban areas while 58-55 percent comes from rural areas. Migration pattern in Mirab and Misrak Hararge Zones

	Mirab Hararge	Misrak Hararge
Rural-rural	55	61
Rural-urban	22	17
Urban-urban	16	14
Urban-rural	10	8

Although in absolute numbers more people move inside rural areas the growth of towns is based very much on migration. In Oromiya Region 44 percent of total urban population are migrants (10.5% in rural areas). The share of migrants is smaller than regional average in both Mirab and Misrak Hararge being 38 and 29 percent, respectively.

The share of migrants in the towns such as Arba, Mieso and Asebe Teferi migrants' share of all population is 43, 40, and 41 percent, respectively. The least shares are in Asebot (26%) and in Kuni (29%) in Mirab Zone. However, the share of migrants is considerably higher in the towns such as in Karamile (42%), Kobo (48%) and Kersa (36%) which all are in Misrak Zone.

In the Oromiya Region in-migrants to the towns in 1993 formed 3.8 percent of all population (total 0.8; rural 0.4). The in-migration to the towns along this road during that period were clearly smaller than regional average falling between 0.4 and 2.6 except in Asebe Teferi and Karamile where the share was 4.5 percent in both. These two towns are growing faster than regional average.

Of the total town population the migrants which arrived between 1991-1994 form around 15 percent of population in Arba, Mieso, Asebe Teferi, Kuni and Hirna showing the regional average. Only in Karamile and Kobo migrants formed more than 20 percent.

Most towns, and especially Asebe Teferi, Karamile and Kobo are growing rapidly due to the migration, while Kuni, Kersa and Alem Maya have received less migration during the same period.

There has been also a change in the migration pattern by sex. Women's share among the in-migrants during the 80s was bigger than men's especially to Mieso, Arba, Hirna, Asebe Teferi, Alem Maya, Kersa and Chelenko. Since the share of migrant men has during the

last years increased also the sex ratio has been balanced in many towns. However, still in 1993 more women than men moved to Mieso (55%), Asebot (61%), Hirna (59%), Chelenko (57%) and to Karamile (65%).

Growth of the towns along the road

Despite a decreasing trend of TFR, the fertility rates are still quite big and taken into consideration also the fact that nearly half of the population is under 15 years of age, the natural population growth will be considerable also in the future. Especially migration will contribute more to the urban growth rate in most towns. Despite dominating rural-rural migration pattern the shortage of agricultural lands will continuously push people to the towns by road. Especially big towns will grow very rapidly. However, the road is not the primary reason for the urban growth rate. Good road and good transportation possibilities will, however, benefit the growing towns and their economies.

4.4.2 Housing situation

Most houses in the towns are of permanent nature. In Karamile and Kulubi all houses are classified as permanent while in Mieso and Alem Maya 95 percent are classified as such and the rest of the towns are between 95 and 99. Most houses also in the towns are built from traditional materials, from wood and plastered with mud/dung/teff straw mixture.

The roofs in the towns are mainly corrugated iron sheets, and hence the houses are also rectangular (traditional houses being round). The floors are mainly mud floors, nearly all in Arba Bordode, Adele and Kobo (92,93,92 percent, respectively). Only in the biggest towns the floors are made from cement/concrete or wood, being in Asebe Teferi nearly half (mud floors constituting only in 54%) and in Hirna (mud floors 64%).

Housing units and households

There are less housing units than households in the whole area and in every town. The average number of persons per housing units is between 4 and 5 persons. This means that if/when houses must be demolished due to the widening of the road - in nearly every town in the hills but also between Dangego and Harar - the number of households affected will be bigger than housing units. The following figures show the present situation in the towns along the road. The housing units from Awash are left out because the road is not affecting the settlement (Table 6, Appendix 9).

Bathing facilities

Any type of bathing facilities can be found only in less than ten percent of the housing units except in Hirna, Chelenko and Aweday towns (13, 21 and 29 percents, respectively).
Availability of toilet. In the rural areas toilet facilities are negligible. In the towns in Mirab Hararge a little over (52%) and in the Misrak Hararge Zone nearly half (47%) of housing units have toilet facilities. Only in the biggest towns the toilets are common (Asebe Teferi 75% and Hirna 65%)

Electricity for lighting

Electricity through own private or shared meter is available in the towns along the road. The use of electricity for lighting varies considerable. The lowest share of four percent is found in Karamile and the highest share of 97 percent in Kulubi town. The biggest towns, Asebe Teferi, Hirna, Alem Maya and Asebot 89, 85, 92 and 60 percent of households use electricity for lighting.

In some places there are some street lights and/or shops and bars are required to have lights during the nights. The increased used of street lighting especially in the towns makes also the movements on the road safer. The high price of electricity is, however, discouraging fact even in their present use.

Availability of TV, radio and telephone

In the urban Mirab and Misrak Hararge Zones TV sets are available in 1.8 percent and 3.6 percent of housing units. In the towns along the road there at least some housing units with TV sets. In first part of the road only in Asebe Teferi and Hirna have the share reaches 3 and 4 percent. The availability of TV sets is bigger in the latter part of the road: In Kobo ten present of housing units has a set, In Alem Maya and Aweday six percent in both and In Kulubi four.

Radio sets are available in 18 percent of all households and 45 percent of urban households in the Mirab Hararge Zone and in 24 percent of all households and 53 percent of urban in the Misrak Hararge Zone. The availability increases towards the east from 11 percent in Mieso woreda to 40 percent in Haro Maya woreda. In Asebe Teferi, Hirna and Kuni in Mirab and in all the towns after that more than half of the households own a radio set.

Every town has also telephone connections, in the Mirab Hararge 4.4 and Misrak 0.3 percent of households have telephone connections. These connections are most common In Hirna, Asebe Teferi and Kobo where every ninth housing unit has a telephone.

Every Monday morning there is a half an hour long radio program about traffic and traffic safety. The program is prepared by Ministry of Information and Culture in collaboration with the Road Transport Authority. The program was earlier transmitted between 6.30 - 7.00 but now it is sent between 8.00 and 9.00. Due to the change of transmission time many people are unable to listen it, because people are already working at that time in the offices or children attending school etc. The earlier time reached more people. However, more than a half of housing units in most towns and quite a considerable number of rural people are potential listeners in the survey area.

Very few people have the access on TV sets which could be also used for traffic education and information about traffic behavior. Now there are no programs concerned about traffic problems/ education/ behavior.

Both radio and TV programs can and should be used more for traffic safety issues, especially when taken into consideration the fact that Ethiopia has one of the worst accident records in the world.

Type of fuel used for cooking.

From the environmental point of view the type of fuel used for cooking by the households is important to know. The absence of trees and forests is one fact worsening also the road side erosion in many places in the country. This is true also along this road. The road is urging more people to move to its vicinity and the trees are decreasing due to the growing settlements. Although the local people do use the trees, they complained that especially previous ERA camps were previously destroying vast areas for need of fuel. (Also according to the people also wild animals were in danger to be eaten.)

The use of fuel wood is by far the most used fuel also in the towns (Table 7, Appendix 9). The wood is carried and transported daily to the markets in towns. The fuel wood is the cheapest fuel and preferred in the preparation of injera needs wood for the even fire. Electric metads do the same but the use of electricity is negligible. Slightly over hundred households (all in Asebe Teferi, Hirna and Asebot) use electricity alone or with other fuels for cooking in the survey area.

The sources of wood might be kilometers from the towns and even longer distances for the charcoal which is preferred by the urban people. From one fifth to one third of households use also charcoal, which is used for preparing food (*wat*) or tea or coffee often in the evenings when also the house will be warmed up. Most of the charcoal is produced and sold illegally, and the trade happens often on the road (outside the towns) due to this reason.

Kerosine is used in the towns but only in Asebe Teferi and Aweday one quarter of households use it; in Alem Maya one fifth. The increased use of electricity and kerosine could substitute the fuel wood, but in practice also the share of fire wood increases with the use of 'modern' fuels.
However, there is a clear concern and awareness about the shortage of trees in the survey area
and people were especially concerned, that trees should be saved - and even planted - by the contractor during the construction period. Planting of trees would stabilize soil and hinder erosion.

Water sources of the households

In the towns most people use tap water, most often from the shared tap outside their own compound. There is no information, however, how safe the tap water is. For example, in Awash the piped water is not treated at all but pumped as such from the Awash River. In the Rift Valley in Arba Bordode nearly all use protected wells (boreholes). Rivers, lakes and ponds are used by less than 5 percent of people, except in Karamile where the share is ten percent. Unprotected wells and springs are not used very much either.

Not only the road construction but also construction camps need lots of water. Depending on the construction sites and availability of (near) water, there might be a need for more boreholds along the road. In this case, and especially locating the construction camps, the place of boreholes should be decided so that it will benefit local people in the future.

Other water harvesting and drainage

The drainage problems were complained all over by the people. Often the problems were seen to be caused by the road construction.

There might be also a possibility to combine quarry sites and drainage system in a way that the water could be harvested to the used quarries to be used by animals.

Ownership and tenure of housing and the cost of houses

In the Oromiya Region as a whole about half of the population own the houses where they live and slightly over half of households in the Misrak Hararge Zone do so. The towns differ greatly in this matter and the highest ownerships can be find in Arba Bordode (76%), Kulubi (74%), Adele (76%) and Aweday (79%) towns. The lowest private ownerships are found in Karamile (24%), Hirna (27%), Asebe Teferi (28%) and Kersa (34%).

In many towns the share of households renting their dwellings from the kebele is considerable. In Hirna and Karamile towns 48 percent and in Alem Maya 44 percent of the households have rented their dwellings from the kebele. The respective percentages for Asebe Teferi, Chelenko and Asebot towns are 37, 35 and 31 percent.

The share of rented houses from the private sources are highest in Asebe Teferi (22%) and Hirna (16%) Many households, if they afford, build extra houses by the road to be rented to other households. The rents by the road side are also higher, often due to the double service of a house; it is used for a business purposes (shops, bars etc) and as a residence for a family/household.

The average monthly rents vary considerably in the survey area. In general the highest rents are in the towns with high ownership rate and small availability of kebele dwellings. The highest rents are in Adele town with the average monthly rent of 40 Birr and in Arba Bordode with 25 Birr. In Asebe Teferi the rents are also high despite the 37 percent kebele share. This is the biggest town in the survey area and receiving many migrants. (Table 8 in the Appendix 9 show the average monthly rents, dwelling rented from a kebele and private sources and the share of owner occupied dwellings)

Cost of houses

The construction costs of the houses vary a lot depending on the construction places. In the rural areas the houses are usually made out of (eucalyptus) wood poles covered with mud, cow dung and teff-straw mixture, which, if well done, will last for years. The costs depend on the available local resources, ownership of trees and cows etc. The work is very often done by the owner himself. (Women do not construct houses.) However, the rural farmhouses will not be affected by the proposed project.

The costs of the houses in the towns vary as well. Most houses also in the town are wood and mud houses and the costs are approximately 800 Birr per square meter without any considerable transportation costs. However, in many places the wood poles must be transported to the construction site and transportation may add the cost of a house about ten percent.

In the towns along the road there are also some brick houses and their approximate square meter price is 1,500 Birr including the labor used for construction. The transportation costs of cement from Addis add about 30 percent to the cost of the ready house. (The cement factory in Dire Dawa has some trouble in their production.)

The construction of the hollow block houses is increasing especially in bigger towns. Hollow blocks are also produced locally in many places due to simple production methods which do not include very high investment capital. The cost of the square meter is around 1,200 Birr plus transportation costs of cement adding 30 percent to the cost of the ready house.

Displacement of houses

Since the geometric design for the road is not ready and hence no detailed designs of the need to remove/demolish the houses are available to the consultants, the number of buildings to be removed are not known. However it seems obvious that many houses/shops/bars, especially in the hill area in the towns and between Dangego and Harar must be removed due to the construction. Most of these houses are within the Right of Way of ERA or 'illegally' built. The ERA will compensate only the houses outside this area. In case the houses will be compensated, the owner of the house, be it kebele or private household, will be compensated. The tenants have no claim to any compensation.

Besides the compensation issues also the question about the resettlement will arise. There are no laws in Ethiopia about resettlement, although traditionally the communities have taken this responsibility. The hills are densely populated and any extra land will be difficult to find in this area. The Era coordinated compensation committee usually also try to find solution for resettlement. However, the resettlement issue should be addressed also in policy level in this country. However, the construction works should be designed as to avoid or minimize the displacement of people. For that purpose the careful consideration into this question must be done before construction.

4.4.3 Local economic activities by the road

The different regions/areas along the road differ from each others by their physical and climatic features and hence also economically. The first part of the road from Awash to Mieso goes along the hot and arid Rift Valley where lands are used mainly as pasture lands, only few fields can be seen here and there. The seasonal movements of the cattle and crossings of the road for animals to be taken to the water sources for drinking are typical to this area. The cattle is also sold to the national markets, and transported to towns mainly by train from Mieso. After Asebe Teferi the road climbs to the higher altitude where lands are fertile and intensively cultivated. Between Dangego and Dire Dawa lands are badly eroded. Some steep slopes are terraced and small chat and millet fields can be found here. Where possible some slopes are used as pasture lands, however, most are too steep even for grazing. Between Dangego and Harar on the other hand the lands are fertile and cultured.

Agriculture. The main crops grown in the hills are sorghum, millet, maize, and teff. The whole area is also an important source for agricultural export earnings. Especially coffee is grown in this area for export. Also chat (Chatha edulis) is increasingly grown in the area also as a cash crop. The best chat is said to come from Aweday. In the whole area mainly

women take chat to the road sides where it is collected for further transportation. Chat is transported to other parts of the country, where the first daily loads of fresh chat gives good profits. The drivers from this part of the road are competing to reach first towns such as Jijiga due to the better price for the first truck to arrive. This type of the sport causes, however, many accidents on the roads. Chat is also increasingly exported. The fresh chat is the main export item but also dried chat to be vaporized later is increasingly finding its way out of the country. (The export prospects are, however, quite limited to the western countries where chat is regarded as an illegal drug. Saudi Arabia does not allow imports either. The dried chat is mainly contraband trade.)

Animal husbandry. In the Rift Valley part of the road animal husbandry is mainly in the form of semi-nomadism. The animals are sold also by the road side but mainly they are taken by the trains from Mieso to the cities, to Addis and Dire Dawa.

In the hills, agriculture and animal husbandry support each other due to the mixed farming system. Due to the shortage of agricultural land, but also due to its intensive use, the pasture lands are scarce and cattle is stall-fed and moving on the road only when taken to the markets etc. During the nights animals are commonly kept inside the houses where people sleep. (In Mirab and Misrak Hararge Zone 73 percent and 79 percent of households, respectively. Only in Haro Maya and Kersa woredas the share is lower than zonal averages, in all other woredas along the road the share is higher being highest in Goro Gutu with 86 percent.)

Between Dangego and Harar the area is partly flooded during the rainy season or/and marshland and not suitable to agriculture. These areas are mainly used as pasture lands.

Service Sector. There are numerous permanent road side shops, bars and hotels in the settlements serving local and transitory traffic. The road is used to the weekly markets which are often by the road. Many people come also to the road side from their places of residence to sell and trade whatever they have. Charcoal, fuel wood, fruit, chat, handicrafts etc.
Most of the bars and hotels are run by the women, often themselves the only supporters of the dependant family. Service sector especially in small towns is more dependant on the transitory traffic than in bigger ones where also the locals are more served.

Industry. The big and small industrial enterprises are using the road to transport their raw materials and ready products. The biggest industry in the area includes a cement factory, a pasta and a biscuits factory, a Coca Cola factory, a flour mill and textile factories in Dire Dawa. In Harar there are a mineral water factory and a brewery. Not only is Harar beer transported to the other parts of the country, but nearly all of its raw material is also transported from somewhere else to Harar. Especially in Dire Dawa and Harar but also in other towns there are numerous small (industrial) enterprises, garages and workshops

Economical activity and unemployment

Economical activity rates are high in the rural areas among the people engaged in agriculture. More than half of economically active persons are unpaid family workers, most of them women.

In the towns only about one third of women are counted as economically active. This is due to the fact that reproductive work, mainly done by women, is not counted to be 'economically active' but also due to the higher unemployment rates for women.

The figures in the Table 9 in the Appendix 9 show the urban and rural economic activity and unemployment rates of population aged ten years or over for the Mirab and Misrak Hararge Zones

Although women are engaged in all type of work they are especially active in hotels, bars and restaurants. (Appendix .. shows the economic activities by major industrial division by sex.) These activities are often located by the roadside serving the transitory traffic. The project is anticipated to increase the volume of the traffic which would benefit these activities. Also the quality of services are felt to be better after the project due to the future absence of dust.

Unemployment rates in the whole Oromiya Region are for men 14.49 and for women 16.75. In the urban areas of the Mirab Hararge Zone it is a little less being 12.08 for men and 15.92 for women. In the Misrak Hararge Zone unemployment rate for men is 14.57 and for women 21.31. However, in towns along the road the rates are considerably higher, especially for women.

Highest unemployment rate can be found in Asebot where 33 percent of men and 56 percent of women are reported as unemployed. In Asebe Teferi and Hirna and Alem Maya the rates are for men 16, 11 and 12 percent and for women 22, 16, and 15 percent. In Karamile, Kobo and Aweday one quarter of men are unemployed. (Table 10, Appendix 9)

Due to a high unemployment in the towns it will not be difficult to find daily labour for the construction work. People also expressed their wish for the project to start soon and provide employment to the local people. The local administration would like to have a say, who should be employed due to the high unemployment rates.

4.4.4 Social acceptability of the project

Social acceptabilty of the project to rehabilitate/ upgrade the present road is very high. All people and organizations interviewed and the participants in the Dire Dawa public consultation gave a clear acceptance to the project. The only concerns are related to the construction period. Especially business communities are worried about the detours which might by-pass their present business. However, the pavement was seen as an improvement and benefit the business on the long run.

Both the people living by the road and those using the road for transportation/ transitory traffic see the road be vital and beneficial to their communities, local business and national economy. The project and the pavement is anticipated to increase the benefits. The project would free the people from the biggest problem, dust, caused by the present gravel road.

Benefits for the local residents

Although the road is mainly constructed to connect/link the far away places for transportation of goods and people, most road users are pedestrians who use the road very locally. For them the access on many local facilities and services is more important than

long distance mobility. Road is extensively used for local social and economic activities as well as local transportation needs, very often by traditional means.

The road gives better access on health and education facilities and other services and to the administrative centers. The buildings for these institutions are usually by the road due to the accessability by motor vehicles.

The better road helps especially women because they are the main local users of the road. They take care of many social tasks (such as sickness in their own family or death occurrence in some other) also during the times and better road is seen to be also safer road. Many women move to the relatives or familiar families who live by the road for better and quicker access to the clinics for delivery. The school attendance by girls is also bigger in towns and by the road and better road is anticipated to increase enrollment.

The road is important to the local economic activities. The road makes commercial activities possible/profitable for the permanent shops and bars and creating the road side trade and markets. Many people come from the far away villages to the towns and market places or simply to the road side to sell/barter whatever they have. Charcoal, fuel wood, animals, grain, vegetables, chat or whatever people have to sell.

One of the justifications to rehabilitate/upgrade the road is the assumption that the agricultural production would increase due to the better marketing outlets. Already now the road is important for agricultural inputs such as fertilizers, pesticides etc. and outputs for transporting the farm products such as grain, coffee, chat etc. to the other areas.

Road is also "opening the people's eyes" making traveling possible but also due to its role as as an important information channel.

Benefits for the transitory traffic The acceptance of the present road itself by those who use it for transitory traffic and/or for long distance transportation is natural, and the plan to pave the road was very much welcomed. (People are eager to see the road asphalted, since there have been news about pavement for years.) In the public consultation, however, especially the business community expressed their concern about the use of the road during the construction/pavement period. The transportation of any fresh products, and especially that of chat, would not tolerate the delays on the road because it must be watered at certain intervals to keep its quality. However, the pavement was seen as an improvement and be beneficial for business on the long run.

Problems with the present road were many and expressed by many people. However, the benefits of the road are seen greatly exceed the problems the road bring with. After pavement the road is anticipated only to increase benefits.

The most complaints were related mainly to the traffic accidents: loss of human and animal life. The missing traffic signs, over speed etc were mentioned. Dust, however, is explained to be one of the biggest causes for traffic accidents especially in the rural towns where it from time to time totally block the visibility for drivers and pedestrians alike. Also traffic passing each other raise the dust so, that the visibility will be blocked and the driving will not be safe. According to the Traffic Police in Asebe Teferi and Hirna due to the bad condition of the road and due to dust people get killed. Also the over speed by drivers is seen as a cause for accidents.

The accidents, although regrettable such as loss of human life, are seen as 'inevitable' and 'natural' also among the local people. Also the loss of land was seen as minor problem compared to the benefits of the road.

Besides its role in accidents dust is one of the most persistent and largely felt and complained problem on the road. This problem was expressed by the road side communities as well as by the participants in the Public Consultation. All people living by the road suffer from the dust which ascend to food and make washed clothes dirty "even before they get dry". In Asebe Teferi, the town people have gone to the extent to slow down the speed of transitory traffic by digging trenches on the road.

The bad condition of the road is also causing extra costs for the vehicle owners since vehicles deteriorate and/or get broken too quickly and too often. During the rainy season the road surface gets very slippery in certain places making not only transportation very dangerous but also the driver's life is at the risk. The drivers have also been attacked by Shiftas when their vehicles are broken "in the middle of nowhere".

Many people remarked that the road was designed and built for totally different traffic needs. Now the road is used by bigger and heavier trucks, and the fleet of vehicles is considerably bigger. Especially fuel truck have problems with the present road. There are no systems to clean the environment if the fuel/oil is running to the soil.

The accidents and breakages of vehicles are causing delays in the transportation of goods. Products from this region are mainly export products but due to the transportation problems they are not exported at all or on time. Also the farmers of the area complain that the agricultural inputs such as fertilizers are not coming on time. With the quicker/ safer/ reliable transportation it would be possible, for example, to export fruits and vegetables to Djibouti which now imports these fresh items from South America.

Asebe Teferi and upland country is a vulnerable area for soil erosion due to its natural features and rainfall. Primary and secondary ditches by the road side have become major sources for soil erosion on the hilly part of the road. Flooding and bad drainage during the rainy season is a problem between Dangego and Harar, especially in Alem Maya and Adele.

ERA was complained not to rehabilitate lands which have been used as quarry sites. Open quarries are complained to be new breeding places for malaria mosquitoes and other insects. The construction camps were blamed to have been a major cause for destruction of natural resources such as forests, wild animals etc. "People should see the resources as their own."

4.4.5 Construction camps

Construction camps are one of the characteristic features of any road construction project. Although not yet present on this road, but once established, the camps will have several impacts on the surrounding environment of the camps. Many of the previous camps have with time developed into real towns.

Earlier the camps were simply called 'ERA camps', most construction work done particularly for the last two decades by ERA. According to the FDRE's policy, the

construction work is mainly done by private contractors and is open also to foreign tenders. However, no big changes are to hexpected in the camp practice; new construction camps follow more or less the previous ERA camp models and practices. Changes may be expected in the (decreased) number of workers residing in the camps.

The camps are situated usually outside the towns and often (sometimes kilometers) away from the existing roads. Although ERA has the right to occupy any site for road construction sites (suitability of place, rents etc) are discussed and agreed together with the local administration.

The first persons to arrive to the site are carpenters, masons etc. who start the construction of the camp. They first stay on perdiem basis in the towns near the camp site. When the offices, residences, ware houses, main workshops, kitchen and mess-hall and all other required buildings are ready, the construction labour move in.

There are normally 150-250 people residing in the main camp. All of them are professional and skilled workers and move from outside to the camp. The personnel include technical as well as clerical staff. The camps themselves turn out to be like small towns which are headed by a Camp Administrator. The rules and habits in the camp are mainly to keep discipline and order. For example, no alcohol is allowed in the camps. Neither are the families of the workers allowed to stay overnight in the camps.

It is also more economical way to lodge all the workers in one place than have dispersed lodging in the surrounding area. The kitchen serves all staff at the fixed times. Most food items such as meat, grain, vegetables, etc. is bought from local markets to the camp kitchen. Sometimes bigger quantities of items either not locally available or due to the increased local prices, are bought and transported with trucks from the nearby bigger towns. Fire wood is sometimes bought from the construction site if the site is situated in bushy land or it is bought from local markets.

The fact that all workers live in the camp makes it also easy to transport them to the construction sites in time and back to the camp. The workers usually stay in the camp one month and every fourth week-end they are taken to the town for *asbesa*/shopping week-end. The local economies benefit from these visits, but social and personal conflicts are also common.

Although the camp administration does not allow temporary huts and houses to come too close to the camp to avoid looting or other misbehavior, drinking houses and small markets sprout up selling whatever is wanted by the construction workers.

Because of the increased demand on goods and services many people settle down near the camp to do their business. Many of them are without any farmlands and some of them stay even after the camp is demobilized.

The camps have also impacts on the physical environment. The increased need for fire wood and charcoal rises also local prices and more trees are cut down to be sold and even more wood is wasted to produce charcoal with inefficient local methods. The supply area might be considerable especially along this road because of absence of real forests. Not only the camp workers but also other people residing near need fuel wood and other

sources. The inflation of prices do temporarily benefit business people while at the same time the poorer sections of the communities will suffer even more.

The people who settle down are also putting some pressure to the local public services. The drinking water situation might be difficult in some places, and the boreholes are needed to construction camps. The location of boreholes should be such that they can later benefit the local people.

Although the camps have their own health units for minor health hazards, the more serious cases or cases not belonging to the camp sanitarians, the workers and migrants put also pressure to the local health services.

These impacts are directly felt only so long as the camp exist. The main camp will stay for one or two years at the same place, while the 'advance camps' will be established maybe after 60-100 kilometers away. Sometimes there are also smaller 'satellite camps' if needed.

The contractor is responsible to see that the living conditions for the camp residents are kept satisfactory. "Labor Proclamation No. 42/1993" covers the conditions of work including aspects such as hours of work, wage, leave, payment due to dismissal, workers health and safety, compensation to victims of employment injury, dismissal because of redundancy, grievance procedures and any other similar matters. It states also that worker or employer shall have the right to establish and form trade unions or employers' associations.

Earlier it was ERA that supervised the conditions in the camps (or in construction), now it will be left mainly to the consultants.

Use of local and foreign labor

The Ministry of Labor and Social Affairs is empowered to ensure that local labor is hired in accordance with the law. The local labor consists about 300-400 workers. Only men were hired earlier for the work, nowadays also women take part also on road construction work.

Since the trunk road construction will be open to the international tender, some foreigners may enter the construction work. In this case the Ministry of Labor issues work permits for foreign workers upon the request by the contracting authority.

Wages and salaries

The level of wages paid by public and private construction enterprises differ significantly. However, the contractor upgrading/rehabilitating the road is required to pay at least the minimum wage to unskilled workers. If the employer is not doing that the workers can complain about this or from other shortcomings to trade unions. For example, unskilled laborers' wage levels vary a lot depending on the locality etc. The wages for unskilled labor vary between 1.3 to 2.5 and for skilled workers between 8.30 to 20.80 Birr (information based on construction companies as given in EC Standard Part by WAAS)

The permanent workers are legally entitled to paid leave: (i) annual leave not less than fourteen working days during the fist year and added annually by one day. (ii) thirteen days

for public holidays annually, (iii) for the family reasons such as marriage or death paid leave for three days (possibility for unpaid leave during serious other events), (iv) sick leave not exceeding six months, (v) maternity leave is granted for a period of thirty days preceding the presumed date of confinement and sixty days after it.

Benefits in kind include accommodation, food transport and expenses related to transfer. These benefits are not considered as wages, according to the labor proclamation. Details of benefits are normally specified in collective agreements.

5. POTENTIAL ENVIRONMENTAL IMPACTS

The construction and operation of the Awash-Kulubi-Dire Dawa-Harar road project intended with positive impacts on regional as well as national economy may also bring avoidable as well as unavoidable adverse impacts on the environment as well. However some of the adverse effects, associated with the construction of the project, will be short-term and reversible nature and stem from ground disturbance, operation of equipment's and housing of the labor force, but very few that will lead to permanent change

5.1 Physical Environment

5.1.1 Soil and Erosion

The major adverse impacts during construction stages are erosion, instability of slopes, material use, change in surface water hydrology and quality and sedimentation/siltation.

Erosion

Road side ditches which are constructed to divert surface drainage water to the adjacent lands are major contributors to soil erosion. Erosion will most probably be enhanced due to the following activities especially on hilly terrain:

- Cuts in soil and rock and construction of embankment (widening of the road).
- Borrow pits and quarries if they are located along a river bank.
- Excavation of foundation for replacement and/or additional drainage's bridges and culverts.
- Not compacted embankment and spoiled material disposal sites.

Discussing with the designer of the road it was found out that:

- Additional culverts shall be added to decrease flows where erosion (scouring) of culverts are high (hilly terrain and volcanic rocks).
- The principle of no scour and no silting design approach shall be adopted in the design of side ditches.
- Energy dissipater at bridges and culverts shall be maintained and shall be provided where it is necessary.

Therefore, upgrading and/or rehabilitation of the road shall decrease the erosion rate along the road compared to the existing road condition. Implying that upgrading and/or rehabilitation of the road has a positive impact on erosion.

Slope stability

Clearing and grabbing by earth equipment destabilise slopes of the road section especially on hilly terrain.

Blasting of rocks for widening and quarries shall destabilise the steep slopes of the area.

The section of the road on hilly terrain and volcanic geological formation is relatively unstable section of the road (Mieso-Asebe Teferi, around Hirna, Border, Karamile etc.). The vegetation cover is dense and have increased the slope stability of the road along the hill cuts.

Soil contamination by spills of hazardous material

Pollution of hazards which may occur if oily products from engines are spilled along the road sides and at compounds or due to improper disposal of used oils and lubricants. During construction the traffic will increase and accident may increase with accidental spill of oils and fuels along the road.

Upgrading and/or rehabilitation of the road will increase the traffic on the road. Hence also accidents may increase with accidental spills of oil and fuel along the road.

5.1.2 Hydrological conditions and water quality

Water resources and water quality

Along the road perennial rivers which can be used during construction are few and far apart (Awash, Medbedu, etc.). There are small springs and streams with small discharges during the dry period of the year and used by the local people for water supply and irrigation. Using these streams and springs will completely deplete them and there may be no flow downstream.
The principal effects of the construction work will be to increase sediment loading temporarily to the nearby rivers and streams. However, sediment concentrations and loads naturally vary over a large range during the year. As a result, aquatic communities in the rivers are adopted to high sediment loading. Additional risk to the aquatic environment arises from the accidental spillage of pollutants, particularly diesel.fuel , lubricants and chemicals, which can cause extensive contamination of the Awash River, Hirna River, Lake Adele and Lake Alemaya.

Replacement and new construction of additional drainage's bridges and culverts will discharge cement slag, oil spill hazard (especially during dry season minimum flow).

Temporary cut-off flow during construction of bridge foundations in rivers will change the regime flow of the river, which affects the water quality (increased turbidity).

Construction of flow at culverts and bridges will change the regime flow of the river (increased velocity).

Quarries and borrow pits can not be used for water harvesting after the construction of the road since most of the borrow pits are volcanic cones of pervious material and highly weather volcanic rocks on hilly terrain that cannot pond water. On flat terrain of the rift valley (Awash-Mieso) with scarcity of water, the burrow pits can not be used for ponds due to high aridity of the area (high evaporation).

Upgrading and/or rehabilitation of the road shall not cause substantial effect on the water resources and water quality along the road route. There may be a positive impact due to addition of culverts and energy dissipaters maintenance and providing which will decrease

the velocity of the water and decrease the turbidity of the water downstream (improving the water quality).

5.1.3 Nuisance Noise

Excessive noise levels from operations of construction equipment and vehicles will cause disturbance to local residents living in the vicinity of the construction activity. Noise generated from the quarry and borrow pit sites will be an annoyance to only those few residents living near the sites as well as the construction labor force. Noise is generally not considered as a major nuisance by the people. However, noise sensitive areas such as schools, hospitals, residental areas shall be considered during road construction.

Noise disturbance affects wildlife also and should be considered in protected areas.

5.1.4 Air Quality

There is no air quality information available in the project area. The large number of vehicles in towns create health risks through their engine and exhaust emissions. However, traffic emissions are not seen as a problem by local people.

The major effects on air quality during the road construction would be an increase in suspended particles from blasting, excavation and quarrying as well as movement of heavy machinery, trucks and trailers over unpaved roads and the dust caused when all traffic is directed to unpaved detours. Many of these operations will take place in locations away from the towns and settlement areas. However, the present gravel road is already now causing a dust problem which will disappear with the pavement.

5.2 Natural Environment and Biodiversity

5.2.1 Loss of terrestrial vegetation

The impact on natural vegetation would be associated with operating the quarry and borrow areas, and constructing detour and access road to the borrow material pits and quarry sites.

Construction of the road will not significantly affect areas which support conservation worthy terrestrial ecosystem or natural or semi-natural forest all along the project area.

5.2.2 Destruction of wildlife habitat and impediment to movement of wildlife

There are no important wildlife and wildlife habitat reported to exist in the project area that will be affected by the proposed construction activities.

5.2.3 Encroachment into ecologically sensitive areas

The road right-of-way was cleared and disturbed during construction of the existing road some 50 years ago. Therefore, the project component will not involve in any encroachment into known and designated ecologically sensitive areas and nature reserves.

5.3 Human and Social Environment: Social Issues

The following issues/concerns are all related to the present road and to the anticipated project to upgrade/rehabilitate it. The issues/concerns described here were expressed by different representatives (see annex of invitees) in the Public Consultation in Dire Dawa, by interviewed local people by the road. Issues/concerns also include direct observation by the consultants and available/relevant literature on the area and the road project.

5.3.1 Social acceptability

Social acceptability of the project is high among the local people and among all those engaged in transitory traffic. The new project to asphalt the present road was seen minimizing the present problems and increasing the benefits. The only worries were related to the use of road during its construction.

The public consultation held in Dire Dawa and interviews with the road side showed, that possible misunderstandings - and possible resistance for the project - can be avoided before hand with good information. Participants were happy about the public consultation and saw it "as a big step forward". However, it was felt and said that consultations should be arranged in several places along the road. Especially local issues/concerns could be discussed better in different places.

It was also seen and admitted by all that development of the road system entails damages but if mitigation plan is integrated to the planning the problems could be minimized.

Problems during the construction can be mitigated by establishing local committees with the local knowledge of the physical, social and economic environment. The committee should represent different stakeholders. Although the committee was seen to be very necessary especially for compensation issues/concerns, it could also guide in other local issues. For example, local knowledge was felt to be necessary in the cases such as to avoid the road to go over the existing spring sources because this might cause the whole spring to disappear. Also worship places could be identified before quarry sites, detours and other construction sites are selected and decided.

There should be consideration if the local development activities can be integrated to the road project activities. Even communities could take part in costs, which would be also lower for them than working separately. This type of activities include to design detours to the places where a community plans to have future road anyway or select boreholes or quarry sites which can be later used for water harvesting etc.

5.3.2 Resettlement/displacement of people

Between Awash and Mieso the resettlement question will not arise, except possibly in Mieso town itself (the design of the road was not available to the consultant). The road between Awash and Mieso goes over the flat and arid land with no rural towns and by-passes Arba Bordode and Asebot.

Resettlement question will arise in the hills in many towns. Some displacement of people/ households in the towns such as Asebe Teferi, Hirna, Karamile and Kulubi, seems

inevitable, while in Dangego resettlement may be avoided (depending on the design of the road, however). Many shops, bars and hotels to be removed are also residential units.

Between Dire Dawa and Dangego there will be no need for resettlement due to the absence of roadside settlements, while between Dangego and Harar some houses must be removed because their closeness to the present road. Alem Maya, Adele and Aweday will be affected by the road widening (assuming that the present road alignment is followed here)

By law ERA or the contractor are not responsible for resettlement. In practice the community is considered to be responsible to resettle people, but there is no law which require them to do so.

The ERA coordinated compensation committee is supposed to negotiate with the local administration also the new places/ resettlement for the displaced people. However, there are no evaluations done about the real situation after negotiations/decisions.

The resettlement issues arise only in town areas along the road and the number of people affected will not be very big (about 120 housing units). The resettlement is also easier in the towns than what it would be in rural areas. No farmhouses with agricultural lands are affected by the project and hence no farmer occupations lost. The new places for shops and bars with their economic activities to go on, is more difficult even if the owners will be resettled.

It is not very difficult to resettle people in the towns such as Mieso due to the more flat land/terrain, while in some places in the hills the road follows the steep slopes where houses are often built on narrow roadsides above and below the road. The new locations might be further away along the road or off the road behind the other houses depending, for example, on the terrain.

5.3.3 Demographic changes

Due to the road upgrading/rehabilitation no big or dramatical demographic changes are expected in the communities along the road. Migration to the towns continue. In the big towns the fertility rate is assumed further to decrease. The share of women in the big towns will increase due to the migration and in some towns change the sex rate. Ethnic composition will not be changed but the share of Oromoes of the total population might still increase.

None of these trends will be due to the road pavement project.

5.3.4 Change in way of life

The changes due to the upgrading/rehabilitation of the present road will not have any dramatical impacts to the people's present life. With better and faster road also services will be improved, more imported, new and cheaper goods are available raising maybe the standard of living but not the way of living. The electricity often follows the road and change the way of life in many aspects, but also electricity has been introduced to the study area already with the old road.

With the better road public transportation possibilities increase (minibuses and taxis are appearing all over to the asphalted roads), the travel costs will decrease and people might travel further and more often and the way of life is slightly changing.

In case road construction brings new water points to the areas, it will have more positive impacts on time consumption patterns of local people, but the way of life will not be changed.

5.3.5 Impacts on women

Since the road has existed for years the rehabilitation/upgrading project will not have any radical impacts on women. However, asphalted road with better shoulders and drainage and without dust will make it easier, more comfortable and safer for the rural people to use the road as pedestrians and/or for local transportation of goods/products. All local people benefit but especially women, who are the main users of the road as pedestrians. The use of better road during night time will be safer especially to women.

The dust between Awash and Kulubi is one of the biggest complaints by local people. Dust is harming the bars and restaurants as well as washed clothes. Road safety is decreased by the dust as well. The asphalted road will reduce this problem.

The shops and bars along the road are often run by the women. With the better and safer stopping places for cars/trucks/busses would also increase these income generating activities. Mainly women are engaged in bringing fresh chat to collection points.

With the better asphalted road small (private) busses appear to these roads. The travel costs are less than what regular (long distance) busses charge. Lots of social travel obligations would be easier by them. However, many women would still walk some hours twice a week to markets to sell their (mainly agricultural) products. The profits are so low, if any, that even 50 cents will make it difficult for many to afford even this. Due to the big volumes such as fuel bundles many women have to continue to walk to the towns and market places.

With the better road the health and educational facilities can be reached quicker and safer. The better road may encourage the parents to send also the daughters to schools. Also the maternity services are reached easier.

During the construction period there will be more women engaged in income-generating activities running the restaurants and bars, or selling fuel wood or other local products to the camp workers. These activities will benefit mainly women who are very often the sole supporters of their families. On the other hand, the increased local prices affect especially women who are often worse-off than men.

Women are also posed to increased risk of sexually transmitted diseases and unwanted pregnancies.

5.3.6 Impacts on indigenous peoples

The indigenous people in this connection would be only the Afars and the Somalis/Isas, both living/ traveling on the first part of the road. Many Afars and Isas are still semi-

nomads living/traveling with their camels, cattle and goats on the Rift Valley. The conflicts between these two groups have been serious at times.

The road, however, have been built years ago and the new improvements will not very much change their culture or their present economies. For a long time there has been trade and barter between permanently settled people and nomads. Both, but here particularly the Isas, have been transporting goods with their camels from the east to be sold in Dire Dawa or other Rift Valley settlements.

With the better and quicker roads this trade (when not contraband trade) will most probably slow down but the better cattle transportation possibilities, on the other hand, will benefit those Isas (and some Afars) who trade with cattle in the survey area.

5.3.7 Induced development

Maybe one of the most common example about the induced development due to the construction of road is the fact that ERA camps which are meant for temporary use, turn out to be permanently settled and sometimes they develop into real towns like for example, Arba Bordede along this road. (The similar development can be found with the previous checking points or *kellas*.)

When the ERA camp has been established, 150-250 workers are moving in it. The camp offers income-generating possibilities to the local people during the construction period which might last from one to two years. Many people settle down near the camp to trade and offer their services: food, talla, katikala or other drinks, chat, fuel wood or whatever is needed and bought by camp workers.

Increased demand inflate the local prices. The people engaged in business by the camp will benefit while those local people who are dependant on the same purchases will suffer in the form of increased prices. Although the impacts will be felt only during the construction period the increased demand of goods and services and higher prices will affect some individuals and families to migrate and settle down near the camp sites for their business. Most of these people are landless and continue to stay after the camp has been demobilized.

People who are moving near the camp to do any business may rent land from the local kebeles or PAs and build their own houses. Some of them will settle down illegally without any registration by the local administration.

The camp needs quite a lot of fuel wood which is bought from the local markets or sometimes from the people coming to the camp to sell it. The locals complained that ERA camps (previously) destroyed the forests and even killed wild animals.

5.3.8 Conflicts between locals and immigrants

The arrival of 100-200 workers, mainly men, to the construction camps will have several impacts to the local communities. In general the camps are well accepted due to the 300-400 employment possibilities also to the local people. Possible ethnic conflicts are small, if any at all, in the hills where camps can be located any place, because in all localities people expect to be hired as semi-skilled or daily labor. Skilled labor would come from outside and reside in the camp while locally hired labor will not.

Usually the workers stay in the camp for four weeks at a time and during the fourth week-end the whole staff is taken to the near by town for *asbesa/* shopping week-end.

However, occasional and personal conflicts will be expected due to many reasons, often due to drinking. Also the more cash available among the migrant workers might cause personal conflicts. The more cash might inflate also local prices and cause bad feelings in the local population. Especially already worse-off people would be affected negatively. However, also inflation will be temporary.

The families are not allowed to stay in the construction camps and the relations between construction workers and local women are common during the construction period. Due to the dislike about condoms among Ethiopian men the occurrence of veneral diseases might increase also among the local population. Many temporary relations result in pregnancies and 'milk payment' court cases increase.

5.4 Human and Social Environment: Economic Issues

5.4.1 Loss of agricultural lands

Because the upgrading/rehabilitationfollows the old road, not very much agricultural lands will be lost. In the Rift Valley area or between Dangego and Dire Dawa no agricultural lands will be affected. In the hills many fields are coming near the road, and some strips of agricultural land might be permanently lost. However, most of these fields are inside Right of Way.

The temporary losses will be greater in the places, where the detours will be constructed. In these cases, however, the losses are only temporary and there will be no compensation due to the temporary use of land.

5.4.2 Loss of grazing land

The project will affect grazing lands between Awash and Asebe Teferi in the Rift Valley, where Isas/Somalis and Oromos are engaged in semi-nomadism with big cattle populations. The loss of grazing lands will be temporary and negotiable with local people.

5.4.3 Loss of property

Residential and/or other buildings. The removal of many houses and other buildings in the area between Arbereketi and Dangego and between Dangego and Harar seems unavoidable. Many (if not most) of these buildings are located within the right of way.

The compensation is paid according to the price of a new similar house, not on the present value of a house. However, it would be advisable, if the wood & mud houses will be compensated by ERA according to the price of hollow block houses. This would be environmentally sustainable, and especially saving the scarce tree resources in the area. It would also add economic activities in the area, since the production of hollow blocks is based on simple manual technology. The hollow blocks are produced in many towns and are not very much more expensive than the wood poles with increasing prices.

The owners of the houses are allowed to remove the old houses/construction material during a certain period after the decision of the displacement of a house is done.

Crops and trees. There will be temporary losses of agricultural land (for detours, ERA camps, storage sites, asphalt plants etc.) In this case the compensation is based on the value of the lost crop for one or two years depending on the time detour is used. With the grain crops the estimation can be based on yearly value, but in the case of coffee and chat bushes, which are plenty in this area, the estimation should be based on many years' production.

There will be few places where the trees would be affected. Only between Dangego and Harar some commercially valuable eucalyptus trees are near the road, and depending on the road design might be affected/ cut down. The compensation will be estimated using market value.

5.4.4 Employment opportunities

Due to high unemployment rates in the towns people along the road wait for the construction work to start due to the anticipated/expected employment possibilities. The road construction employs 150-250 people who resides in the camps. Besides these some 300-400 daily laborers will be hired locally for construction work. Previously only men were hired but now also women participate in road construction work. Some local people will also be hired locally for the camps as cooks and cleaners, some of them women.

If the availability of the modern machinery and equipment will increase with new (foreign) contractors the share of local labor might decrease, despite the labor-intensive policy recommended in the RSDP. However, along this road local daily labor will be needed especially in many erosion prone places.

Outside the construction work there will be other economic activities created due to the demand of different products and services by the construction workers.

5.4.5 Change in economic activities

There will be no significant changes in the economic activities in the settlements due to the road upgrading project. The road construction will, however, bring more but less new type of employment opportunities. Most of these will be temporary by nature, but some of these activities may turn out to be permanent even after the camp has been demobilized.

5.4.6 Effects on public and private services

During the construction period the construction camps might overload the public services, mainly in the health sector, since in the camps only first aid in case of accidents can be given. Demand on the private services will increase, benefitting the local community. These impacts are temporary.

The longer lasting impacts will be on the public transportation, which will be improved, since with the better and paved road mainly private minibuses will appear on the road, as they do in the other parts of the country after pavement. Due to their lower prices more people would use them than what people now use long distance busses.

It is also anticipated that more youngsters would enroll to the school or go on to the higher grades due to the better transportation. This effect might be more beneficial to the girls than boys. However, if this happen in a large scale this might put a pressure to the educational institutions. However, better road only gives this possibility, there are so many other reasons why this opportunity will not be used.

The water resources as well as fuel needs will increase during the construction period. The location of the camps must be such as not to put any extra burden to the local resources.

5.4.7 Impacts on national economy

This road is one of the most important roads to the national economy. It connects the eastern and south-eastern part of the country to the rest of Ethiopia and makes the transportation of goods/products possible to and from these areas. The road serves also as an import/ export road from Dire Dawa to Djibouti and from Harar to Somalia..

This road goes along the area which is producing coffee and chat for export. Especially Dire Dawa, and to the lesser extent also Harar, are important industrial centers in the country and transportation of industrial goods to the other parts of country. These industries, however, are also very dependant on the raw materials which are transported to this area from other parts.

5.5 Human and Social Environment: Other Issues

5.5.1 Cultural, religious and historical areas

There are many places along the road which are important due to their cultural, religious and historical background. The most famous ones such as Saint Gabriel Church in Kulubi are known by all, and benefits for pilgrims will be positive. However, there are many local monuments, holy trees or sprigs or old grave yards etc., which are known only by the locals. These objects should be taken into consideration and can be done only with the cooperation of the local people/committees. On the other hand not all culturally valuable things are regarded important to the locals. There are many places in the country were archeologically valuable lands are used for agriculture. Also the Ministry of Information and Culture should be informed about road construction.

The better roads help tourists to reach many valuable places. Even if the money they bring is valued, there should be plans already from the beginning to handle the tourist business with the controlled manner.

Damage to Aesthetic Sites

This road is graded as one of the most scenic roads. The quarries and storage sites for construction materials should be rehabilitated after their use. There might be good suggestions by local people for the future use of these sites and how they should be rehabilitated.

5.5.2 Health and sanitary issues

The pavement of the road benefits people, who now suffer from the dust, which now is one of the additional reasons to common respiratory diseases. People do not complain very much of the other type of air pollution, and the release of harmful emissions need some other measures to be decreased (better car condition inspection etc.) However, with better roads also the amount of vehicles, and especially the private cars, will increase adding to this problem.

The use of local services such as health centers can be seen negatively from the local community, especially if the services are scarce and immigrants have more money to use them. ERA camps have also easily different health risks. Due to the crowded lodging and not very hygienic environment many contagious diseases may cause epidemics.

Among the locals occurrence of veneral diseases may increase.

The contractor is responsible to see that health and sanitary facilities are satisfactory in the camps.

5.5.3 Road Safety

Many reasons contribute to weak traffic/road safety on the road. The bad condition of the road (potholes, slippery material) was the biggest reason given by the people using the road for transitory purposes, while many locals including traffic policemen saw dust and high speed as one of the biggest reasons for the accidents.

Missing traffic signs were blamed. It was claimed that the signs, if and when provided, are taken by people to use its metal for other purposes. However, even where they exist, they are not followed unless the local traffic police ticket/fine drivers. The traffic behavior is not always the best, however, many big trucks when moving very slow on the hill area, do signal the possibilities to pass them.

Domestic animals are causing many accidents.

Due to the bad road condition all cars can not speed but occasionally. However, when the road will be asphalted, the used speeds will get higher. The speed will cause more accidents, while the accidents caused by the dust will decrease.

Better inspection of car condition could diminish some accidents (but this belongs to the other authorities than to ERA). The traffic police already now inspects overloads and over speeds. These activities could be more fined (now mainly the remarks are done). The fines should go to the Road Fund (instead of the Treasure) for better road safety activities.

5.5.4 Public Consultations

Public consultations give to the decision makers environmental data, understanding of likely impacts and information of individual and community preferences as well as possible project alternatives, which can be used to avoid or mitigate negative impacts of the proposed project.

6. ANALYSIS OF ALTERNATIVES

The upgrading of this road to the proposed standard compared to the "zero alternative" (no project) is environmentally more sound solution. The benefits can be justified by the following environmental and safety points:

- through upgrading, the erosion problems due to the low standard of the road will be mitigated

- the new pavements will tremendously reduce the dust and thereby the amount of accidents caused by dust which blocks the visibility from drivers and pedestrians alike will be diminished; reduced dust problem improves the living standards and health status especially in the towns

- the problem of vehicles tending to change their courses of driving from the carriage way to shoulders and ditches and sometimes outside of the road itself, will be solved by upgrading/rehabilitating the road

- During the rainy season the paved road will not be as slippery as the present gravel road

Furthermore, the road improvement plans are well accepted by the people residing along the road as well as by the people engaged in the transitory traffic.

The major negative impact of the upgrading/rehabilitation project are caused by the detour construction during the construction period and widening of the existing road particularly between Dengego and Harar where there are significant permanent cash crops like coffee, eucalyptus, "chat" and some other trees.

The adverse impacts of the proposed road improvement are mainly related to the construction period and therefore temporary. These impacts are small compared to the positive economic and environmental benefits of the road rehabilitation. Even the impacts would be minimized by including the technical, operational and phasing procedures in the tender document for the contractor.

7 MITIGATION MANAGEMENT PLAN

The potential negative impacts have been identified and discussed in the Chapter 5 and the recommended mitigation measures that should be adopted to avoid or minimise potential adverse impacts are discussed in this chapter, following the same categorization (and numbering) as in Chapter 5. Some of the measures involve good engineering practices while others are viewed from human and social angle. The table at the end of this Chapter 7 provides a summary of the mitigation plan, the organisation responsible for their implementation and cost estimates.

7.1 Physical Environment

7.1.1 Soil and erosion

The bidding document for construction should include technical specification for the prevention of environmental hazards and pollution i.e.

Borrow Materials

Borrow and/or quarry sites:

- Materials will be preferably extracted from existing quarries.
- Gravels and sands shall not be extracted from minor river bed to avoid scouring and water pollution.
- Washing water shall be systematically cleaned before discharging to rivers or streams.
- After completion of the work restoration of the sites is required.

Cuts in Soil and in Rock and Construction of the Embankment

Cut of topsoil to be used for plantation of the embankments and to refill borrow pits.

Blasting should be optimized not to cause slope destability and damage adjacent built structures.

Embankment should be compacted.

Hydraulic Structures (Bridges and Culverts)

Provide appropriate return period floods for determining the opening dimension of additional culverts and bridges and check the existing structures.

Avoid erosion of cuts and fills by providing proper drainage.

Care should be taken not to pollute the river water during concrete work from cement slag and spills of oil and fuel by providing diversion and other measure appropriate to each specific site.

7.1.2 Hydrological conditions and water quality

Water resources and water quality

Construction activities in and around perennial rivers should be conducted during dry season to minimize sediment loading. In order to prevent accident spillage of pollutants to water sources or leakage to the ground, all temporary and permanent storage facilities should be located away from these sites and in a bounded enclosure with an impermeable liners. Waste oil and other liquids originating from on-site maintenance of construction equipment must be disposed of in a proper manner. A spill contingency plan should be drawn up before the start of the construction activities.

Periodical monitoring of the road for environmental impact should be conducted and appropriate measure must be taken.

In general the rehabilitation of the road have no impacts compared to the existing road from the physical point of view.

Once the construction of the project is complete, the contractor is required to remove all equipment from the site and clear the site from potentially hazardous materials. Reclamation of sites exposed during construction will include re-grading and re-vegetation.

Water quality

Clearing of vegetation cover for excavation and filling of construction areas exposes the underlying soils and rock surfaces to erosion and erodible materials may eventually find their way into the river causing increases in the suspended sediment concentration in the river. However, sound engineering practice by the contractor will be required to completely avoid where possible, or minimize, erosion of excavated areas and spoil dumps to avoid increases in turbidity in the downstream rivers during times of heavy rainfall causing surface runoff. Therefore, these activities should be carried out in the dry season to reduce the potential environmental damage and soil erosion and sediment loading to streams and lakes.

In order to prevent accidental spillage of pollutants to water courses or leakage to the ground, all temporary and permanent storage facilities should be located away from these sites and in a bounded enclosure with an impermeable liners. Waste oil and other liquids originating from on-site maintenance of construction equipment must be disposed of in a proper manner. A spill contingency plan should be drawn up before the start of the construction activities.

Highway run offs

Highway runoff along the side ditches of the road is maximum during rainy season when natural drainages (rivers, streams and flood paths) have peak floods. Therefore discharging the highway run off to the natural drainage will have high dilution effect which will have no change of the water quality. Therefore no mitigation measure is required along the road route.

7.1.3 Nuisance noise

Activities producing excessive noise levels should be restricted to the day time, and equipment normally producing high levels should be suppressed or screened when working

within a distance of 200 m from any settlement or religious building. To cause the least disruption to the local population, it is recommended that construction producing nuisance level noise shall be minimized or rescheduled so as not to occur at night or locally recognized religious days (i.e., Saints' days, etc.) and Sundays.

7.1.4 Air quality

Air quality can be affected by particle emissions during construction work, batch plants operations and traffic.

All trucks carrying fine materials should be covered. Where top soil is to be stockpiled for a long period of time, it should be covered or seeded to prevent wind erosion. Traffic speeds should be reduced and regular application of water on road pavements may be required as appropriate to prevent high dust emissions.

Poor air quality can result from diesel powered machinery vehicles. Construction machinery must be well maintained to minimize excessive gaseous emission.

Once the construction of the Awash - Kulubi - Dire Dawa - Harar road upgrading project is complete, the contractor is required to remove all construction equipment from the site and clear the site of potentially hazardous materials and re-contour and landscape the disturbed areas. Restoration plan of sites exposed during construction will include re-grading of the disturbed areas and planting appropriate ground cover to minimize erosion and to provide a more aesthetically pleasing appearances to the visible project facilities.

7.2 Natural Environment and Biodiversity

7.2.1 Loss of terrestrial vegetation

One of the major unavoidable impact of roads is the effect on the terrestrial vegetation in the vicinity by the virtue of the construction. Major environmental impact will results from excessive widths of right of way. While some flexibility is essential to achieving stability of cuts and fills, exacting principles of design also need to be adhered in order to avoid excessive destruction of vegetation and disturbance of land.
The most important mitigation options for forest resources are:

- consider the location of mature trees during route selection for the detour to minimize destruction of trees;
- during borrow area clearing, prepare a plan to remove mature trees in the borrow area to obtain optimal benefits from harvested timber;
- in order to compensate for loss of trees, replanting must be mandatory. Consult forest department of the concerned zonal administration with regard to selecting plant species for land restoration to both erosion and improving habitat;
- replanting must be made mandatory and quarrying must be limited to the direct needs of construction works within the National Forest Priority Areas.

To compensate for the losses, it is recommended to re-forest at least 50 ha of land in the project area. Designation and management of the re-forested area will be co-ordinated and implemented by the Forestry Department of Agriculture Bureau office to establish a Forest

Development team to organize and manage the overall implementation of this proposal as soon as the fund is made available for the construction of the project.

This 50 ha should be within the two National Forest Priority Areas. These forests as well as the existing stands of naturally occurring trees will be included within areas subject to existing National Forest Priority Areas management practices and policies.

The estimated cost to implement the programme over a period of two years is about Birr 207,000. Table 3 shows the cost break down. Regular programme reports will be prepared by the team and submitted to ERA.

Table 3 Cost estimate for compensation reforestation programme

Cost Item	Amount (Birr)
Nursery Support	30,000
Labour and Transport	120,000
Monitoring and Evaluation	30,000
Total	180,000
Contingency (15 %)	27,000
Grand Total	**207,000**

7.2.2 Effects on Wildlife and Wildlife Habitat

Construction of the project will not significantly affect wildlife population because the area has no wildlife reserves and couldn't provide a good habitat to support a diverse wildlife species due to extensive human intervention in the area.

7.3 Human and Social Environment: Social Issues

7.3.1 Social acceptability

There should be good information about the future project activities and alternative designs through the consultations along the road. The consultation places should be with short intervals in order to make it possible for people to attend. All stakeholders should be involved in consultations. Also alternative designs should be available before consultation.

ERA sets a committee before road construction activities to set the compensations. The role of this committee could be widened to include resettlement and other local development issues.

Cost of the mitigation measures

The costs of information and consultations will be very small if they are arranged along the road when designers go along the road any way. Main cost will be the time used for consultations. Assuming that environmental costs will be the responsibility of the contractor in the future, many future costs to the contractor can/may be avoided by proper stakeholder participation .

7.3.2 Resettlement/displacement of people

The demolishing of present houses should be minimized to avoid the displacement of people. Still the displacement of quite many households seems to the unavoidable and the resettlement should be arranged.

The ERA coordinated compensation committee should negotiate with the local administration the resettlement and also see that the resettlement is really done. ERA should evaluate the resettlement situation later.

Also people who have been displaced from the 'illegal' settlements, should be resettled with those who are displaced from outside Right of Way or from legal settlements.

In general the clear resettlement policy should be created instead of traditional practice. The policy should clearly state who are responsible to resettle displaced people and under which conditions.

Cost of the mitigation measures

The cost of a new hollowblock house is about 1200 Birs/square meter. A new house of 40 sq.m. including kitchen and toilet space will cost 48 000 Birs.
Estimated 120 new houses would cost 5,7 millions Birs (about 1 million US Dollars).

7.3.3 Demographic changes

There is no need for mitigation plan due to the rehabilitation project.

7.3.4 Change in way of life

No mitigation plan needed

7.3.5 Impacts on women

The local women should be consulted for their needs and recommendations. Often small changes in the design might have quite big positive impacts to women and cost little or nothing at all to the project.

7.3.6 Impacts on indigenous peoples

Although the road upgrading does not bring any new negative impacts on these people, it could, however, benefit them and their animals if some new water sources/boreholes are needed for the project and left to their use in the valley area.

Also the animal crossings could be negotiated with the locals for better road safety for all parties.

7.3.7. Induced development

To induce planned development the sites should be selected in a way which take into consideration the available natural resources (such as availability of water, fuel etc.) for

potential permanent settlement in the future. The fact that the contractor will choose the construction camps on technical bases locating camps at about 80-100 kilometers' interval should give a few kilometers' flexibility in selection of the sites.

The preconditions to chose the location of the camp should be the same as for any planned permanent residence place. Enough water for present and future use, natural resources needed for the permanent settlement and their use should be planned and controlled.

Houses which are build temporarely and illegally due to a camp should be registered by kebeles/PAs in order to avoid illegal permanent settlements. By registration also 'rents' to private land owners would stay at more normal level.

7.3.8 Conflicts between locals and immigrants

Although big ethnic conflicts are not to be expected, the decisions of the camp locations have to take this possibility into consideration.

The 'shopping week-ends' should be divided among the staff as to avoid all of them to appear to one town at the same time.

The health education about veneral diseases (also AIDS is increasing rapidly in Ethiopia) and benefits of condoms should be introduced by the contractor. This should be done in cooperation with the Bureau of Health and implementation by local or foreign NGOs such as Red Cross or Care.

7.4 Human and Social Environment: Economic Issues

7.4.1 Loss of agricultural lands

This area is very extensively cultivated and special attention should be given to the design that no unnecessary losses will happen. Construction of the road use sub-base material and utilisation of this resource will involve loss of agricultural land on sites. ERA compensation committee should be involved already in the design phase to see the situation. Consultation with the local people is important. In case of permanent losses there should be serious negotiations between ERA compensation committee and local administration about new lands.
It is not possible to propose any compensation scheme about the loss of agricultural land because, the final location and extent of the affected area is not determined. Due to this, it is recommended that a detailed assessment should be conducted in the project area, particularly in the selected quarry and sub-base material sites and the compensation plan be formulated and implemented in the future. To compensate loss of land by allotment of agricultural land will not be possible due to unavailability of free land in the project area, therefore, as much as possible avoid all borrow and quarry sites with the potential to completely evict any farmer from his whole farm land.

While there would appear to be no restriction on constructing detour on arable land, the affected communities should have the right to be consulted over the selection of construction material site and routes for access road and detour in these areas to minimise potential damage.

ERA Compensation Committee should minimize the temporary losses of agricultural land. After the project the contractor is responsible to rehabilitate the used sites to their previous condition.

7.4.2 Loss of grazing land

Consultation with the local cattle owners about the location of camps and other construction sites. The seasonal migration must be taken into consideration. After completion of the construction work, the pasture land should be rehabilitated by reseeding immediately to minimize disturbance to grazing land.

Compensation of the lost vegetation estimated by ERA compensation committee including negotiations with cattle owners themselves.

7.4.3 Loss of property

Consultations with the local administration to minimize the removal of houses. ERA compensation committee should be involved with the resettlement planning.

Compensation of property, especially of houses. However, compensation will be paid only for houses outside the right of way. Due to the missing detailed designs it is impossible to say how many houses will be affected, but the square meter prices for block houses are about 1500 birr and for the hollow block houses about 1200 birr plus 30 percent transportation costs of cement for both prices. The wood&mud houses should be compensated for the hollow block houses.

7.4.4 Employment opportunities

Local administration should have a say on who would be employed by the contractor. The preference should be given to those people who lose their own economic activities due to the project.

7.4.5 Effects on Public and Private Services

The construction camps should provide services which otherways would overburden the local public facilities/utilities. The selection of camp sites should be done in good cooperation with the local administration.

7.5 Human and Social Environment: Other Issues

7.5.1 Cultural, religious and historical areas

The destruction of locally important sites can be avoided in cooperation with local elders/administration. The local religious places, graves and funeral places as well as holy trees or springs must be taken into consideration when the detours, quarry and other construction sites are designed.

7.5.2 Health and sanitary issues

Construction and operation of the road project can result in specific health impacts for residents close to construction sites and the workers. To minimise the potential health risk the following mitigation measures are recommended:

- ensure that adequate health facility systems are in place on-site to deal with the influx of temporary workers and open the facility to local residents as a benefit of the project to the community;
- pre-employment medical screening and effective medical treatment of workers could reduce the likelihood of disease outbreak;
- preventive measures for malaria should be strictly enforced in construction camps. It will be important to ensure the use of nets and insect repellents, as well as medical treatment of malaria cases;
- improve the provision of a safe water supply and appropriate waste disposal facilities including the provision of sanitary latrines to control other water-borne diseases. Make the water available to local residents and hand over the water system in good working condition to the residents upon project completion;
- strict adherence to speed limits on access roads during construction;
- erect sufficient and clearly visible warning signs on the road during construction;
- borrow area should be graded after use to prevent the formation of a pond which is a suitable ecology for mosquito breeding.
- health education about veneral diseases (also AIDS is increasing rapidly in Ethiopia) and benefits of condoms should be introduced

7.5.3 Public Consultations

Sound and transparent public meetings/consultations shall be held with relevant information before decision making. Consultations should include all stakeholders and should be held in all localities along the road. Before the public consultation local people should be well informed about the project design and activities.

MITIGATION MANAGEMENT PLAN

	Potential Adverse Environmental Impact	Mitigation Measure	Responsible Institution/Person	Cost
1	**Physical Environment**			
1.1	Soil and erosion			
	- Erosion	* Blasting should be optimised not to cause slope destabilise and damage to adjacent structures. * Materials will be preferably extracted from existing quarries.	ERA	No costing
	- Soil contamination by spills of hazardous material	* Provide appropriate measures to decrease accidents. * Control careless disposal from engines used oil and lubricants along the road.	ERA & Road transport	
1.2	Hydrological conditions and water quality			
	- Water resources and water quality	* Construction activities in and around perennial rivers should be conducted during dry season * Storage facilities should be located away from these sites and in a bounded enclosure * Waste oil and other liquids must be disposed of in a proper manner * A spill contingency plan should be drawn up before construction * After construction all equipment has to be removed from the site and clear the site	Contractor	-
1.3	Nuisance noise	* Activities causing noise to be restricted to the day time/working days; and equipment normally producing high levels should be suppressed or screened when working within a distance of 200 m from any settlement or religious building.	Contractor	-
1.4	Air Quality	* All trucks carrying fine materials should be covered. * Where top soil is to be stockpiled for a long period of time, it should be covered or seeded to prevent wind erosion. * Traffic speeds should be reduced and regular application of water on road pavements may be required as appropriate to prevent high dust emissions. * Construction machinery must be well maintained to minimise excessive gaseous emission.	Contractor	-

	Potential Adverse *Environmental Impact*	Mitigation Measure	Responsible Institution/Person	Cost
2	**Natural Environment and Biodiversity**			
2.1	Loss of terrestial vegetation	* Consider the location of mature trees during route selection for the detour to minimise destruction of trees * Rehabilitation of detours after construction * Compenstion Afforestation	Contractor Contractor ERA	about 200,000 Birr
2.2	Destruction of wildlife habitat and impediment to movement of wildlife	* Avoid these areas where possible to minimise potential damage.	ERA/Contractor	-
2.3	Encroachment into ecologically sensitive areas	* Avoid mature trees areas where possible	Contractor	-

	Potential Adverse Environmental Impact	Mitigation Measure	Responsible Institution/Person	Cost
3	**Human and Social Environment;Social Issues**			
	3.1 Social acceptability	* Good information before the construction should be available to all stakeholders; through Public Consultations held along the road. * Clear information about the compensation system should be given to those who might be affected. * ERA Compensation Committee to be established for all road projects (including all stakeholders).		For ERA coordinator per diems and transportation costs
	3.2 Resettlement	* To minimize the displacement of people. * Consensus of resettlement plans must be achieved		5,7 million Birr
	3.7 Induced development	* To induce planned development the sites should be selected in a way which take into consideration the available natural resources (water, fuel etc) for potential permanent settlement after the construction camps are removed * Houses which are build 'temporarily' due to the camps should be registered by the kebeles/PAs in order to avoid illegal permanent settlements.	ERA and Local Administration Local Administration	
	3.8 Conflicts between locals and immigrants	* The 'shopping week-ends' should be divided among the staff as to avoid all of them to appear to one town at the same time.	Contractor	

	Potential Environmental Impact	Mitigation Measure	Responsible Institution/Person	Cost
4	**Human and Social Environment; Economic Issues**			
	4.1 Loss of agricultural land	* Avoid/minimize the temporary losses of agricultural land. * After the project the contractor is responsible to rehabilitate the used sites to their previous condition.	ERA Contractor	
	4.2 Loss of grazing land	* Avoid/minimize the temporary losses of grazing land. * After the project the contractor is responsible to rehabilitate the used sites to their previous condition.	ERA Contractor	
	4.2 Loss of property	* The needed areas for construction should be planned as to minimize the effects on the growing crop, coffee and chat plants, and trees * The value of the lost crop should be estimated according to market prises. * Demolished houses are compensated by ERA according to the costs of a new house. Due to the environmental reasons it is recommended that wood & mud & thatch houses are compensated according to the costs of a hollow block house	ERA ERA	(units of coffee bushes, chat bushes and eucalyptus trees) Price/sq meter: hollow block house about 1200 Birr (wood & mud & thatch houses about 800 Birr)

5 Human and Social Environment; Other Issues			
5.1 Cultural, religious and historic areas	* The destruction of locally important sites can be avoided in cooperation with local elders/administration. * The local religious places, graves and funeral places as well as holy trees or springs must be taken into consideration when the detours, quarry and other construction sites are designed.	ERA	
5.2 Health and sanitary issues	* ensure that adequate health facility systems are in place on-site to deal with the influx of temporary workers and open the facility to local residents as a benefit of the project to the community; * pre-employment medical screening and effective medical treatment of workers could reduce the likelihood of disease outbreak; * preventive measures for malaria should be strictly enforced in construction camps. It will be important to ensure the use of nets and insect repellents, as well as medical treatment of malaria cases; * improve the provision of a safe water supply and appropriate waste disposal facilities including the provision of sanitary latrines to control other water-borne diseases. Make the water available to local residents and hand over the water system in good working condition to the residents upon project completion; * strict adherence to speed limits on access roads during construction; * erect sufficient and clearly visible warning signs on the road during construction; * borrow area should be graded after use to prevent the formation of a pond which is a suitable ecology for mosquito breeding. * The health education about veneral diseases (also AIDS is increasing rapidly in Ethiopia) and benefits of condoms should be introduced.	Contractor	
5.5 Public Consultations	* Sound and transparent public meetings/corisultations shall be held with relevant information before decision making. Consultations should include all stakeholders and should be held in all localities along the road. Before the public consultation local people should be well informed about the project design and activities.	ERA	

8. ENVIRONMENTAL MONITORING PLAN

Monitoring is carried out to assess any disturbance to the environment and to protect both ERA and the affected parties from false charges. It is recommended that an environmental inspector be assigned to this project by ERA or the Supervising Consultant. The inspector should have a number of short term inputs from the commencement of the construction through to its completion and until cleanup has been finalised.

The Environmental inspector will take a pictorial record of all the quarry and borrow material sites and the critical sites before any construction commences. This can be used to ensure that pre-construction conditions have been restored after clean up, specially at quarry and borrow sites, detours and temporary access roads and construction camp sites. The environmental inspector's responsibilities will be to ensure that the mitigation and monitoring requirements are carried out effectively as outlined in the report and that good construction practices are followed to minimise impacts to the environment.

During construction, monitoring of the following indicators are recommended. Although ERA will retain administrative directive and management, certain part of this programmes, as described below, will be performed by other governmental agencies under contract to ERA.

8.1 Soil and Erosion

Monitoring during construction shall be done by the environmental inspector as per the mitigation measures recommended in Chapter 7.1.1.

During operation the surveillance of erosion should be conducted by the district maintenance office.

8.2 Terrestrial Vegetation

The purpose of this programme is to monitor effects of the project during the construction and after the completion of the project. The monitoring of components associated with terrestrial vegetation will be contracted to the Department of Forestry under Agriculture Bureau of the Oromia and Afar Administrative Region.. The Department of Forestry, will determine which types of forest stands should be planted and implement as recommended by mitigation plan and periodically report the progress to ERA. It will be the responsibility of the environmental inspector to be assigned by ERA or the supervising consultant to ensure the protection of important vegetation covers as outlined in section 7.2.1.

8.3 Agricultural Land

The Environmental Inspector together with Agriculturist should ensure that topsoil stripping and separate stockpiling occur during construction on agricultural land. Topsoil shall be removed to its actual depth. After completion of the work all stored topsoil shall be returned to its original area. Upon completion of backfilling, the area shall be graded and compacted to allow the topsoil to be replaced uniformly over the original area.

8.4 Health and Safety

The contractor will have primary responsibility for treatment and control of the contagious diseases in the construction site and workers camps.

The monitoring of public health will focus primarily on pre-employment medical screening and the environmental inspector together with the public health departments within the respective administrative regions will conduct periodic surveys of the project area once the construction starts to assess the safety issues associated with construction in the vicinity of the towns and villages.

Health education focusing especially on venerial diseases must be arranged by the contractor with possible coordination of MOH and/or local NGOs such as Red Cross or Care.

8.5 Nuisance Noise and Dust

It will be the responsibility of the Site Engineer and Environmental Inspector to ensure that appropriate control measures are taken and that construction activities generating significant noise and dust do not occur outside of the hours specified in section 7.13.

8.6 Equipment Fuelling and Maintenance

It will be the responsibility of the environmental inspector to ensure that recommendations outlined in section 7.1.2 are implemented and strictly followed.

8.7 Cleanup

Following the completion of the road project, it will be necessary to cleanup and rehabilitate the construction site.

This monitoring will be maintained for only a short duration during the cleanup of the construction site to ensure that environmental precautions are implemented by the construction contractors and that the required landscaping and re-vegetation programmes on all quarry and borrow areas are done as part of the construction demobilisation project. This shall also include all work necessary to rehabilitate the site including reclamation of the borrow pits, remove waste materials generated during the construction process, surplus materials from right-of-way and permanently repair or replace all damages resulting from the construction.

This will be inspected by the project environmental inspector and the site clean-up approved before the contractor is allowed to abandon the site.

8.8 Monitoring of Social and Economic Issues

During design/planning phase ERA's Environmental Protection Unit is responsible to look after that the public consultations are held as agreed in the tender.

After the project the Environmental Protection Unit will be responsible to monitor that the resettlement and compensation has been implemented as agreed by the ERA Compensation Committee.

9. TRAINING NEEDS

An analysis of the capacity building and training needs and a detailed training plan will be presented in the Sector EA Report. The plan will include the proposal for staffing and responsibilities for the new environmental unit of ERA.

Training programmes shall be organized at least at two levels:

1. First level training - training for the staff of the environmental protection unit of ERA, which may be at least partly conducted outside the country

2. Second level training-
   - training organized periodically (eg. annually) at the training center of ERA for its own staff;
   - training possibilities shall be also arranged for designers, contractors, supervisors, operation and maintenance engineers and supervisors of private and government contractors and designers organized by the environmental protection unit in collaboration with EPA and other related institutions.

The training contents should be tailored to meet the needs of the personnel concerned. The training programmes may contain legal and regulatory aspects, capacity building issues, EA procedure, environmental issues in road design (alternatives), environmental impacts to be assessed, carrying out public participation, preparation of statements, preparation of mitigation plan, preparation of monitoring plan, meaning and influence of the EA, results of the EA process, implementation of the mitigation and the monitoring plan as well as environmental aspects in contract specifications, construction supervision, maintenance and operation supervision, other environmental protection issues etc.

Emphasis shall also be given to public education on environmental protection and road safety. issues.

LIST OF TEAM MEMBERS

Foreign Experts

Mr. Hannu Karttunen	Team Leader/Road Engineering (2 months in Ethiopia - at the beginning)
Ms. Ulla Mustanoja	Sociological Aspects (3 months in Ethiopia)
Mr. Reima Petäjäjärvi	Road Sector Environmental Impact Assessment (at the beginning)
Ms. Auli Keinänen	Home Office Coordinator/EIA (1 month in Ethiopia - at the end)

Ethiopian Experts

Mr. Engida Zemedagegnehu	Hydrogeology/Soil Science/Road Engineering
Dr. Dejene Woldemariam	Ecology/Natural Resources Management
Mr. Atnafe Beyene	Sociology
Mr. Imeru Tamrat Yigezu	Institutional, Legal, Policy and Capacity Building Issues
Mr. Mengistu Haile	Project Coordination and Local Liaison/Road Engineering

References/Baseline Documents

Relevant Legislative and Policy Papers and Guidelines of the Government of Ethiopia:

Proclamation No. 1/1995 Constitution of FDRE

Proclamation No. 63/1993 Ethiopian Roads Authority Re-establishment

The National Conservation Strategy 1994, Vol. I, II, III and IV

Vol II	Federal Policy on Natural Resources and the Environment
Vol III	Institutuional Framework and Operational Arrangements for the Federal Policy on Natural Resources and the Environment
Vol IV	Action Plan for the Federal Policy on Natural Resources and the Environment

Proclamation No. 9/1995 Environmental Protection Authority Establishment

Proclamation No. 4/ 1995 - Definition of the Powers and Duties of the Executive Organs of the FDRE Proclamation

Proclamation No. 94/1994 Forest Conservation and Development Conservation (MOA to be requested)

Proclamation No. 122/1995 Ethiopian Roads Authority Amendments

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Ethiopian Roads Authority, ERA 1996: Road Sector Development Program, Second Draft, Final Report, January 1996

Environmental Protection Authority 1996: Environmental Policy of the Federal Democratic Republic of Ethiopia. EPA in collaboration with the Ministry of Economic Development and Cooperation

FDRE, Environmental Impact Assessment, Council of Ministers Regulations (draft 1997)

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Environmental Protection Authority, EPA 1997: Environmental Impact Considerations for Transport Sector Projects (draft)

Environmental Protection Authority, EPA 1997: Procedural Guidelines for Environmental Impact Assessment (draft)

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Documents regarding the Five Roads:

The Transport Construction Design Enterprise (TCDE) 1994-1995: Pavement condition surveying and designs for the following roads:

a) Kulubi - Mieso, Eng. Report (1994)
b) Alemgena - Hossana - Sodo Eng. Report, Volume I & II (1995)
c) Awash - Mille Eng. Report , Volume I (1994)

TecnEcon 1997: Consulting Services for the Five Roads Feasibility Study, Draft Final Report Volume I, II and III, May 1997. Ethiopian Roads Authority/International Development Association.

Plancenter 1997: Inception Reports for the Environmental Analysis of the Road Sector and the Five Roads selected for Upgrading/Rehabilitation (2 separate reports, June 1997). Ethiopian Roads Authority/International Development Association.

Guidelines, directives and other relevant documents of the World Bank

The World Bank 1989: Operational Directive 4.00, Annex A: Environmental Assessment

The World Bank 1990: Operational Directive 4.30 on Involuntary Resettlement

The World Bank 1991: Environmental Assessment Source Book

Volume I	Policies, Procedures and Cross Sectoral Issues
Volume II	Sectoral Guidelines
Volume III	Guidelines for Environmental Assessment of Energy and Industry Projects

The World Bank 1991: Operational Directive 4.01 on Environmental Assessment

The World Bank 1994: Roads and the Environment: A Hand Book

The World Bank 1994: Road Maintenance and the Environment

The World Bank 1995: Operational Policies 4.04 on Natural Habitats

The World Bank 1995: Papers on Social Assessment

The World Bank 1995: National Environmental Strategies: Learning from Experience

The World Bank 1996. The Impact of Environmental Assessment; The World Bank's Experience

The World Bank 1997: Participation Sourcebook

References/Baseline Documents

Other relevant/available environmental guidelines and documents:

Commission of the European Union 1993: Environmental Manual: Environmental procedures and methodology governing Lomé IV development co-operation projects

Commission of the European Union 1993: Environmental Manual: Sectoral Environmental Assessment Sourcebook

Asian Development Bank 1993: Environmental Guidelines for Selected Infrastructures Project

The World Conservation Union (IUCN) 1993: Environmental Synopsis of Ethiopia

Plancenter Ltd 1992: Environmental Impact Study of the Chida-Sodo Road Project, Ethiopia. African Development Bank Project.

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Kazmin V. 1973: Geological map of Ethiopia. Scale 1:1,000,000. Ministry of Mines and Energy.

Gouin P. 1976: Seismic zoning of Ethiopia. Bulletin of the Geophysical Observatory, Ethiopia.

Tesfaye Chernet 1982: Hydrogeological map of Ethiopia. Scale 1:2,000,000. Ministry of Mines and Energy

Soil and Geomorphology map of Ethiopia. Scale 1:2,000,000. Ministry of Agriculture, 1982.

Mean annual rainfall map of Ethiopia.Scale 1:2,000,000. National Meteorology Service Agency 1982

Master Plan for the Development of Surface Water Resources in the Awash Basin. Ethiopian Valleys Development Studies Authority, Final Report, Vol. 4 and 9. 1989

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Statistics

The 1994 Population and Housing Census of Ethiopia. Federal Democratic Republic of Ethiopia. Office of Population and Housing Census Commission. Central Statistic Authority.

- Results for Oromiya Region
  - Volume I: Part I. Statistical Report on Population Size and Characteristics, April 1996, Addis Ababa
  - Volume I: Part II. Statistical Report on Education and Economic Activity, April 1996, Addis Ababa

References/Baseline Documents

  - Volume I: Part III. Statistical Report on Migration, Fertility and Mortality, April 1996, Addis Ababa
  - Volume I: Part IV. Statistical Report on Housing Characteristics, April 1996, Addis Ababa
- Results for Harari Region
  - Volume I Statistical Report, September 1995, Addis Ababa
- Results for Dire Dawa Provisional Administration
  - Volume I Statistical Report, October 1995, Addis Ababa
- Results for Tigray Region
  - Volume I Statistical Report, November 1995, Addis Ababa
- Results for Amhara Region
  - Volume I: Part I. Statistical Report on Population Size and Characteristics, December 1995, Addis Ababa
  - Volume I: Part II. Statistical Report on Education and Economic Activity, December 1995, Addis Ababa
  - Volume I: Part III. Statistical Report on Migration, Fertility and Mortality, December 1995, Addis Ababa
  - Volume I: Part IV. Statistical Report on Housing Characteristics, December 1995, Addis Ababa
- Results for Affar Region
  - Volume I Statistical Report, December 1996, Addis Ababa
- Results for Southern Nations
  - Volume I: Part III. Statistical Report on Migration, Fertility and Mortality, June 1996, Addis Ababa
  - Volume I: Part IV. Statistical Report on Housing Characteristics, June 1996, Addis Ababa

Statistical Abstract 1995, Ethiopia, April 1996

General data of Ethiopia:

Spectrum Guide to Ethiopia 1995

Sources of social, cultural, economic and health data:

Trends in Developing Economies, World Bank, 1994

The socio-cultural and economic baseline data is based on several documents (books, studies, reports, articles and other relevant literature)

Lankinen, Bergström, Mäkelä & Peltomaa 1994: Health and Diseases in Developing Countries

List of Organizations, Institutions and Persons Met/Interviewed during the Work

Ethiopian Roads Authority, ERA
ERA District Office Manager, Gondar
ERA District Office Manager, Adigrat

Environmental Protection Authority of Ethiopia, EPA

The World Bank, Addis Ababa

The Delegation of the European Commission

Ministry of Information and Culture
- Department of Archeology and Anthropology
- Department of Information

Ministry of Agriculture
- Ethiopian Wild Life Conservation Authority
- Land Use Policy and Planning

Forestry Department

Ministry of Economic Development and Cooperation
- Environmental Planning Unit

Road Transport Authority

Chairman of the Council of Representatives of the Hadiya Zone
Economic Development Section Head of the North Wolo Zone
Inspector of the Mashilaye Transport Association
Accountant of the Mashilaye Transport Association
Deputy Chairman of the Council of Representatives of the South Tigray Zone - Maichew town
Traffic Policemen in Hirna, Asebe Teferi and Alamata towns
Elders of the Robit town
Residents in different villages/towns
People interviewed by the roads

List of Organizations, Institutions and Persons

Participants representing the following organizations in Public Meetings:

Place Dire Dawa
Date June 20, 1997

Representatives from:

1	Kulubi Saint Gabriel Church	Kulubi
1	Kulubi Town	Kulubi
3	Kulubi Peasant Association	Kulubi
1	Kersa Administration	Kersa
1	Education Office	Kersa
1	Agricultural Office	Kersa
1	Oromo Development Association	Kersa
2	Hirna Town	Hirna
1	Dire Dawa Administration	Dire Dawa
1	Dire Dawa Municipality	Dire Dawa
1	Planning Office	Dire Dawa
1	Public Works & Urban Development	Dire Dawa
1	Education Bureau	Dire Dawa
2	Agricultural Bureau	Dire Dawa
2	Agricultural Office	Dire Dawa
1	Trade Council	Dire Dawa
1	Food Complex Factory	Dire Dawa
1	Textile Factory	Dire Dawa
2	Chat Association	
1	Alem Maya Administration	Alem Maya
2	Alem Maya University	Alem Maya
1	Planning & Economic Devt Office	Harar
1	Public Works & Urban Devt.	Harar
2	Agricultural Bureau	Harar
1	Social Affairs	
1	Harar Beer Factory	Harar

Place Awash Town
Date June 22, 1997

Representatives from:

2	Woreda Council	Awash
2	Awash Town Municipality	Awash
1	Awash Kebele	Awash
1	Women Affairs Office	Awash
1	Justice Office	Awash
1	Education Office	Awash

List of Organizations, Institutions and Persons

1	Trade and Industry Office	Awash
2	Public Transport Organization	Awash
3	Awash Business Community	Awash
	Awash residents	Awash
2	Elders of Awash Town	Awash
2	Awash National Park	Awash
1	Gewane Town	Awash
1	ERA	Awash
2	ERA	Awash-Gewane

Place Mekele
Date June 26. 1997

Representatives from:

Alamata Administrative Council	Alamata
Southern Zone Administration	Maichew
Regional Administration	Mekele
Regional Adminstration	Mekele
Regional Council	Mekele
Public Works & Urban Development	Mekele
Planning Bureau	Mekele
Mining and Energy Bureau	Mekele
Justice Office	Mekele
EELPA	Mekele
Telecommunications	Mekele
Mekele Town Administration	Mekele
Mekele Town Administration	Mekele
Mekele Town Adminstration	Mekele
Rural Roads Authority	Mekele
Business Community	Mekele
Business Community	Mekele
Relief Society of Tigray	Mekele
Tigray Development Association	Mekele
Woin Newspaper	Mekele
The Press	Mekele
Eastern Zone Administration	Adigrat
Public Works & Urban Development	Adigrat

List of Organizations, Institutions and Persons

Place Hossaina
Date July 8, 1997

Participants/Representatives from:

Amacho Wato town	Amacho Wato
Peasant Association	Limu
Peasant Association	Limu
Tiya town	Tiya
Business community	Butajira
Business community	Butajira
Hadiya Zone Council	Hossaina
Hadiya Zone Council	Hossaina
Hadiya Zone Council	Hossaina
Hadiya Zone Council	Hossaina
Education Office	Hossaina
Women's Affairs Office	Hossaina
Hossaina Municipality	Hossaina
Hossaina Town	Hossaina
Hossaina Hospital	Hossaina
Public Transportation Organization	Hossaina
Hadiya Development Association	Hossaina
Business community	Hossaina
Business community	Hossaina
Business community	Hossaina
Business community	Hossaina
Private investors	Hossaina
The Press	Hossaina
KAT Zonal Council	Durame
Public Works & Urban Development	Durame
Business community	Areka
Business community	Areka
Woreda Council	Shinshicho
Woreda Council	Shinshicho
Education Office	Shinshicho
Sodo Woreda Council	Sodo
Women's Affairs Office	Sodo
Business Community	Sodo
Business Community	Sodo

FIELD VISIT PROGRAMME

The Field Survey on the Five Roads 19.6.-8.7.1997

Date	Road Section/Public Consultations	
19.6.1997	Addis Ababa - Dire Dawa	Night in Dire Dawa
20.6.	*Public Consultation in Dire Dawa*	*8.30 - 13.00*
	Dire Dawa - Harar - Dire Dawa	Night in Dire Dawa
21.6.	Dire Dawa - Awash	Night in Awash
22.6.	*Public Consultation in Awash*	*8.30 - 13.00*
	Awash - Mille - Bati	Night in Bati
23.6.	Bati - Dessie - Woldia	Night in Woldia
24.6.	Woldia - Mekele	Night in Mekele
25.6.	Mekele - Zalambesa - Mekele	Night in Mekele
26.6.	*Public Consultation in Mekele*	*8.30 - 13.00*
	Mekele - Adigrat - Axum	Night in Axum
27.6.	Axum - Gondar	Night in Gondar
28.6.	Gondar - Bahir Dar - Dangla	Night in Dangla
29.6.	Dangla - Debre Marcos - Addis Ababa	
7.7.	Addis Ababa-Hossaina	Night in Hossaina
8.7.	*Public Consultation in Hossaina*	*8.30 - 13.00*
	Hossaina-Addis Ababa	

Persons attending the site visits:

Ms. Ulla Mustanoja	Senior Sociologist
Mr. Engida Zemedagegnehu	Hydrogeology/Soil Science/Road Engineering Expert
Mr. Dejene Woldemariam	Ecology/Natural Resources Management Expert
Mr. Atnafe Beyene	Sociologist
Mr. Taddele Debela	Counterpart from ERA

MINUTES OF MEETING

Public Consultation due to the Upgarding/Rehabilitation of the Awash - Kulubi - Dire Dawa - Harar Road

Place	Dire Dawa
Date	June 20, 1997
Time	9:00 - 12:00

Coordinator

Facilitators	Ato Tadele Debele,	ERA HQ, Chairperson
	Ato Dejene Wolde Mariam	Plancenter
	Ato Atnafe Beyene	Plancenter
	Ms. Ulla Mustanoja	Plancenter

Agenda

1. Introduction by ERA representative
2. Introduction of the Plancenter Consultants
3. Discussion on the issues raised by the introductions

1. Introduction by ERA representative

The representative of ERA explained the purpose of the public consultation and the Road Sector Development Plan (RSDP) in general and specifically the Mojo - Awash - Mille road rehabilitation work that ERA will undertake. In the introduction outlined following issues:

* Environmental Assessment is an essential part in planning and designing roads
* Environmental impact issues are global by nature and environmental problems crosses national borders. Problems such as ozone layer depletion, soil erosion, forest depletion etc have become major concern in the world.
* Development activities should not disturb the environment and hence mitigation plans must be included already in the planning process.
* Benefits of the road and use of natural environment should be harmonized in road construction
* Public consultation is a new approach in the road sector and it is believed that it contributes a lot in the designing of the roads.
* The public can use this forum to express their ideas regarding the present problems and benefits of the road.

2. Introduction by the Plancenter consultants

The consultants of Plancenter explained about the general framework of the environment impact assesment (EA) study, the objective of the public consultation meeting and why public participation is necessary. It was stated that road construction have different impacts on the social and physical environment. The environmental impacts can be classified as

Physical and natural environment
- Soil erosion
- Water
- Air quality
- Flora and fauna

Human and social environment
- Community life and economic activities
- Land aquisition and resettlement
- Indigenous and traditional populations
- Cultural heritage
- Aesthetics and landscape
- Noise
- Road safety

Managing road works and traffic operations
- Construction and offsite activities
- Rehabilitation and maintenance practicies
- Risks associated with road works and traffic operations

It was explained also that public consultation is part of the EA study and the objectives are
* Delivering information about the project
* Collecting information, opinions and concerns about environmental issues related to the road project
* Give different parties of the communities along the road the possibility influence the methods of avoiding, limiting and compensating the possible negative impacts of the road project.
* Have discussions abot possible alternative routes or alignments and e.g. temporary by-passer and work sites during road construction

The introduction included also that
* Participants should mention the problems and benefits that are unique to this road
* The consultants would like to hear from the participants different issues regarding the project and what the public says about this road.
* The upgrading and rehabiltation works will be on existing road and there will be few alignments in some sections of the road.
* In the past there were damages to properties and farm lands and in some areas people reacted negatively and it was difficult to implement road and other projects.

The need and importance of public participation was also stressed

* Participation guarantees sustainability

Participation engourages a sense of responsibility

* Participation ensures that things are done in the right way

Participants were reminded to include into the discussion

* the social problems on the existing road
* what should be done in the future to avoid problems that might appear
* the beneficiaries of the road
* for what purpose the road is used
* what mechanism should be used to involve the public in road construction
* compensation experiences for the loss of property in the region
* resettlement experiences as a result of development activities in the region and how they have been handled etc.
* other social and economic issues they consider important

3. Discussion: Highlights of meeting discussions

* People are happy to have such a meeting. This is regarded as a big step forward.
* The road is import and export road.
* The road is the main link to the eastern part of the country including the Ogaden.
* It is the main road for the trunk roads of the coffee and chat producing areas of Hararge.
* The poor road condition is one of the causes of accidents
* Asebe Teferi and the upland country is a vulnerable area for soil erosion due to its natura features and rainfall.
* The road construction is not going to force people to resettle in another area except in fe rural towns where people have built houses (such as shops, bars) close to the main road.
* The dust have been a major upset to the people who live by the rural towns and to the drivers since it blocks the visibility. The dust gets into the shops, eating places etc. and h created inconviniences to dry the washed clothes.
* The people of Asebe Teferi town have gone to the extend of digging trenches to slow down vehicles and to minimize dust rise.
* People who live near by the road are using the road as a point of center to sell whatever they have, i.e. fire wood, charcoal, chat, fruit etc.
* Worship places should be identified before quarry sites are selected and decided.
* The fuel trucks and other big trucks are in a problem due to the poor condition of the roa
* Vehicles are always broken due to the road condition which has an impact on foreign exchange and down time.
* People are very eager to see the road asphalted since the news have been there for many years.
* The Chat Association representatives indicated that during construction roads may be closed and chat transportation may be affected which may cause damage on the chat sinc it has to be watered at certain intervals to keep its quality
* ERA does not rehabilitate lands used for quarry which could be a breeding ground for malaria and other diseases.
* More than one center should have been used for public consultation since it is quite a distance for some areas to come to Dire Dawa.

* Goods transported to and from are delayed due to the road condition especially during the rainy season since the road becomes slippery.
* Development of the road system entails damages but mitigation plans have to be integratec to the the planning
* Distinction of the farmlands should be minimized since it is decreasing due to the many reasons.
* Roads may go over the existing spring sources and many cause the sprongs to disappear al together.
* Integration of development activities is necessary.
* A committee consisting diffent groups should be established when dealing with compensation
* Fertilizer and other inputs for the farmers are not coming to the region in time.
* ERA construction camps have been a major cause for the destruction of natural resources like forests, wild animals etc. People should see the resources as their own
* Education on the environmental protection should be given to all people
* Primary and secondary ditches by the road sides have become major causes for soil erosion
* Products of the region are export items but due to the transportation problem they are not exported on time or at all. E.g. Djibuti imports fruits from South America while it can get it from this region.
* The Awash-Kulubi-Dire Dawa-Harar road passes through the fertile and productive areas of the region unlike the railroad
* The train and airplane cannot get items to be transported unless the roads are improved.
* Roads to be sustainable need uphill treatment and this needs institutional arrangement which must be seriously considered.
* Loss of land is minor compared to the benefits of the road.
* Detour for major towns like Hirna and Asebe Teferi towns should be considered. However, there was another thought that detour kill towns which have been active.
* Road safety signs are taken by people to be used the metal for different purposes.
* Drivers are attacked by Shiftas when their vehicles are broken in the middle of nowhere.
* Coordinate soil engineers activities with road engineers to prevent soil erosion.
* The benefits of the road has been stated by the different groups which reflect their interests.

Participants of the Public Meeting

Representatives from

1	Kulubi Saint Gabriel Church	Kulubi
1	Kulubi Town	Kulubi
3	Kulubi Peasant Assiciation	Kulubi
1	Kersa Administration	Kersa
1	Education Office	Kersa
1	Agricultural Office	Kersa
1	Oromo Development Association	Kersa
2	Hirna Town	Hirna
1	Dire Dawa Administration	Dire Dawa
1	Dire Dawa Municipality	Dire Dawa
1	Planning Office	Dire Dawa
1	Public Works & Urban Development	Dire Dawa
1	Education Bureau	Dire Dawa
2	Agricultural Bureau	Dire Dawa
2	Agriculture Office	Dire Dawa
1	Trade Council	Dire Dawa
1	Food Complex Factory	Dire Dawa
1	Textile Factory	Dire Dawa
2	Chat Association	
1	Alem Maya Administration	Alem Maya
2	Alem Maya University	Alem Maya
1	Planning & Economic Devt Office	Harar
1	Public Works & Urban Devt.	Harar
2	Agricultural Bureau	Harar
1	Social Affairs	
1	Harar Beer Factory	Harar

QUESTIONNAIRE FOR NON-GOVERNMENTAL ORGANIZATIONS

On the basis of Ethiopian Road Authority's (ERA) in-house preparatory activities and the results of the Road Transport Sector Study, the Government formulated the Road Sector Development Plan (RSDP) covering the period 1997 to 2007.

The RSDP aims to enhance and expand the Ethiopian road network over a ten year period and involves both road rehabilitation and construction of new roads. Detailed design of the individual road components will be developed gradually over this period. Environmental Assessment of the Program is required according to national policies, regulations and guidelines as well as to regulations of the financing institutions.

These questionnaires are preliminary for the Environmental Assessment for

(a) the rehabilitation of the Mojo-Awash-Mille bitumen surfaced road;
(b) the upgrading of the Alemgena-Hossaina-Sodo gravel road;
(c) the upgrading of the Woldiya-Adigrat-Zalambessa gravel road;
(d) the upgrading of the Debre Marcos-Gondar road; and
(e) the upgrading/rehabilitation of the Awash-Kulubi-Dire Dawa-Harar gravel/paved road

We cordially ask Your Organization's view about the present environmental situation along the above mentioned road as well as the anticipated positive and negative impacts for the local communities during the construction period and after it.

If Your Organization is not active along the roads mentioned above, we nevertheless appreciate your general opinion and experiences about the social and environmental issues/ concerns which should be taken into consideration when constructing/ upgrading or rehabilitating the roads in the country.

We kindly ask you to fill the attached questionnaire, However, we welcome any additional comments and suggestions Your Organization can provide of the problems and wishes related to the use and construction of roads. If the space left for the answers is not enough, please, use the back of the paper.

The answers are received and studied by the independent consultants participating in the development of the Environmental Assessment (EA) for Road Construction for ERA. The answers will be confidential.

NGO Questionnaire

Due to the limited time for this preliminary study the filled questionnaires should be back to us no later than the 5th of July to

Plancenter Ltd
P.O.Box 100086
Addis Ababa
[Fax number 614939]

Thank You for Your cooperation!

Questionnaire for NGOs for the ERA Environmental

Name of the NGO:
Main office location:
Type of activities:

Locations of the activities:

Participation in decision making

The road prodects may have significant impacts to human and natural environment. Therefore, to avoid community or sectional opposition to the road project, the community members along the proposed road sites need to have an opportunity to be involved in an early stage in the planning process.

According to your opinion, how should this be done?

- Who are the individuals or groups who especially should be contacted?

- Especially for which road construction activities affecting people (loss of land, drainage design, location of schools etc.) should local people be contacted?

- Who/which ministry/ authority should have the responsibility to decide that environment will be taken into consideration

Use of Road

Which are the most important uses of the road by people living by the road?

Which of these activities would not exist without the road?

Who are the main users of the local roads?
- men
- women
- children
- shop keepers
- others such as

What should/ could be done with the domestic animals to avoid traffic problems?

NGO Questionnaire

The Biggest Problems with the Roads

What are the present problems with the existing road?

Which groups of people have problems with the road or who are suffering most of the road?

How these problems should/could be decreased or eliminated according to your judgement?

What type of measures - and by whom - can be taken to mitigate the anticipated problems caused by the upgrading/rehabilitation of the road

Road Safety and Traffic Accidents

Ethiopia has one of the highest frequency of traffic accidents in the world and hence the traffic safety should be increased on the roads.

- What are the biggest reasons for road accidents?

- What are the most "typical" accidents?

According to your judgement, what should be the first tasks to decrease the amount of accidents?

- Who should do it?

Has any of your vehicles had any accident on above mentioned roads (or on some other road)? If yes, what was the reason for accident?

- What happened after the accident, what measures were taken to deal with the accident?

Compensation Issues

In case of an traffic accident such as losing human life, what is the compensation system in practice?

What would be the just compensation due to the loss of farm land or other property to the road construction?

Erosion

Erosion is one of the major causes deteriorating /damaging the roads in Ethiopia. What are the biggest reasons for erosion along the road sides?

- Which human or village activities are causing the environmental problems such as erosion (or other problems) to the roads?

- What could /should be done to avoid these activities? Who should do?

Road Construction Period

Road construction needs machinery and labour, which disturbs the normal life of the road side people. What are the biggest problems caused by the construction work?

What are the social and environmental problems to the local people left behind by the road construction machinery or their storage?

What could/should be done to avoid or mitigate the problems?

What benefits are the construction workers/camps bringing to the area?

How could the benefits be increased or made permanent?

What problems are the construction workers /camps bringing to the area?
What should be done to avoid the problems?

What should be taken into consideration during the upgrading/ rehabilitation of the road to mitigate the problems during construction period.
Benefits from the improved roads

What do you think will be the benefits from the improved road and why?
- to the community at large

- for the business community

- for governmental administrative staff

- to the communities along the road

- to tourism

- to any other persons/groups

NGO Questionnaire

Settlement patterns

Many people are settling down by the roads and build their houses there. What are the biggest reasons for that?

Who are the people who prefer to settle down by the road?

What are the reasons for the new settlements?

What should be done with the illegal settlements?

Cultural and Historic Sites and Wild Life Sanctuaries

How should/could they be taken into consideration?

CHECKLIST FOR SCOPING

Project: Awash - Kulubi - Dire Dawa - Harar

	Potential Environmental Impact Area	Adverse Impacts	No Impacts	Beneficial Impacts	Evaluation Base
I	**Physical Environment**				
1	**Soil and bedrock**				
	1.1 Erosion	X		X	
	1.2 Stability of slopes	X			
	1.3 Soil contamination by spills of hazardous materials	X			
	1.4 Material use	X			
	1.5 Ground subsidence		X		
	1.6 Others				
2	**Water Resources and Water Quality**				
	2.1 Changes in surface water hydrology	X			
	2.2 Changes in ground water hydrology		X		
	2.3 Sedimentation/Siltation		X		
	2.4 Water harvesting			X	
	2.5 Highway runoff pollution	X			
	2.6 Others				
3	**Air Quality**				
	3.1 Air pollution due traffic	X		X	

	Potential Environmental Impact Area	Adverse Impacts	No Impacts	Beneficial Impacts	Evaluation Base
II	**Natural Environment**				
4	**Biological and Ecological Changes**				
	4.1 Impacts on vegetation	X			
	4.2 Impacts on important flora and fauna		X		
	4.3 Degradation of ecosystem with bio-diversity		X		
	4.4 Wildlife reserve		X		
	4.5 Impairment of fisheries	X			
	4.6 Encroachment into precious ecology		X		
	4.7 Others				

	Potential Environmental Impact Area	Adverse Impacts	No Impacts	Beneficial Impacts	Evaluation Base
III	**Human and Social Environment**				
5	**Social Issues**				
	5.1 Social acceptability		X		
	5.2 Resettlement/displacement	X			
	5.3 Demographic changes	X		X	
	5.4 Change in way of life		X		
	5.5 Impacts on women			X	
	5.6 Impact on indigenous peoples			X	
	5.7 Induced development	X		X	
	5.8 Conflicts between locals and immigrants	X			
6	**Economic Issues**				
	6.1 Loss of agricultural land	X			
	6.2 Loss of property	X			
	6.3 Employment opportunities			X	
	6.4 Change of economic activities			X	

7	*Effects on Public and Private Services*	X		X	
8	Health and Sanitary Issues	X		X	
9	*Traffic Safety*	X		X	
10	Cultural, Religious and Historical areas			X	
11	Damage to Aesthetic Sites		X		
12	Impacts on Local and National Economy			X	

Table 1 Annual Rainfall at Dire Dawa Town

Month	Rainfall		
	Mean	Minimum	Maximum
January	15.47	0	76.9
February	40.21	0	159.7
March	50.12	0	248.3
April	66.58	0	186.7
May	51.64	0	145.7
June	35.34	2.5	128.1
July	93.43	26.0	228.7
August	117.11	58.3	259.6
September	56.68	12.1	116.0
October	11.65	0	41.5
November	15.38	0	122.7
December	9.99	0	94.3
Annual	**563.60**	**353.8**	**858.5**

Source: Awash Basin Master Plan, EVDSA, 1989

Table 2 Mean Monthly Flows for Awash and Hirna Rivers

Month	Locations
	Awash at Awash Station
January	82.58
February	80.18
March	95.53
April	100.37
May	102.14
June	91.79
July	152.87
August	281.96
September	280.03
October	112.98
November	79.00
December	80.36
Annual	

Table 3 Water Quality of the Awash River at Melka Sadi

Parameter	
EC (ys/cm)	0.32
pH	7.59
Total Dissolved Solids	160.00
ESP	0.04
Ca^{2+} (mg/l)	1.24
Na^{+} (mg/l)	1.52
Mn^{2+}(mg/l)	0.40
Mg^{2+}(mg/l)	0.52
Cl^{-} (mg/l)	0.32
HCO_3^{-} (mg/l)	3.08
Adj. SAR	0.88
$N\text{-}NO_3^{-}$ (mg/l)	2.20
$N\text{-}NH_4^{-}$ (mg/l)	0.26
F^{-} (mg/l)	1.58
Fe^{2+} (mg/l)	0.05
B (mg/l)	0.22

Source: Ministry of Water Resources,
1993 Water Quality Survey Report

Baseline Data/Human and Social Environment

Table 1. Counted and Estimated Population Size of Regions, Zones, Woredas and Towns by Sex, and the Share of Urban Population; and Share of Women of Total Urban Population (1994)

	Total population	%Female	%Urban	%Female
The Affar Region	1098184	43.3	7.8	47.8
The Affar Zone 3	150346	45.0	24.6	47.9
Amibara Woreda	40175	41.5	48.1	47.1
- Awash	4042	49.6	-	49.5
The Oromiya Region	1962804	51.6	10.0	50.8
The Mirab Hararge Zone	1271894	48.6	7.5	50.0
Mieso Woreda	93735	50.0	21.6	49.8
- Arba Bordore town	3485	49.6	-	49.6
- Asebot town	7335	49.9	-	49.9
- Mieso town	5769	49.8	-	49.9
Chiro Woreda	294295	48.7	7.1	50.5
- Asebe Teferi	18678	50.6	-	50.6
- Kuni town	2164	48.9	-	48.9
Tulo Woreda	117273	48.9	9.5	50.9
- Hirna town	9353	51.5	-	51.5
The Misrak Hararge Zone	1830631	48.9	5.4	50.0
Goro Gutu	105719	49.1	4.1	48.9
- Karamile town	1837	49.9	-	49.9
Deder Woreda	179541	48.9	7.8	48.9
- Kobo town	4407	48.0	-	48.0
Meta Woreda	172803	48.8	4.0	49.9
- Chelenko town	4457	49.3	-	49.3
- Kulubi town	2501	49.7	-	49.7
Kersa Woreda	121197	48.6	5.6	48.9
- Kersa town	1808	48.3	-	48.3
Haro Maya Woreda	166597	49.1	11.2	49.9
- Alem Maya town	8560	50.6	-	50.6
- Adele town	3663	51.2	-	51.2
- Aweday town	3925	46.6	-	46.6
Harari Region	76378	50.9	100.0	50.9
- Harar town	76378	50.9	-	50.9
Dire Dawa Provisional Administration	251864	49.4	68.8	50.1
- Dire Dawa town	164851	50.1		-50.1

Baseline Data/Human and Social Environment

Table 2. Table Population under 15 years of age (%)

Mieso	48
- Arba Bordode	47
- Asebot	44
- Mieso	44
Chiro	47
- Asebe Teferi	33
- Kuni	41
Tulo	46
- Hirna	36
Goro Gutu	46
- Karamile	44
Deder	46
- Kobo	42
Meta	46
- Chelenko	39
- Kulubi	35
Kersa	44
- Kersa	38
Haro Maya	46
- Alem Maya	39
- Adele	43
- Aweday	47

Table 3 **The percentage share of the biggest ethnicities in the survey area by woreda, by the share of urban population, and separately by town**

	Oromo		Amhara		Somali		
Mieso woreda	88	62	3	15	6	14	
- Arba Bordode	-	49	-	10	-	36	
- Asebot	-	73	-	14	-	5	
- Mieso	-	52	-	22	-	12	Argoba 6
Chiro woreda	86	42	12	46	-	-	
- Asebe Teferi	-	40	-	47	-	-	Guragie 8
- Kuni	-	64	-	34			
Tulo woreda	79	45	20	47	-	-	
- Hirna	-	45	-	47	-	-	Guragie 4
Goro Gutu wo	92	57	7	39			
- Karamile	-	56	-	41	-	-	
Deder woreda	92	67	7	28			
- Kobo	-	78	-	17	-	-	Guragie 4
Meta woreda	92	53	7	39			
- Chelenko	-	59	-	33	-	-	Guragie 6
- Kulubi	-	43	-	49	-	-	Guragie 6
Kersa woreda	96	68	3	30			
- Kersa	-	54	-	44			
Haro Maya wo	96	74	3	20			
- Alem Maya	-	65	-	30	-	-	Guragie 3
- Adele	-	69	-	28	-	-	
- Aweday	-	95	-	3	-	-	Guragie 2

Baseline Data/Human and Social Environment

Table 4 The share of Muslims and Orthodox Christians of the total population in the woredas along the road, and share of urban population.

	Orthodox Christian		Muslims	
	Total	Urban	Total	Urban
Mirab Hararge Zone	14	47	86	51
Mieso woreda	5	20	95	79
- Arba Bordode	-	13	-	87
- Asebot	-	20	-	79
- Mieso	-	28	-	71
Chiro woreda	17	64	82	33
- Asebe Teferi	-	63	-	33
- Kuni	-	70	-	30
Tulo woreda	23	56	77	42
- Hirna	-	55	-	43
Misrak Hararge Zone	4.5	33	95	66
Goro Gutu wo 8	46		92	53
- Karamile	-	51	-	47
Deder woreda	8	30	92	68
- Kobo	-	20	-	80
Meta woreda	8	43	92	57
- Chelenko	-	38	-	62
- Kulubi	-	52	-	48
Kersa woreda	4	32	96	67
- Kersa	-	46	-	51
Haro Maya wo	4	24	96	75
- Alem Maya -	26		- 73	
- Adele	-	36	-	63
- Aweday	-	3	-	97

Table 5 Literacy rates in the project area

	Male Female Urban+Rural		Male Female Urban	
Mieso woreda	15	9		
- Arba Bordode	44	23		
- Asebot			47	34
- Mieso			62	46
Chiro woreda	20	12		
- Asebe Teferi			80	69
- Kuni			53	43
Tulo woreda	26	14		
- Hirna			81	62
Goro Gutu wo	18	7		
- Karamile			74	40
Deder woreda	15	10		
- Kobo			56	36
Meta woreda	13	6	-	
- Chelenko			73	50
- Kulubi			62	54
Kersa woreda	18	9		
- Kersa			79	58
Haro Maya wo	20	12		
- Alem Maya			69	53
- Adele			53	40
- Aweday			47	30

Table 6 Households per housing units in towns along the road, persons per urban housing units, and persons per one room (rural + urban)

I Households per Housing Units in Town, and
II Persons per Housing Unit, and
III Persons per one room by woreda (urban + rural)

	I	II	III
The Mirab Hararge Zone	1.05	4.5	4.2
Mieso woreda			4.6
- Arba Bordode town	1.04	5.1	
- Asebot town	1.04	5.3	
- Mieso town	1.05	4.7	
Chiro woreda			4.3
- Asebe Teferi	1.03	4.3	
- Kuni town	1.03	3.7	
Tulo woreda			4.0
- Hirna town	1.05	4.1	
The Misrak Hararge Zone	1.04	4.5	3.9
Goro Gutu woreda			4.1
- Karamile town	1.04	4.1	
Deder woreda			3.9
- Kobo town	1.02	5.3	
Meta woreda			4.1
- Chelenko town	1.04	4.4	
- Kulubi town	1.05	4.2	
Kersa woreda			3.5
- Kersa town	1.04	3.6	
Haro Maya woreda			3.3
- Alem Maya town	1.10	5.1	
- Adele town	1.02	4.9	
- Aweday town	1.03	5.6	

Table 7 Share of households using different fuels in the towns by road.

The share of household units using
I Fuel wood only or with the other fuels
II Charcoal only or with other fuels
III Kerosine only or with other fuels

	I	II	III
The Mirab Hararge Zone	97	0.06	0.2
- Arba Bordode town	93	40	1
- Asebot town	92	19	4
- Mieso town	98	31	8
- Asebe Teferi	86	26	26
- Kuni town	75	6	2
- Hirna town	86	15	12
The Misrak Hararge Zone	97	0.1	0.1
- Karamile town	90	10	5
- Kobo town	85	33	7
- Chelenko town	84	39	11
- Kulubi town	91	19	11
- Kersa town	75	42	9
- Alem Maya town	84	27	21
- Adele town	90	31	3
- Aweday town	94	16	25

Table 8 **Average monthly rents, dwelling rented from a kebele and private sources and the share of owner occupied dwellings**

I Average monthly rent per housing unit in Birr
II Share of housing units rented from Kebele in per cent
III Share of housing units rented from private households in per cent
IV Share of housing units occupied by owner in per cent

	I	II	III	IV
The Affar Zone 3	38.71	9	27	45
The Oromiya Region	18.20	24	17	49
The Mirab Hararge Zone	17.05	29	17	42
- Arba Bordore town	24.80	7	10	76
- Asebot town	7.55	31	5	42
- Mieso town	15.20	29	14	52
- Asebe Teferi	22.83	37	22	28
- Kuni town	13.88	21	11	62
- Hirna town	12.69	48	16	27
The Misrak Hararge Zone	14.70	28	11	52
- Karamile town	8.90	48	14	24
- Kobo town	12.81	26	11	51
- Chelenko town	17.82	35	12	48
- Kulubi town	14.18	15	8	74
- Kersa town 13.07	30	13	38	
- Alem Maya town	10.53	44	9	42
- Adele town	40.01	13	4	76
- Aweday town	17.16	15	3	79

Table 9 **The urban and rural economic activity and unemployment rates of population aged ten years or over for the Mirab and Misrak Hararge Zones**

	Mirab Zone:		Misrak Zone:	
	Activity rate	Unemployment rate	Activity rate	Unemployment rate
Urban				
Male	61.72	12.08	62.19	14.57
Female	35.33	15.92	31.60	21.31
Rural				
Male	87.12	.30	84.80	.51
Female	66.55	.40	57.39	.81

Table 10 **The urban economic activity and unemployment rates of population aged ten years or over by sex in the towns along the road:**

	Economically active		Unemployment Rate	
	Male	Female	Male	Female
- Arba Bordode	66.43	17.77	20.46	12.44
- Asebot town	65.83	29.83	32.76	56.33
- Mieso town	64.28	40.10	24.01	32.22
- Asebe Teferi	53.03	33.38	15.85	22.22
- Kuni town	59.85	43.43	NA	NA
- Hirna town	56.97	34.13	11.65	16.48
- Karamile town	60.88	25.73	27.00	27.68
- Kobo town	59.28	24.92	25.88	38.40
- Chelenko town	71.25	28.12	16.98	24.40
- Kulubi town	73.69	32.91	19.06	34.71
- Kersa town	62.41	36.80	3.15	3.23
- Alem Maya town	55.46	20.73	12.66	14.73
- Adele town	56.74	19.04	10.04	17.07
- Aweday town	79.79	46.07	24.52	37.83

The lower activity rates for women are mainly due to the way 'productive activity' is defined. Unpaid household tasks such as preparing food, cleaning the house, taking care of the children or collecting firewood or fetching water are not considered to be productive activities.

Table 11 Economically active population aged ten and over by sex and major industrial divisions (Oromiya Region - Urban): 1994

	Total	Male	Female
Economically active	612269	62	38
Agriculture, Hunting, Forestry and Fishing	113542	73	27
Mining and Quarring	3488	93	7
Manufacturing	47987	69	31
Electricity, Gas and Water Supply	3904	83	17
Construction	13837	94	6
Wholesale & Retail Trade, Repair of Vehicles, Personal and Household Goods	119440	63	37
Hotels and Restaurants	95109	16	84
Transport, Storage & Communications	32430	90	10
Financial Inter-Mediation	1265	77	23
Real Estate, Renting and Business Activities	1511	85	15
Public Administration and Defence, Compulsory Social Security	59438	80	20
Education, Health and Social Work	38762	75	25
Other Social, Cultural, Personal and Household Activities	17124	84	16
Private Households with Employed Persons	28908	31	69
Extra-Territorial Organizations and Bodies	197	77	23
Not Stated	35327	59	41