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

ALEMGENA-HOSSAINA-SODO ROAD

Final Report
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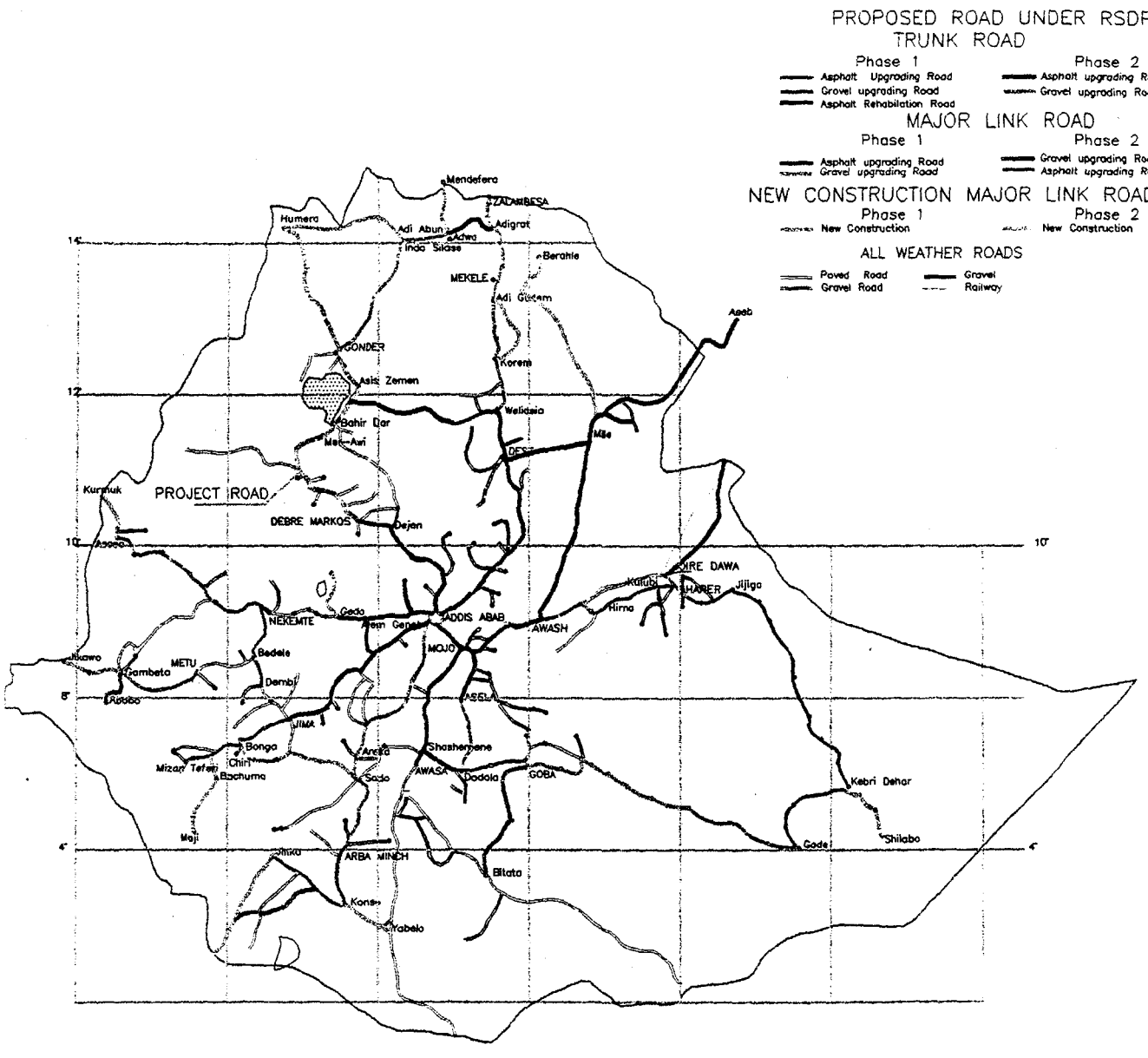
APPENDICES

ABBREVIATIONS

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
KAT	Kembata Alabana Timbaro (Zone)
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
SNNP	Southern Nations and Nationalities and Peoples (Region)
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 and Mojo-Awash-Mille Road. This report includes the environmental analysis of upgrading of the Alemgena-Hossaina-Sodo 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 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

The project road starts in Oromiya Region and in its Mirab/West Shewa Zone and continue to the Southern Nations and Nationalities and People's Region (SNNP Region) going through Gurage, Hadiya, Kambata Alabana Timbaro, and Semen/North Omo Zone where the project road ends in Sodo town from where there is a road junction one road continuing to Sawla and the other to Arba Minch.

This 320 road is a secondary road located in the North-South Rift Valley corridor. It runs parallel to the main road running north through Shashamene to Addis Ababa and forms part of the Trans East Africa Highway. The road is trafficked by about 60 percent of medium to heavy (mainly rigid) commercial vehicles or large buses. It lies mostly within the high plateau region south of Addis Ababa although the last 50 km to Sodo drops down towards the Rift Valley. The terrain is predominantly flat to rolling with about 10 -15 % of the length classified as hilly to mountainous.

Near Awash there is a famous archeological site, Melka Kunture, where since 1965, geologists and archeologists have had a compound set up to excavate this area at the entrance to the gorge where, two million years ago, the earliest ancestors of mankind had a home. Nearby, but off the road, is also the Adadi Maryam church, which is similar to the rock churches at Lalibela and visited by many Ethiopians during the annual celebrations. Also in Tiya many prehistoric monoliths or stelae can be found. This site is listed as one of the World Heritage Sites by UNESCO.

The road is characterized by tens of ethnicities and different languages. Also the religions vary from one town to the other. Protestants, Orthodox and Catholic Christians, Muslims and also many traditional religions are followed here.

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

level 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 adverse issues 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. Negative 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.

Clearing and grabbing by 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.

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

Pollution hazards 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.

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 of terrestrial ecosystem or natural or semi-natural forest all along the project area. The project component will not involve 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 upgrade the present road is very high. All people and organizations interviewed and the participants in the public hearing in Hossaina gave a clear acceptance to the project. The only concerns are related to the construction period.

There will be temporary losses of agricultural and grazing land (for detours, construction camps, storage sites, asphalt plants etc.). 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 houses to be demolished are compensated according to the costs of a new similar house. However it is recommended by the consultant that wood & mud houses would be compensated by the value of hollow block or natural stone houses to save the scarce tree resources. However, there will not be any need to demolish houses along this road due to the project.

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. 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 the estimation should be based on many years' production. There will be few places where the trees will be affected, the compensation will be estimated using market value.

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.

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.

The improved road make it easier to the tourists to reach the cultural, archeological and historical monuments and sites near the road. 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. The potential impact of the project upon cultural, religious and historical sites was assessed and there is only one archeological site in Tiya which might be affected by the 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. The improved road would not raise dust which is one of the biggest reasons for accidents alongside the slippery road surface during rainy season. The better pavement will also increase the speed of traffic increasing the risk 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) through upgrading, the erosion problems due to the low standard of the present 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) during the rainy season the paved road will not be as slippery as the present road; and (iv) it is environmentally friendly that vehicles stay in better condition due to improved road surface.

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.

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 kept 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 ERA Compensation Committee has always been established for all road projects. The main role of the Committee is to set compensations.

The needed areas for construction should be planned as to minimize the effects on the growing crop, coffee, trees and temporary losses of agricultural and grazing land. The value of the lost crop should be estimated according to market prices. Although it seems that no

houses will be affected, in case this question arises later, demolished houses are compensated by ERA according to the costs of a new house. It is recommended that wooden houses will be compensated with a price needed for hollow block houses for environmental reasons.

Resettlement must be planned before the implementation starts. Both the compensation and resettlement should include all displaced people, independent of the fact if they reside in legally or illegally built houses.

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 camping 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.

The health education, especially about veneral diseases should be included in the mitigation plan.

Monitoring

It is recommended that an environmental inspector would be assigned to this project. 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 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.

There has been no evaluation or monitoring on resettlement/ compensation from ERA's side. It is ERA's responsibility to monitor the compensation and resettlement implementation.

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 through improved design standard and related specifications in addition to greater use of re-vegetation techniques made especially on exhausted gravel pits. Existing potential for re-dressing much of the damage by bio-engineering techniques shall also be promoted. 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 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-SodoRoad, Woldiya-Adigrat-ZalambessaRoad, Debre Markos-Gondar Road, Awash-Kulubi-Dire Dawa-Harar Road as well as Mojo-Awash-Mille Road. This report is the environmental analysis of the Alemgena-Hossaina-Sodo 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.

1.2 Location of the Study Area

This 320 km road is a secondary road located in the North-South rift valley corridor. It runs parallel to the main road running north through Shashamene to Addis Ababa and forms part of the Trans East Africa Highway. The road starts in Oromiya Region and its Mirab/West Shewa Zone and continue to the Southern Nations and Nationalities and People's Region (SNNP Region) going through Gurage, Hadiya, Kambata Alabana Timbaro, and Semen/North Omo Zone where the project road ends in Sodo town from where there is a road junction one road continuing to Sawla and the other to Arba Minch.

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 Band 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)

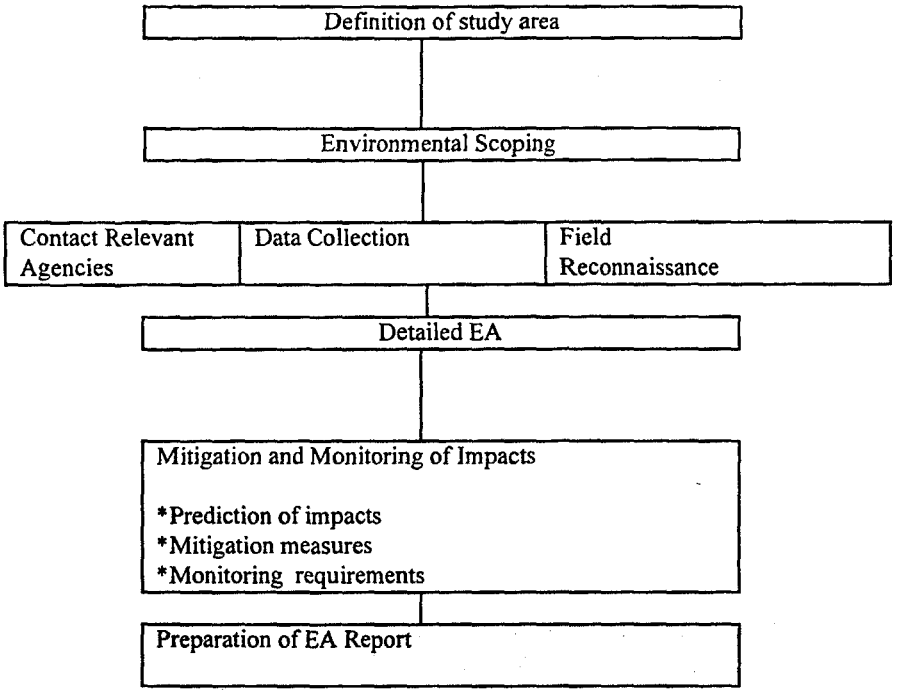
- site visits; the whole road section was studied by the team (see site visit programme; Appendix 4)

- 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 upgrade 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 Hossaina 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.

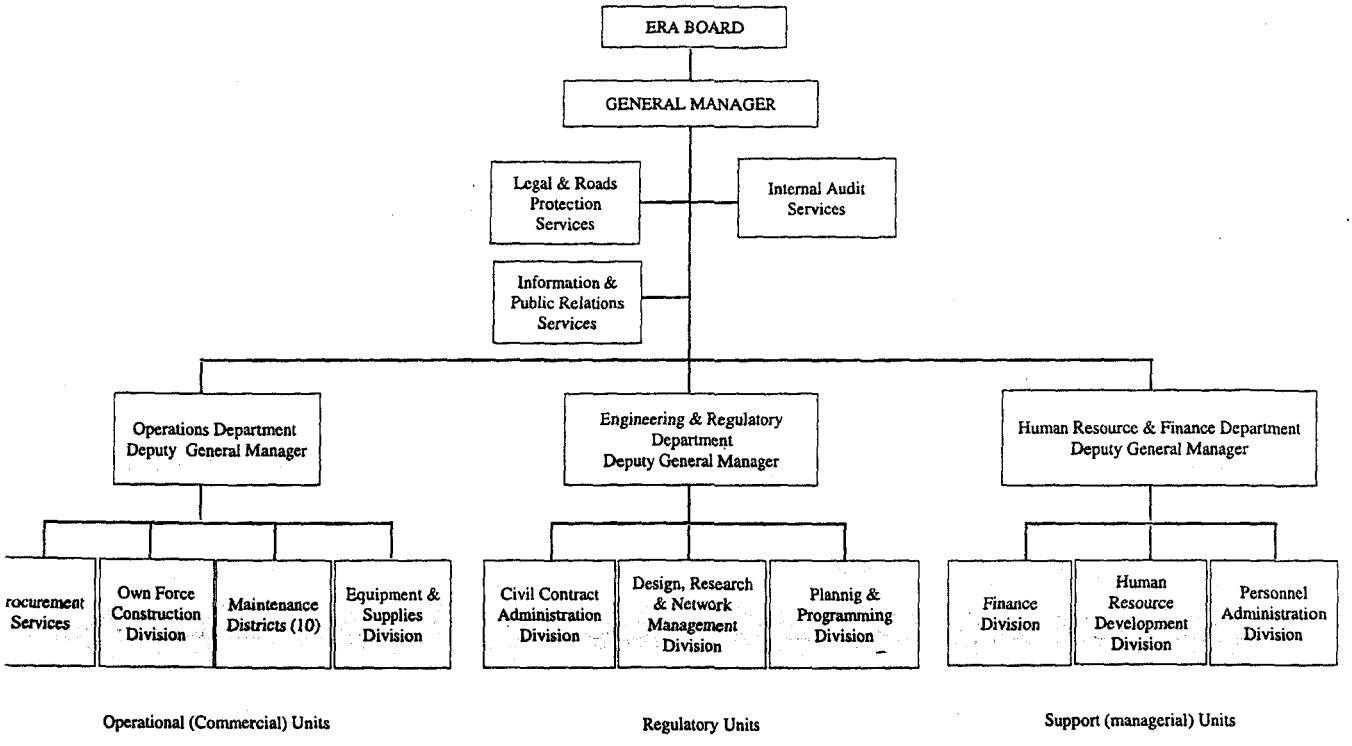
Previous practice shows that apart from routine engineering requirements little attention has been given to incorporate environmental considerations in road sector activities. However, the RSDP has given due attention to the environmental impacts that may arise under the programme and the need for capacity 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 it is 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 Alemgena - Hosanna - Sodo upgrading road project falls under the Alemgena and Shashemene District offices. The first section between Alemgena and Areka 268km is under the Alemgena District administration while the remaining part to Sodo is under the Shashemene District. There are sections namely Alemgena and Hossaina under Alemgena District office for the routine and periodical maintenance activities and Sodo section under the Shashemene District.

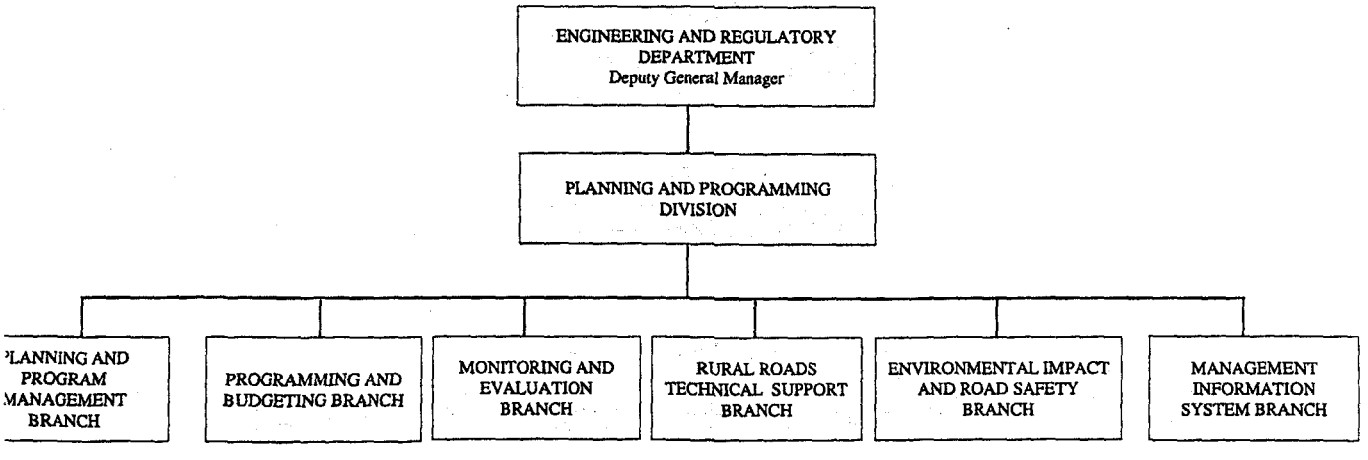
ETHIOPIAN ROADS AUTHORITY
ORGANIZATIONAL CHART



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 committee's 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.

The owners of these houses (legally or illegally built) are allowed to remove their property before the construction activities start. 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 etc.

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 Light and Power Corporation (former 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 acting 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 recognizes 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 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. The ERA compensation committee forms one official consultation channel which, however, has a very limited purpose and do not substitute public consultations.

3 DESCRIPTION OF THE PROPOSED PROJECT

The first 30 km of the Alemgena - Hossaina road was initially constructed during the Italian occupation In the 1930's. The whole road was then upgraded to feeder road standard up to Sodo Town, by the then Imperial Highway Authority, now ERA, in the 1960's. The roade at its initial stage had a telford base of about 15 to 20 cm thick and a five meter width for the first 30 km. After upgrading, natural gravel and cinder material was placed on all of the stretch, with an average six meter of width. There are still four km of asphalt road at the beginning of the road on the Alemgena side.

The Transport Construction Design Enterprise (TCDE) was nominated by ERA to carry out site investigation of the road condition and design of the pavement structure in June 1995. Accordingly, TCDE conducted the soil survey with Dynamic Cone Penetrometer (DCP) field tests and interpreted these for the pavement design, on the basis that the road design was to serve for the appraisal of the project. After analysis of ten years traffic data, extracted from ERA's Census, and a consideration of 15 and 20 years of design life, the Australian and Kenyan design procedure was adopted to reach the final design. The final recommendation was that the road was subdivided into eight sections, based on the sub grade material and an average of 275mm sub base 150mm base course and double surface dressing as the riding surface.

As part of the appraisal of projects for the RSDP, the feasibility of the Alemgena - Hossaina - Sodo road has been evaluated by TecnEcon consultant. 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 three sections, and the recommended treatment is as follows together with the resulting economic internal rate of return (EIRR);

Road Section	Recommended Treatment	EIRR percent
Alemgena - Butajira	Reconstructed 50mm. AC surface + 450mm granular base &sub base	34.10
Butajira - Hossaina	Reconstructed 50mm. AC surface + 400mm granular base &sub base	12.70
Hossaina - Sodo	Reconstructed DBST surface + 500mm granular base &sub base	15.40

The detail engineering design and preparation of tender document for the Alemgena - Hossaina - Sodo proposed project was carried out by the Stewart Scot Consultant. The contract was awarded in December 1996, and the anticipated completion time is August 1997. The consultant has indicated that the design works will be finalized in December 1997. So far the design is still in its preliminary stage, however, there will be some realignment, though not yet approved by the client at this stage.

Traffic and condition

This 320 road is a secondary road located in the North-South rift valley corridor. It runs parallel to the main road, running north through Shashamene to the capital, which forms part of the Trans East Africa Highway. The road is trafficked with about 60 percent of medium to heavy (mainly rigid) commercial vehicles or large buses. It lies mostly in the high plateau region south of Addis Ababa, although the last 50 km to Sodo drops down towards the rift valley. The terrain is predominantly flat to rolling, with about 10 -15 % of the length

classified as hilly to mountainous.

The short length of surfaced road at the Alemgena end of the project is in too poor a condition to consider patching and overlaying and will have to be reconstructed. Elsewhere, the road condition is extremely variable with considerable stretches reduced to no more than an earth road which during the rainy season becomes impassable for small two wheel drive vehicles.

27 bridges and 266 culverts were observed, mostly in sound condition. Thirteen of the bridges could be classified as "major" structures with spans in excess of 30 metres.

Proposed Activities

Apart from minor adjustments of straight stretches and curve easement through the hilly and mountainous sections, no realignment of the road is envisaged or, indeed, possible.

Between Alemgena and Butajira, one major bridge across the Awash river is single lane and requires widening, and one bridge needs to be replaced.

4 BASELINE DATA

4.1 Description of the Road Environment

The road starts in Oromiya Region's Mirab/West Shewa Zone and continues to Semen/North Omo Zone in the Southern Nations and Nationalities and People's Region (SNNP Region) through Gurage, Hadiya, and Kambata Alabana Timbaro Zones. The project road ends in Sodo town, from where it is possible to reach Arba Minch and Jinka.

The project road starts at Alemgena town where road departures turning to the south from the Jimma road which continues to the east. ERA District Office for Shewa area and ERA Training Center are both located in Alemgena. Within 5-10 kilometers from Alemgena there is a alcohol factory at Sebata and Meta beer factory along Jimma road.

After Alemgena road goes through Daleti, a small Muslim community and passes by a big radio station to Awash Konture town by the Awash river. The hills here were complained to be very slippery during rainy seasons, although during dry seasons the road seems to be quite good.

Near Awash there is a famous archeological site, Melka Kunture, where since 1965, geologists and archeologists have had a compound set up to excavate this area where, two million years ago, the earliest ancestors of mankind had a home. Nearby, but off the road, is also the famous Adadi Maryam church, which is similar to the rock churches at Lalibela and visited by many Ethiopians during the annual celebrations.

Then the road enters to Lemen town which is the last town in Oromiya Region. The whole area is extensively cultivated mainly by subsistence farmers. However, especially in Daleti area also eucalyptus trees are dominating. Red pepper is popular cash crop in the area.

The first town in the Gurage Zone is Tiya where many prehistoric monoliths or stelae can be found in an open meadow. This place is considered as important an historic site as are Axum and Lalibela, and the Tiya Stelae are listed as a World Heritage Site and are partially administered by UNESCO. After Tiya road crosses Suten, Buie and Kella (the last being developed from the previous check point or *kella*). From the next town, Butajira with the population of 20,000 persons, another road connects Butajira and Ziway town which is on the Mojo-Shashamane road by the Ziway Lake. In this area there are besides the subsistence farming also plantations, some started within last years, all waiting the paved road for their production exports. Butajira is the most important business and market center in Gurage Zone. After Butajira there are still towns within Gurage Zone: Kibet, Menaharia, Alfonso, Worabe and Wulbareg. The Gurage Zone is the traditional place for Gurages, both Sodo Gurages and Silti Gurages. Sodo Gurages are predominantly Orthodox Christians while the Siltis are Muslims. The farming is mainly subsistence farming and the main crops are wheat, maize and other grain and *enset* or false banana, which is the basic diet/stable food in this area.

After Wulbareg the road enters the Hadiya Zone and goes through small settlements such as Achamo and Lafto Lenka before entering to Fonko and Belessa towns and eventually to Hossaina (pop. 32,000), which is the capital of Hadiya Zone. There is a road that connects Hossaina, the capital of Hadiya Zone, to Wolkite which is the administrative center of the Gurage Zone.

Hossaina is also an important market center. Spices, coffee and grain crops, especially wheat, are grown and exported from this area. Also here enset is a stable food for the locals. The area is one of the most densely populated areas in the country, and many people migrate seasonally, for example to the state farms to Melka Sede and Warer by Awash-Mille road.

After Hossaina the road enters to the Kembata-Alabana-Timbaro Zone (KAT Zone) where the first town is Amecho Wato after which the road goes through Deyogena, Zelera and Hobichaka towns. The last part of the road goes on the hills before reaching Mazoria. The hill before is complaint to be very slippery during the rainy season. From Mazoria (literally meaning a turning point) an other road goes from the project road to Durame which is the administrative center of the Kembata Alabana Timbaro Zone. Also this area is a good agricultural area where coffee, maize, bananas, ginger and many other spices are grown as cash crops. Although the land is fertile, most of the farms are small and subsistence farming is predominant, but also cash crops are grown.

The project road goes from KAT Zone to Semen/North Omo Zone where the first town is Areka (pop. 12,000). The next town is Sodo which is the administrative center of the Semen Omo Zone where the project road ends. Sodo is an centuries old important business and market center and is connected to Keffa and Jimma by the Chido-Sodo road (near completion) and to Arba Minch. From Sodo one road goes to Shashamane from where the road goes north to Mojo. One road goes south to Sawla in Gamo Gofa which is an important coffee growing area. The main crops for Sodo area are enset, maize, coffee, spices, and different root crops. Here too, the land is extremely scarce and the fields are small.

The road is characterized by tens of ethnicities and different languages. Also the religions vary from one town to the other. Protestants, Orthodox and Catholic Christians, Muslims and also many traditional religions are followed here.

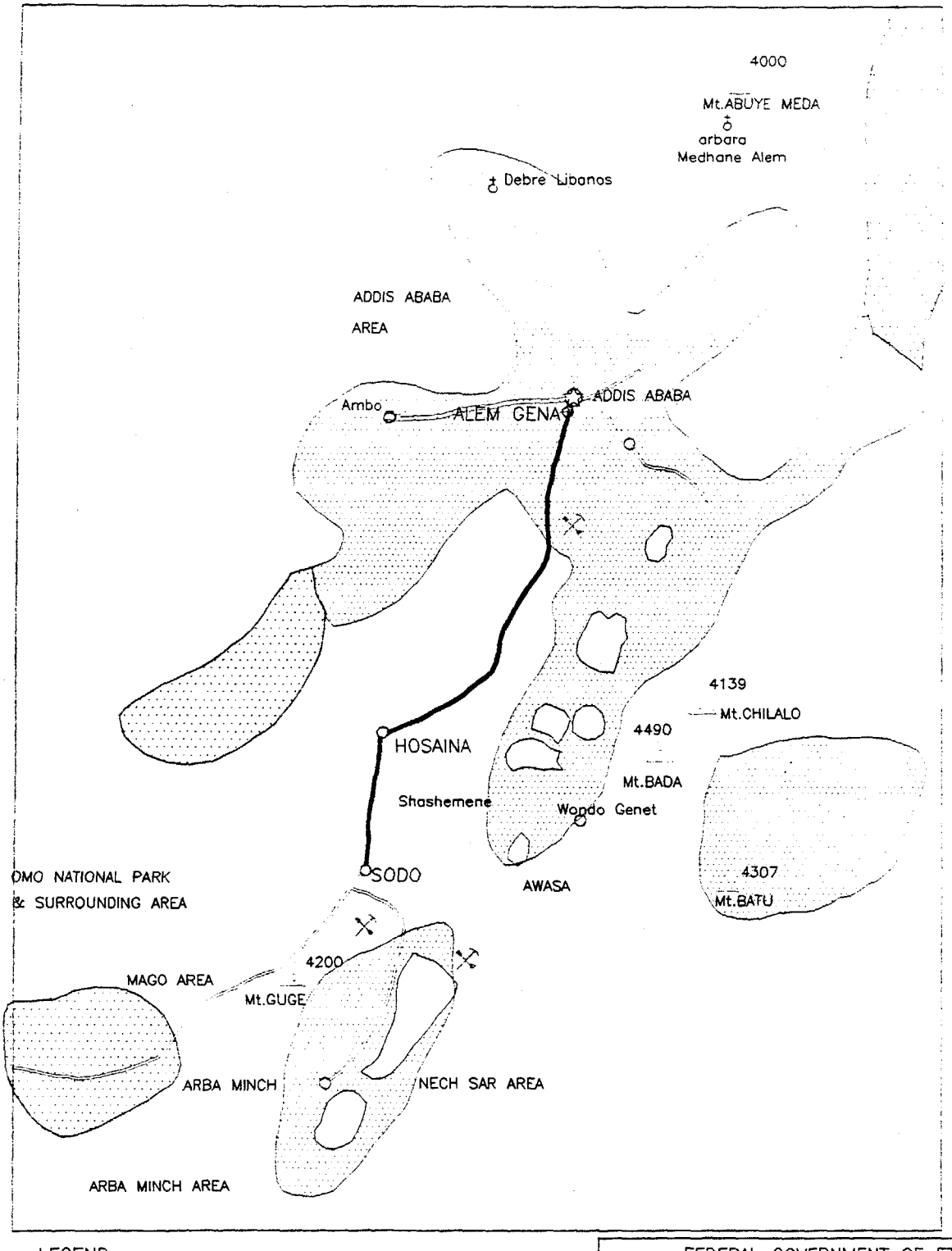
Tourist sites along the road are shown in Figure 4.1.

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. 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.



LEGEND

- Major Tourist Areas
- Minor Tourist Areas
- Southern & south western Route/Project Road
- Other Roads
- Archeological SDite
- Monastery
- Mountain Peak
- 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

ALEM GENA–HOSINA–SODO

PLANCENTER Ltd. Finland

TURIST SITES

Figure 4.1 | Date

Also different pack animals are plenty on this road; donkeys, mules and 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 (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 is semi-humid with bimodal rainfall. The mean annual rainfall ranges 1000 - 1200 mm. Table 1 in Appendix 8 depicts the mean monthly rainfall in Alemgena, Hossaina and Sodo areas.

The mean minimum temperature in the area varies between 8 °C and 13 °C and the maximum ranges between 22 °C and 30 °C (Tables 2 and 3 in Appendix 8).

Water Resources

The primary sources of water is rainfall and there are a number of perennial rivers (including Awash at Melka Konture) with high floods during the main rainy season (June to September) at the dry period they have low flows. Flow characteristics of the river Awash is presented in Table 4 in Appendix 8.

Ground water

Unwelded tuffs and pumice of high productivity and lava intermediate composition of moderate productivity static water level greater than 60 meters. Around Butajira confined aquifer static water level about 20 meters.

4.2.2 Physiography

The road traverses different major physiographic features of the south - western part of the country. The road is mainly aligned along the central lava highlands of the western Ethiopian plateau and crosses at two section (Lemen - Kela and Kibet - Wilbareg) the transitional scarp slopes of the Ethiopian Rift Valley Escarpment.

4.2.3 Topography and hydrography

The road traverses hilly undulating and rolling hilly plains and flat plains of the Awash and Rift Valley basin drainage. The elevation of the terrain crossed by the road varies:

Alemgena - Butajira	2320 - 2060 m.a.s.l
Butajira - Hossaina	2060 - 2320 m.a.s.l
Hossaina - Boditi	2320 - 1960 m.a.s.l
Boditi - Sodo	1960 - 2240 m.a.s.l

The road is crossed by few perennial rivers (Awash, Lemen, Weyera, etc.) with high floods during the main rainy seasons (June - September) and very low flow during most of the dry period of the year.

4.2.4 Geology

Alemgena-Awash and Kibet-Hossaina-sections are mainly unwelded volcanic ash (Ryholitic and trychitic tuffs), ignimbrites, etc. and the Awash-Kibet -section alkaline olivine basalt.

Hossaina-Sodo -section is mainly siliceous domes and flows (Lateritic soils).

A geological map of the area is presented in the Figure 4.2.

4.2.5 Soils and geomorphology

The road sections cross the following soil and geomorphology:

Alemgena - Hossaina : Thick residual soils on undulating high plateau, step faulted plateau formed predominantly on proclastics and moderately dissected side slopes and moderate to high relief hills.

Hossaina - Sodo : Thick lateritic soils on moderately dissected side slopes of extinct volcanoes and graded extinct central volcanoes, caldera remnant and associated forms of high to mountainous relief.

A soil map is presented in the Figure 4.3.

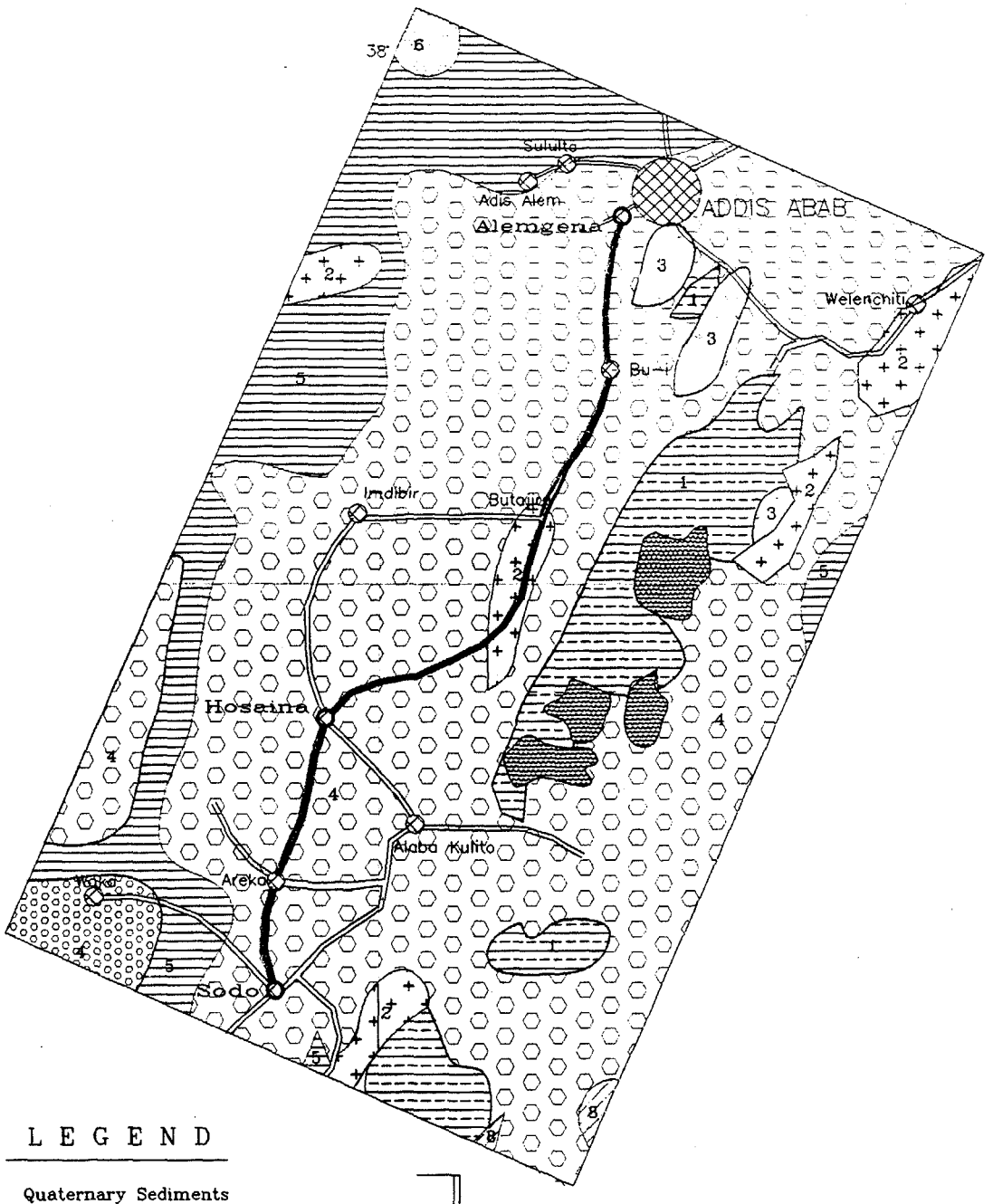
Erosion

Sensitive section of the road are along Lemen - Hossaina. This section of the road exhibits high erosion due to the friable nature of the unwelded fine grained volcanic ash. Scouring along the ditches and downstream of culverts is a critical issue along this section of the road.

4.3 Biological Environment

4.3.1 Land use

The project area has some of the most densely populated and intensively farmed areas in the country. Butajera, Hosaina and Sodo are dominated by a farming system based on enset. Major crops in the area include enset, sorghum, maize, teff and red pepper. Next to farming,



LEGEND

1	Quaternary Sediments	QUATERNARY VOLCANICS	CENOZOIC
2	Basaltic flows and related Spatter Cones		
3	Basaltic intermediate and felsic Volcanic		
4	Magdala Group	TERTIARY VOLCANICS	
5	Trap Series		
6	Adigrat Sandstone	CENTRAL PLATEAU SEDIMENTS	MESOZOIC
	Project Road		
	Other Roads		

FEDERAL GOVERNMENT OF ETHIOPIA

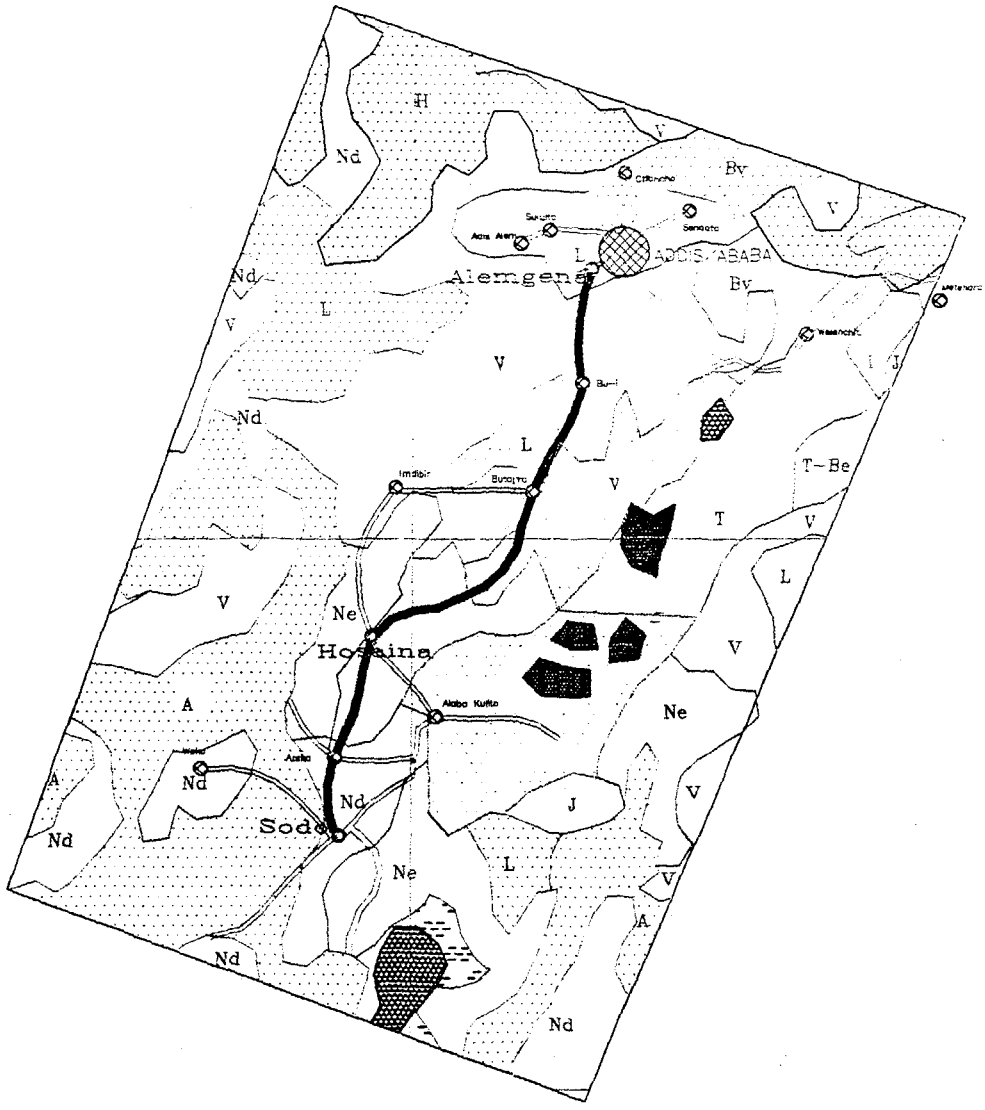
THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND/OR UPGRADING

ALEMGENA–HOSAINA–SODO ROAD

PLANCENTER Ltd. Finland

GEOLOGICAL MAP

Figure 4.2 | Date



A	Orthic Artisols
Be	Chromic Eutric and Calcic Cambisols
Bv	Vetric Cambisols and Vetric Luvisols
J	CalcRIC and Eutric Fluvisols
L	Chromic and Orthric Luvisols

Nd	Dystric Nitosols
Ne	Eutric Nitosols
T	Humic,Mollic and Vetric Andosols
V	Chromic and Pellic Vetrosols
	Project Road
	Other Roads

PHASES

	Lithic
	Stoney
	Sodic

FEDERAL GOVERNMENT OF ETHIOPIA

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

ALEM GENA – HOSAINA – SODO ROAD

PLANCENTER Ltd. Finland

SOIL MAP

Figure 4.3 | Date

agro-pastoral practices dominate on places where cultivation has been partially abandoned in the eroded land and reverted to pasture.

Forest coverage comprise very little percentage of the total land of the study area. Few stands of forest remain in areas on steep slopes. Most households plant trees in adjacent agricultural plots.

Butajera, Hosaina and Sodo are the three urban areas large enough to be delineated at the scale of mapping.

Figure 4.4 shows the general land use - land cover along the road.

4.3.2 Flora

The area along the road between Alemgena-Hossaina-Sodo 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, phalloid 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 have a vegetation cover with a higher species diversity.

The area between Hossaina and Areka contains degraded Montane woodland with shrubs of Erica arborea, Rosa Abysinica, Hagenia abysinica, Juniperus procera, Schefflera abyssinica, Croton macrostchyus, Ekebergia capensis and Podocarpus falcatus. The main types of climatic climax vegetation along the road is shown in Figure 4.5.

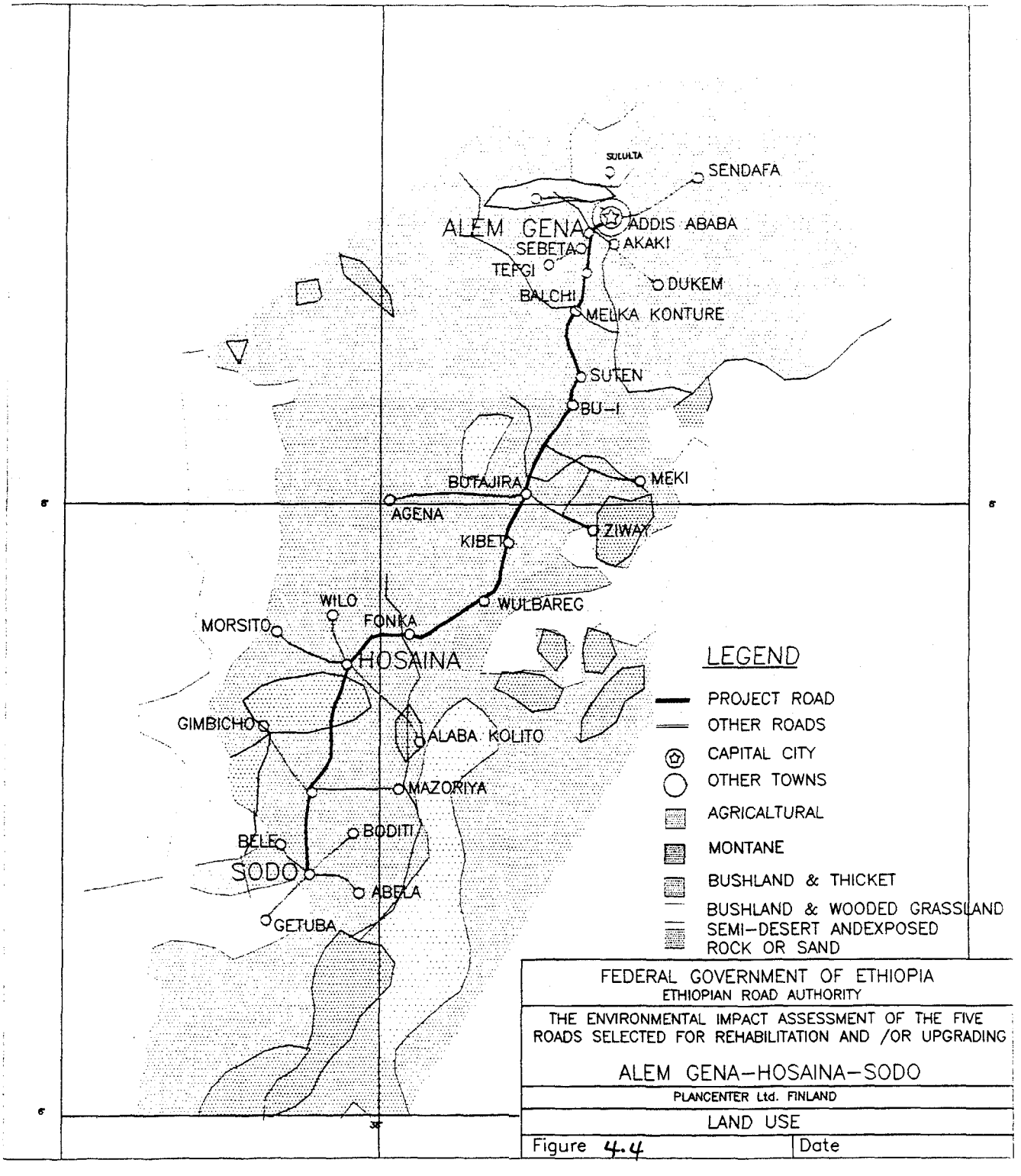
Though there is no National Forest Priority Areas along the road corridor, there are community forests along and the species commonly planted Bahir Zaf *(Eucalyptus)* and Tid *(Juniperous Procera)*.

4.3.3 Fauna

As most of the area along the road is inhabited and intensively used for cultivation, there are no places to shelter any wildlife. Therefore, mammals are limited mainly to hyaena, fox, monkey, rabbit, mole rat, aardvark, porcupine, dekuler and medakuar. As shown in Figure 4.6, Boyo controlled hunting area is located by the project road near Hossaina. The Boyo wetland is used to be famous for its hippopotamus. Wildlife conservation areas are shown in the Figure 4.7.

The Boyo lake, is an important freshwater lake and swamp, and supports a high concentration of water birds, and one Globally Threatened species (Wattled Crane). Pallid Harrier and Lesser Kestrel also occur in the area.

The road section between Alem Gena - Hossaina - Sodo is classified as part of the South - Eastern Route. The archaeological site of and Melka Konture is a major tourist area of the country and is located in the project area along the Awash river at Melka Konture town (see Figure 4.1).



FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

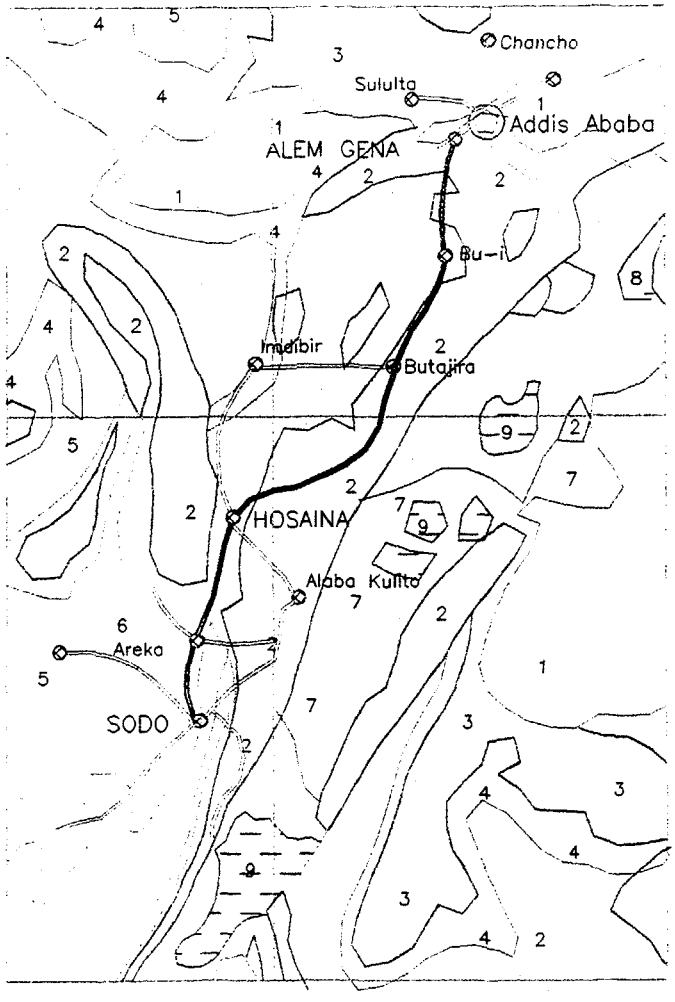
THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

ALEM GENA–HOSAINA–SODO

PLANCENTER Ltd. FINLAND

LAND USE

Figure 4.4 | Date



LEGEND

AFROALPINE & SUBAFROALPINE

CONIFEROUS FOREST
- Juniperst
- Podocarpus

BROADLEAF FOREST
- Arundinaria
- Aningeria
- Olea
- Baphia

WOODLAND & SAVANNAH
- Juniperus
- Acacia

GRASSLANDS
- Lake
- Project Road
- Other Road
- Capital City
- Other Towns

FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

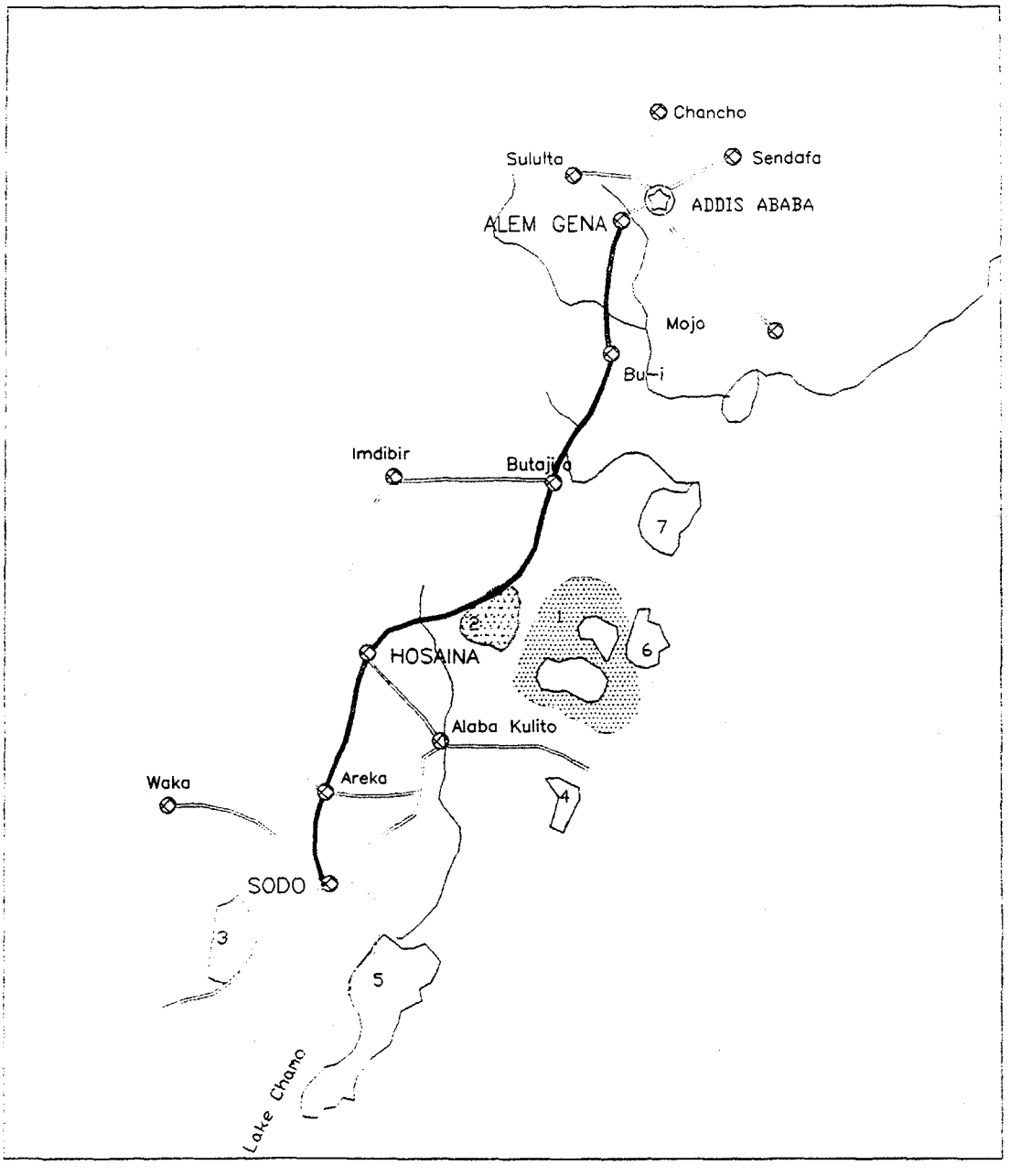
THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

ALEM GENA–HOSAINA–SODO

PLANCENTER Ltd. Finland

CLIMATIC CLIMAX VEGETATION MAP

Figure 4.5 | Date



LEGEND

1. Abijatta-Shalla Lakes National Park
2. Boyo Swamp Controlled Hunting Area
3. Maze Controlled Hunting Area
4. Awasa Lakes
5. Lake Abaya
6. Lake Langano
7. Zewai Lake

Project Road

Other Roads

FEDERAL GOVERNMENT OF ETHIOPIA
ETHIOPIAN ROAD AUTHORITY

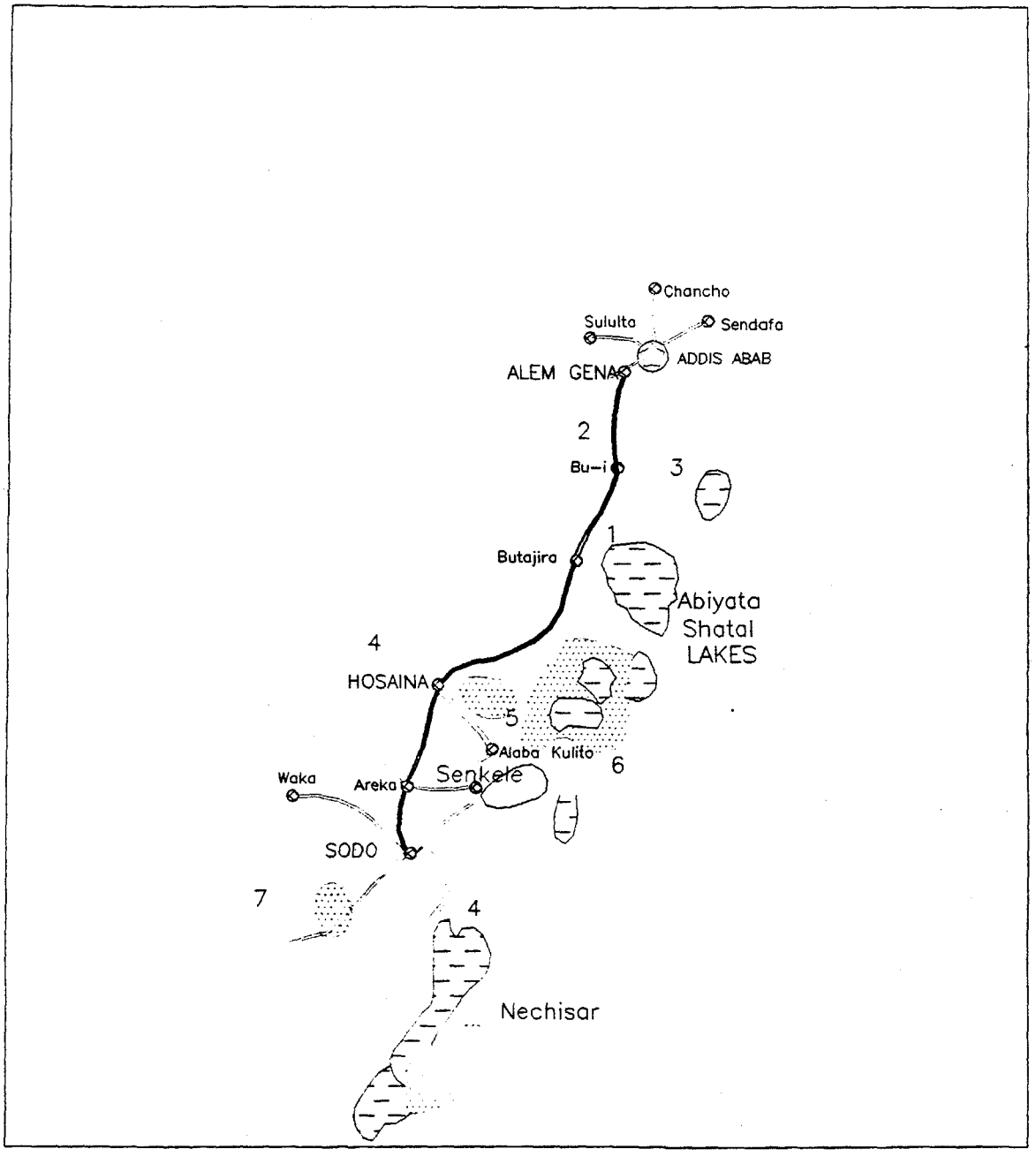
THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE FIVE ROADS SELECTED FOR REHABILITATION AND /OR UPGRADING

ALEM GENA–HOSAINA–SODO

PLANCENTER Ltd. Finland

PROTECTED AREAS

Figure 4.6 | Date



LEGEND

1. Aardvark
2. Klipspringer
3. Gelada Baboon
4. *Hippopotamus*
5. Flamingo (Lesser)
6. Great White pelican
7. Swayne's Hartebeest

NATIONAL PARKS UNDER ESTABLISHMENT
CONTROLLED AREAS
Project Road
Other 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

ALEM GENA–HOSAINA–SODO

PLANCENTER Ltd. Finland

WILDLIFE CONSERVATION AREAS

Figure 4.7 | Date

4.4 Human and Social Environment

4.4.1 Characteristics of the population living by/along the road

Settlement pattern

The whole project area is one of the most densely populated areas in the whole country. Distribution of the population into the rural and urban vary among the zones. In Alemgena woreda 19 percent of total population are urban while in Kersana Konadaltiti woreda only 2 percent are urban. There are 24 towns or rural centers along this road. The biggest town is Sodo with 37.000 and Hossaina with 32,000 inhabitants. Although this road is an important road to the area there are quite many towns (such as Wolkite, Angacha etc.) outside but linked to this road.

The land is extensively cultivated wherever the soil allows it. In some places no cultivation is possible due to bad erosion or quality of soil. In rural areas villages and individual farm houses are separated from each others by their compounds and fields, but also the houses surrounded by enset compounds can be very close to the each others. In the rural centers and towns the attached housing units are more common and form lines along the road.

The small cultivated 'forests' and tree groups, mainly of eucalyptus species, can be found in many places along the road, while also vast areas are without any trees at all.

The houses by this road are not so near the project road that they should be displaced. If the old alignment is followed there will be no need to demolish any houses and no resettlement questions will arise due to the project.

Size of Population along the road

The people living in the towns through which the road goes are directly affected by the road. The town population along this road amounts nearly 150,000 persons. Many people living in the rural areas of the woredas along the road are also directly affected in their everyday life. The total population in these woredas is 1,700,000 persons. Since this is the most important road for the area the impacts of the road are felt by more than eight million persons who live in the zones by the road. (Table 1, Appendix 9).

Sex Ratio is quite balanced in the zones and the woredas along the road, only in Alemgena, Kersana and Angacha woredas there are less women than men (49%). In the towns of these woredas women's share is quite high: In Alemgena 53, Awash Konture 58, and Lemen 55 percent. Women's share increases in the other towns as well, except in Sodo and Belessa towns where the ratio is in favour of men (48%). Despite the general increase the share does not reach the shares in Amhara or Tigray towns. (Table 1, Appendix 9). The road towns pull especially divorced women, and their daughters, to look livelihood there.

Female headed households

Female headed households in Oromiya Region form 21 percent of all households. In rural areas the share is little less or 20 percent, while in the urban areas the figure goes up to 33 percent.

In Southern Nations, Nationalities and People's Region (SNNP Region) 22 percent of households are female headed. In the rural areas the share is nearly the same; 21 percent of households have a female head. In the urban areas 28 percent of households are female headed. Although this urban share is much less than in the Amhara and Tigray regions (where it is 40-50%) it still means that one quarter of households living in towns by this project road are economically dependant on women and their income which is mainly received from the service sector. Mainly women run hotels, restaurants, bars, talla and taj houses. For them the better road with increased traffic would be beneficial.

Fertility and population under 15 years of age

The total fertility rate is very high in Mirab Shewa zone, where it is 5.2 and higher than for the whole SNNP Region where it is 4.3. Only in Hadiya zone in urban areas the TFR is smaller than 3, and in Gurage area, contrary to general trend, the fertility rate is bigger in towns than in countryside. In the big towns the average total fertility rate is quite big being 3.8 for Butajira and Sodo, 3.2 in Areka and only in Hossaina rate goes down to 2.4. (Appendix 9, Table 2A)

The population under 15 years of age is about 46 percent of all population in the zones along the road. In urban areas the share is less, especially in the Oromiya side of the road. In Alemgena the share goes below and in Sodo just over 40 percent. (Appendix 9, Table 2B)

Average household size is highest in Hadiya and Kembata Alabana Timbaro zones where more than five persons in average belong to a household. The households are smaller in urban areas the biggest differences being in Oromiya side of the road, where in the urban Mirab Shewa Zone the average household has 4.4 persons. (Appendix 9, Table 3).

Ethnicity

There are about 80 different ethnicities represented in the survey area. Most are represented by few persons while many with hundreds of thousands. The zones are named after biggest groups in the survey area.

In Gurage Zone the biggest ethnic groups are Guragies: Sodo, Sebatbet Guragies and Silties. In Gurage Zone there are more than 60 ethnicities out of which those ethnicities with more than ten thousand persons are, besides Guragies, Amharas, Marekos, Kebenas and Oromos.

In Hadiy Zone Amharas are still forming one big group and the Guragies and Silties, Kembatas and Alabas are biggest groups among more than 60 ethnic groups in this zone.

In Kembata Alabana Timbaro Zone these groups are biggest, and additionally Hadiyas and Silti Gurages form big minorities.

In Semen Omo more than 80 ethnicities are represented, out of which the biggest groups are the Amhara, the Ari, the Basketo, the Guragie, the Wolaita, the Gamo, the Goffa, the Konta, the Kulo and the Mello each with more than ten thousand persons.

In all zones also some foreigners live: Eritreans, Somalis, Sudanese etc. The area is really

of the mixture of different ethnicities, which have resided a long time in this area and "know each others thanks to the present road".

Religion

One of the main socio-cultural features is the prevailing religion.
The population in this area represents an interesting mixture of all religions. The changes are very big from one place to the other and sometimes from one town to the other. Many Christian missions have long traditions in this area and the share of Protestants (35%) exceed here both the Ethiopian Orthodox Christians (28%) as well as Muslims (17%). Also quite many Catholics (3%) can be found in the southern part of the road. Also the traditional religions (15%) are here still common. The ethnicities and religions although overlapping, and do not coincide strictly. (Table 5, Appendix 9)

Literacy rate

In urban areas three quarters of men and over half of women are literate. In rural areas one quarter of men and less than ten percent of women are literate. (Table 4, Appendix 9)

Amarigna was previously the common language which all educated people spoke and were able to read and write. Now the means of education depends on the ethnicity, and local languages are used as the means of education. However, in the survey area more than 80 languages are spoken, but only few used in education. Oromigna is now using also Latin letters and probably the share of the 'literate' have decreased.

Migration

In the whole Amhara Region 10 percent of all population are migrants. Women are moving more than men (12.1 and 9.3% respectively). Among urban population the share of migrants is much bigger, out of urban men 42 percent and out of women 44 percent are migrants.

In the SNNP Region ten percent, and in the zones little less, of population are migrants. The share of migrants increases in the urban areas by the road where 30-43 percent of population are migrants. The rural-rural migration pattern is by far the most common; 52- 60 percent of migrants move from one rural area to the other rural place. (Table 6, Appendix 9)

More women than men change their place of residence; 55 percent of migrants are women. Some women change the place of origin due to the marriages and quite many after divorces.

Future growth of the settlement/towns along the road

The towns have developed due to the road and is still important to their social and economic life. Despite the road's important role also to the present towns, the towns continue to grow with or without the road project. The growth rate for urban areas is assumed to be 3.7 percent annually and in the rural areas 2.1. However, taken into consideration the migration to the towns in the survey area, the urban growth might easily be higher than projected. The improved road is also anticipated to benefit the economic activities in the area, the fact that would pull more people to the towns. High fertility rates and high shares of population under 15 years of age in the survey area will put great pressure on the farming lands which will push out more people to the towns.

Urbanization in the survey area has totally depended on the present road and the trend will continue even without the upgrading. However, good road will benefit to the living standards and increase economic activities through better transportation of people and goods.

4.4.2. Housing Situation

Permanent houses Nearly all houses are permanent in the survey area. The wall material is mainly wood and mud in Gurage, Hadiya and Kembata Alabana Timbaro Zones and wood and thatch in Semen Omo Zone. Only about ten percent of houses have corrugated iron sheets, the most common cover material is thatch in the whole area. Floors are mud floors in 75-80 percent of houses.

About 80 percent of the houses have one room in the three first zones but in the Semen Omo only about 70 percent. In Semen Omo more than twenty percent have two rooms when the respective percentage is only ten in the other zones.

Average regional number of persons per room is 2.3 for urban and 4.0 for rural areas (Gurage Zone 2.4 and 4.0; Hadiya 2.5 and 4.8; KAT 2.6 and 4.6 and Semen Omo 2.2 and 3.4.)

Persons per housing units are in Gurage Zone 4.7; Hadiya 5.3; KAT 5.5 and Semen Omo 4.6. In every zone there are more households than housing units: there are 1.05-1.06 households per housing units.

Availability of bathing facilities is not common in the whole region. In Gurage zone about three percent and in Hadiya about four percent of the housing units have these facilities. The situation is a little bit better in the KAT and Semen Omo zones where six percent have these facilities available.

Availability of toilet facilities. The availability increases towards south. In Gurage zone only five, in Hadiya six, in KAT 11 and in Semen Omo 17 percent have toilets, in the last zone also 14 percent of rural households have toilets. (The percentages include both private and shared facilities.)

Electricity for lighting is available for the half of the SNNP housing units. The share is highest, i.e 57 percent, in Gurage area and decreasing towards south. In Hadiya 43, KAT 36 And in Semen Omo 39 percent of households use electricity for lighting.

Availability of TV, radio and telephone
Availability of radio in rural areas varies between 6 and 20 percent. In Gurage area 20 percent, in Hadiya 12 percent and in Semen Omo 6 percent of the rural households have a radio set. In the towns from one quarter to half of the households have radio.

TV set is very rare in the whole region. Although in many towns there are some sets, only in Sodo, Hossaina and Alemgena the percentages go up to five for the two first towns and to four percent in the last.

Telephones are available in most but not in all towns. In Sodo, Hossaina and Kibet seven percent of housing units have a telephone connection, and in Alemgena five percent. (Table 7, Appendix 9)

Every Monday morning there is a half an hour long radio program about traffic and traffic safety. The program is prepared by the 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 after the 8.00 morning news. Due to the change of transmission time many people are now unable to listen it, because adults are already working at that time or children attending school etc. The earlier time reached more people. However, nearly half of housing units in most towns and about ten percent 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 behaviour. Now there are no programs concerned about traffic problems/ education/ behaviour. The availability of TV sets will grow and there should already now be programs for better road and traffic behaviour and safety taking into consideration the traffic accident statistics in the country.

Ownership of houses and rents

In the Oromiya side of road little less than half of households own the house they live in, while in the SNNP Region over half does so. However, there is a big variation among the towns. In Alemgena and Buie less than 40 percent own their residence and in Belessa and Deuogena more than 90 percent do so. (Table 8, Appendix 9)

About one quarter of population has rented a house from kebele in Oromiya Region but the renting from kebele is less common in the SNNP Region. In Belessa and Fonko there are no houses rented from kebeles and very few from other private households. In Kibet and Kella more than 30 percent are rented from kebeles. (Table 8, Appendix 9).

The average monthly rent per housing unit in the Oromiya Region is 18.20 birr and in the SNNP Region 24.79 birr. In Mirab Shewa the rents are less than regional average, between 11 and 15 birr per month.

Also in Gurage Zone the rents in the towns by the road are less than zonal average 21.45 birr, being 9 birr in Kella (where also the share of kebele owned houses is the biggest).

In Hadiya Zone the average monthly rent is as high as 31 birr and in the Semen Omo 29 birr. In Semen Omo also the highest average rents are paid in Deyogena where they are 46 birr. (Table 8, Appendix 9)

Most houses in the survey area are built from wood. The average square meter prices for the houses is about/less than one thousand birr.

Type of fuel used for cooking

Fire wood and leaves are by far the most common fuel for cooking: more than 90 percent of housing units are using them. The share of other type of fuels are small. In this area there are many places where the planting of, especially eucalyptus trees, has been done for several years, either as a community based activity or by private farmers. However, the consumption of trees for cooking will increase due to the population growth and due to the very small increase in the use of other alternative fuels. The use of wood fuel is also usually increasing with the use of other alternatives, which are taken into use with increasing income.

The construction camps will put an extra pressure on wood fuel, and the planting activities should be integrated to the road construction. This would mitigate the temporary extra use of fuel but also the trees would stabilize the soil and mitigate erosion.

Drinking water

Most people in the survey area use unprotected wells, springs and/or rivers, ponds and lakes as a source for their drinking water. The unprotected sources are used more in the northern part of the road, in Gurage and Hadiya 86 and 81 percent, respectively. In KAT and Semen Omo 74 and 77 percent use these sources.

In the urban areas the unprotected sources are used less. In urban Gurage and Hadiya 23 and 38 percent uses unprotected sources, the respective percentages for KAT and North Omo are 20 and 27 percent.

Many of these sources are near the road, the fact that must be taken into consideration especially during the construction period.

4.4.3. Local economic activities by the road

Agriculture The area is very extensively cultivated. Teff, wheat, maize and other grain is cultivated in the area for own consumption but especially wheat is also exported from this area. Ensete or false banana is a stable food for many households in this area, although also the leaves are sold for the others to be used as a 'aluminum folio' to bake bread. Also banana is cultivated, as well as different root crops.

The main cash crops are coffee, red pepper, ginger and many other spices. There are many plans to start different plantations in the area for cash. The better road is expected to help the present difficult transportation possibilities.

Animal husbandry is here mainly for mixed farming; oxen are needed for farm work and there must be cattle enough to ensure the needed number of oxen.

Most households keep animals in the house over night. Nearly 70 percent do so in Mirab Shewa, but Hadiya and Kembata Alabana Timbaro zones more than 90 percent of the households (85 to 89 percent in other zones) keep animals in side the house and people sleep in the same room with the animals. Animals are taken into houses for many reasons. There is a threat of thefts, but also the fear that animals might spoil the crop, either in the field or stored, if not looked after this way.

Industry and services

There is no big scale industry in the survey area, but near Alemgena there is a beer and an alcohol factory. The small scale industries can be found in the big towns, mainly serving the local markets. To start any type of agroindustry in the area is an important issue and the better road is seen as a promise to the better transportation possibilities (roses from near Butajira to the European markets etc.)

In the towns there are services such as food, drinks and lodging for the road users. These services are usually run by women. Although there are gas stations along the road, the gas is

not always available especially during the rainy season, because many fuel trucks refuse to go on the road due to its poor condition.

Traditional transportation methods

The road serves 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 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 the 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 pack animals are plenty on this road; donkeys and to the lesser extent also horses are used on this road for transportation. Where the road goes on the flat terrain, the horse charts transport both people and products.

Economically active population and unemployment

Economical activity rate for men in urban Mirab Shewa is 58 for men and 40 percent for women. In the rural areas activity rates are higher. The rates for urban women are low, less than half of women population is counted active (the reproductive work done mainly by women is not counted statistically as 'economically active').

The unemployment in Mirab Shewa is less than one procent in rural areas, but in urban areas 15 percent of men and 14 percent of women are unemployed. (Table 9. Appendix 9)

There will be no difficulties to hire local labour to the road construction work. Actually, the people living by the road are expecting the road construction to start and create employment possibilities to the locals.

Most people or more than 90 percent of population in the region are engaged in agriculture. Mining and quarring is the second biggest occupation with about seven percent's share and business has the third position with about two percent of population engaged in it.

The migrant labour movements, especially as an seasonal agricultural labour, are considerable from this area to the other parts of the country.

4.4.4 Social acceptability of the project

Social acceptability of the project to rehabilitate/ upgrade the present road is very high. All people and organizations interviewed as well as all participants in the public consultation in Hossaina gave a clear acceptance to the project. The only concerns are related to the construction period. However, the longer term benefits are felt much bigger than the temporary problems caused by the construction period: "If there is a damage to ten persons' property but ten thousand beneficiaries, benefits outnumber manyfold the losses."

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 local people from the biggest problem, dust, caused by the present gravel road. The improved condition of the road is anticipated to speed up the transportation, decrease considerable the present costs of transportation due to less breakages and other failures, and increase the traffic safety. (See Appendix 5 for discussions in the public consultation in Hossaina)

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 accessibility 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, 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, etc. to the other areas. Especially the present and future planned plantations need road to bring their products to the national (and as hoped international) markets.

The proper pavement would bring also minibuses to the road serving local transportation and making the travel fees cheaper.

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.

Problems with the present road

Dust is one the biggest problems for the locals and for the drivers. During the rainy season the slippery surface in the highlands is causing accidents and delays. The bad surface is breaking the cars "too often and too quick". (Appendix 5)

Urbanization in the survey area has totally depended on the present road and the trend will continue even without the upgrading. However, good road will benefit to the living standards and increase economic activities through better transportation of people and goods.

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 present FDRE's policy, the construction work will be mainly done by private contractors and is open also to foreign tenders. However, no big changes are expected 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 these 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

such as animals, 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 misbehaviour, 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. "Labour 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 labour

The Ministry of Labour and Social Affairs is empowered to ensure that local labour is hired in accordance with the law. The local labour 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 Labour 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 constructor 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 labourers' wage levels vary a lot depending on the locality etc. The wages for unskilled labour vary between 1.3 to 2.5 and for skilled workers between 8.30 to 20.80 Birr.

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 labour proclamation. Details of benefits are normally specified in collective agreements.

5. POTENTIAL ENVIRONMENTAL IMPACTS

The construction and operation of the Alemgena-Hossaina-Sodo 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 associated with operating the quarry and borrow sites, operation of equipment's and housing of the labour force, but very few that will lead to permanent change.

The potential environmental impacts 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 public consultation.

5.1 Physical Environment

5.1.1 Soil and Erosion

The major adverse issues during construction stages are erosion, stability 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 can be enhanced due to the following activities 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 river banks.
- Excavation of foundations for replacement and /or additional deranges bridges and culverts.
- Not compacted embankments and spoiled materials.

Slope stability

Clearing and grabbing by equipment and blasting of rocks for road widening will affect the slope stability. The section of the road on hilly terrain and volcanic geological formation is a relatively unstable section of the road.

Soil contamination by spills of hazardous material

Soil contamination can occur due to spills of oils and fuels from engines , improper disposal of used oil, lubricants and others, and accidental spills of hazardous materials due to accidents caused by increased traffic for construction.

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. There are small springs and streams with small discharges during the dry period of the year which are used by the local people for water supply and irrigation. The use of these streams and springs will completely deplete them and may lead to a situation where there is no flow downstream. 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 piles 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 be used for water harvesting after the construction of the road if the geological condition and the topography are favouring.

Upgrading 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).

Highway runoff pollution has insignificant adverse impact, since highway runoff occurs during rainy season when the streams and flood path have high floods. Therefore, the dilution effect is significant.

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 cosidered 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.

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 and rock quarry sites. These activities may have impacts on grasses and shrubs and isolated mature trees. No major impacts are expected to terrestial ecosystems or natural or semi-natural forests.

5.2.2 Destruction of wildlife habitat and impediment to movement of wildlife

The road right-of-way was cleared and disturbed during construction of the existing road and 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 project does not involve any encroachment into known and designated ecologically sensitive areas or 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 it. The issues/concerns described here were expressed by interviewed local people and organizations by the road and by the participants in public consultation in Hossaina. 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

According to the interviews/public consultation the social acceptability of the project is extremely 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.

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

5.3.2 Resettlement/displacement of people

The settlement along the road has respected the ERA's Right of Way and no buildings are inside this area. The road is wide enough also in the town centers, and there is no need for resettlement due to the upgrading project.

The detours and quarry etc. sites will require temporary realignments, but the loss of residences can be avoided.

5.3.3 Demographic changes

There will be no dramatical changes in demography in the project area due to the project. The population growth continue and more people move to the towns. The present growth and other demographic trends continue with and without the project; there will be no dramatical demographic changes due to the road project.

5.3.4 Change in way of life

The changes due to the upgrading 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 changing 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, especially private minibuses and taxis are expected to appear also on this road once asphalted, and the travel costs to decrease. Increased mobility is slightly changing also the way of life.

5.3.5 Impacts on women

Since the road has existed for years the 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 shops and bars along the road are run by women. With the better and safer stopping places for cars/trucks/busses would also increase these income generating activities.

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 bunches 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 also affect especially women who are often worse-off than men.

However, due to the construction camps women are also posed to increased risk of sexually

transmitted diseases and unwanted pregnancies.

5.3.6 Impacts on indigenous peoples

There are about 80 different ethnicities by the road, some 'indigenous' and some 'traditional' and additionally many who have migrated to the area from other parts of the country or from outside it. The new improved road will benefit all due to the similar circumstances and economies they are engaged with.

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 (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.

5.3.8 Conflicts between locals and immigrants

The arrival of 150-250 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 labour. Skilled labour would come from outside and reside in the camp while locally hired labour will not.

Usually the workers stay in the camp for three 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 follows the old road, not very much agricultural lands will be lost. The temporary losses will be in the places, where the detours will be constructed. In these cases, however, the losses are only temporary and therefore there will be no compensation. However, if the land has been used as a detour for a year, it will take time before that land can be used as agricultural land. Compensation for lost crop should be paid.

5.4.2 Loss of grazing land

There will be no permanent losses of grazing lands.

However, the detour and construction of the access road to the quarry and subbase material sites will affect some grazing land. Much of the grazing land by the road is already now very eroded. The greater part of the required grazing land is for communal use. The land to be taken is small, therefore, this loss will not result either directly or indirectly in significant changes to the pattern or location of traditional grazing territories. On the other hand the grazing lands used for detours etc. must be rehabilitated, reseeded and as such might mitigate also future erosion and might turn out to be better grazing lands than before the project.

5.4.3 Loss of property

Houses and other buildings. There is no need to displace/ remove/ demolish any buildings due to the planned project.

In case there will be new alignments during the construction, the compensation will be paid to the owners by ERA as estimated by the compensation committee. In this case since most houses in the project area are of wood and mud, the compensation should be paid according to the value of a new hollow block house to save the scarce local tree resources.

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.

There are no forests by the road but some new cultivated groups of trees, more in the southern part of the road, where some trees or groups of trees may be affected.

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 labourers 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 labour might decrease, despite the labour-intensive policy recommended in the RSDP. However, along this road local daily labour will be needed especially in many erosion prone places to level out the worst erosion which would affect the road.

Outside the construction work there will be other economic activities due to the construction camp and demand of different products and services by the construction workers. Most of these activities would be run by women.

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, create more opportunities to economic activities which are already available: more services, more sales etc. than create new type of work.

Most of this increase in quantity will be temporary by nature, but some 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 temporarily overload the public services especially in the health sector, since in the camps only first aid in case of accidents can be given. Other type of demand on the private services will increase, and mainly benefitting the local community. Most of 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 pavements. Due to their lower prices more people would use them than what people now use long distance busses. However, not all would be able to use them. Interviews by the road side showed that many women now walking twice a week three hours to the markets to sell their agricultural products such as onions, potatoes, pepper etc. would not pay any fees due to the low profits, if any, from their business. The future absence of dust would make walking more convenient.

It is also anticipated that more youngsters would enroll to the school or go on to the higher grades due to the better transportation and safer road. 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 and fuel demand/needs will increase during the construction period. The location of the camps must be such as not to put any extra burden to these local resources.

5.4.7 Impacts on national economy

The present poor condition of the road is blamed to hinder the agricultural production in the area. The transportation delays in inputs to agriculture such as fertilizers etc. and/ collection of the ready agricultural products are costly to the locals. One of the RSDP justifications for building and upgrading the present road is the assumption that the local agricultural productivity would go up. The road is seen also necessary to developed the local and national agro-industry. With the increased production also the employment possibilities are anticipated to increase and benefit the national economy.

Since the road goes through very densely populated and extensive cultivated area this road is seen vital for local economies and other services. For the transportation of the ready products or raw materials there are no other alternatives than this road.

The condition of the cars will be improved / breaking less due to the better surface and this would save the need for imports of spare parts. On the other hand the imports of the whole cars/trucks will increase.

The improved road will have impacts on tourism which is expected to increase. Also foreign tourists are interested in the historical and cultural sites, many of which are reached from this road. The increased transitory traffic would create new employment possibilities by the road side communities.

5.5 Human and Social Environment: Other Issues

5.5.1 Cultural, religious and historical areas

This road is one of the most interesting archeological and historical roads in the country. There are many valuable cultural and historical monuments and sites in the vicinity of the road, and in the towns through which the road goes.

Most monuments and sites are off the road and will not be affected directly, but the archeological site in Tiya is already now by the present road and the construction must be planned as to avoid any adverse impacts on it. The detours in this area must be planned to by-pass the excavation sites, either already now under excavation or potential sites planned to be studied later. No quarry sites can be located in this area. There should be serious negotiations with the Ministry of Information and Culture and its relevant departments as well as with the representatives from UNESCO.

The improved road make it easier to the tourists to reach these 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. Such as parking places could be negotiated with the authorities of these places. Many of the sites are not guarded and are vulnerable to be disturbed by the casual visitors.

The less known sites such as graveyards or other holy or important places might be affected unless negotiated with the locals. There are several graveyards just by the road.

5.5.2 Health and sanitary issues

The pavement of the road benefits people, who now suffer from the dust, which is also one of the additional reasons to common respiratory diseases and trachoma. (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 such as better car condition inspection etc.)

ERA camps have also easily different health risks. Due to the crowded lodging contagious diseases may cause epidemics, especially in malaria prone areas.

There will also be a risk to the construction workers themselves of contracting malaria and other diseases endemic to the area and risk to the public from blasting activities associated with quarry activities and diversion road construction.

Due to the relations between the locals and camp workers, also occurrence of veneral diseases may increase among the local population.

5.5.3 Road safety

Many reasons contribute to weak traffic/road safety on the road. Dust and high speed are said to be the biggest reasons for the accidents. Animals on the road are causing many accidents. The rainy season is a dangerous time for the transitory traffic due to the slippery nature of the present road in certain localities and better surface will make the road safer.

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 and/or poor surface will decrease.

Better inspection of car condition could diminish some accidents (but this belongs at the moment to the other authorities, not ERA). The traffic police already now inspects overloads and over speeds. After the creation of the Road Fund the fines are supposed to go to this fund instead of the Treasury, and fund money will be used also for better road safety activities. These activities should also include traffic education.

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.

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 identifying quarry sites, detours and other construction sites before they are selected and decided by the consultant. Local knowledge would minimize the negative impacts.

ERA sets a committee at the project level in all the places where the road construction has decided to start. Its main task is to set compensation issues for the lost property with the local administration. It also discuss about needed resettlement. However, there has not been any monitoring or evaluation to see how compensation or resettlement have been implemented.

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 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 in 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.

Erosion:

- Additional culverts shall be provided to decrease flows where erosion (scouring) of culverts are high (hilly terrain) and at flood plains to increase damming effect of the road.
- The principle of no scour and no silting design approach shall be adopted in the design of side ditches.
- Energy dissipators at bridges and culverts shall be maintained and provided where it is necessary.

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

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.

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 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.

7.1.5 Construction spoils

Once the construction of the Alamgena-Hossaina-Sodo 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 minimise erosion and to provide a more aesthetically pleasing appearances to the visible project facilities.

All sites will be inspected by ERA Environmental Protection Unit staff and the site clean-up approved before the contractors are allowed to abandon the site.

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 include:

- 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 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 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. Forest department of the concerned zonal administration has to be consulted with regard to selecting plant species for land restoration to both erosion and improving habitat.

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

Table Cost estimate for compensation of 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 estimate the compensations. (The

role of this committee should be widened to be responsible also for resettlement and other local development issues when relevant.)

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. However, many future costs to the contractor can/may be avoided due to the proper stakeholder participation assuming that environmental costs will be the responsibility of contractor in the future.

7.3.2 Resettlement/displacement of people

As it seems now there will not be any resettlement need due to the planned project. However, if this question arises during the construction period, ERA is responsible to prepare the resettlement plan together with the local administration.

ERA should also be responsible to monitor/evaluate the resettlement situation later. Especially women headed households, many of which have been only tenants, should be included to the resettlement plans.

In case the resettlement is needed, 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. The ERA maintenance section already now has a responsibility to see that no illegal settlements are born inside the reserved area. Also after the construction is over ERA has to see that illegal houses are not built inside the reserved area or Right of Way.

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

Cost of the mitigation measures

At the present the resettlement does not cost anything to the contractor or ERA. (In case resettlement is needed the costs for proper negotiations for the resettlement of displaced people should be paid by ERA.)

Possible adequate assistance, as mentioned in the Constitution, should be available from the state.

7.3.3 Demographic changes

There is no need for mitigation plan due to the planned 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

No special mitigation plan needed for indigenous or traditional peoples.

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 built 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 house and 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 construction workers as to avoid all of them to appear to one town at the same time.

In the construction camps health education about veneral diseases (also AIDS is increasing rapidly in Ethiopia) and benefits of condoms should be introduced. This could be done in cooperation with the Ministry of Health and implemented by local NGOs or other entities able to do it.

7.4 Human and Social Environment: Economic Issues

7.4.1 Loss of agricultural lands

Construction of the road use sub-base material and utilisation of this resource will involve loss of agricultural land on sites. This area is very extensively cultivated and special attention should be given during the construction that no unnecessary losses will happen. Consultation with the local people and administration is important.

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. In case of permanent losses there should be serious negotiations between ERA compensation committee and local administration about new lands.

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.

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 should be held. After completion of the construction work, the pasture lands should be rehabilitated by reseeding immediately to minimize disturbance to grazing land.

Compensation of the lost vegetation estimated by ERA compensation committee should be based on negotiations with cattle owners themselves.

7.4.3 Loss of property

At the present it seems that no houses are required to be removed/demolished. However, if the construction work requires the removal of houses, the wood and mud houses should be compensated according to the value of hollow block houses for environmental reasons.

Due to the detours there will be loss of crop for a year or two because of non-cultivation. Some places trees might be affected by the road, The value of lost property (grain crops and trees) is estimated by temporary ERA Compensation Committee and based on market price.

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 might 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 other ways would overburden the local public facilities/utilities. The selection of camp sites should be done in good cooperation with local administration.

7.5 Human and Social Environment: Other Issues

7.5.1 Cultural, religious and historical areas

The archeological sites along the road should be left untouched by the road construction. The consultations with the Ministry of Information and Culture and UNESCO is a must and their recommendation taken into consideration.

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. Implementation can be done by local or foreign NGOs such as Red Cross or Care.

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, alternatives and activities.

MITIGATION MANAGEMENT PLAN

	Potential Adverse Environmental Impact	Mitigation Measure	Responsible Institution/Person	Cost
1	**Physical Environment**			
1.1	Soil and erosion			
	- Erosion	* Revegetate and restore bare surfaces * Blasting should be optimised not to cause slope destabilise and damage to adjacent structures. * Materials will be preferably extracted from existing quarries.	Contractor 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	* Limit construction activities around perennial rivers to 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 * Rrehabilitation 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	-

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).	ERA	For ERA coordinator per diems and transportation costs
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/inimize 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/Contractor	
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/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.	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 Bureaus of the Oromia and SNNP 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/water-borne 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.

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 compensation (and resettlement) 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)
Ms. Ulla Mustanoja	Sociological Aspects (3 months in Ethiopia)
Mr. Reima Petäjäjärvi	Road Sector Environmental Impact Assessment (at the beginning)
Ms. Auli Keinänen	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

Back-up Home Office Advisers

Mr. Kari Leminen	Road EIA Specialist
Dr. Kari Mustanoja	Institutional and Capacity Building Specialist

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

Ethiopian Roads Authority (ERA) 1995: The Profile of Management and Financing of Roads in Ethiopia November 1995.

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)

Ethiopian Roads Authority, ERA 1997: Reform Study Report, June 1997

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

Environmental Protection Authority, EPA 1997: Procedural Guidelines for Environmental Impact

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

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 Upgrading of the Alemgena - Hossaina- Soddo Road 8.7.1997

Place	Hossaina	
Date	July 8, 1997	
Time	9:00 - 12:00	
Coordinator	Ato Tamrut	
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 works 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

* 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

* The lack of a proper road system has been a problem in the country, but the problem is most serious in the southern part of the country, especially in Hadiya, Kembata - Alaba - Timbaro and North Omo Zones.
* The Alemgena - Hossaina -Soddo road made people know each other, encouraged trade, brought many social services to the area and is considered as a blood vessel that keeps life of the region.
* This road is more convenient, short, safe, etc., than the road through Shashamane. It was indicated that there are more theft and other problems, if using the alternative road.
* The Mojo - Addis road has a lot of traffic since it is the main entry to Addis from th port and other parts of the country, and using that road when there is another alternative, will worsen the traffic jam.
* The existing Alemgena - Soddo road is narrow and slippery during the rainy season and has become a major cause of accidents.
* The upgrading of this road will solve most of the problems caused by the present condition of the road and will make it a reliable road network for the whole region.
* The people of the area can not contribute in cash for the asphalting of the road, but will do everything possible which is in their capacity, like giving moral support, solving problems that may arise etc.
* The people assume that the damage on properties may not be serious since asphalting is done on the existing road. However, if there are damage results from the construction of detours, it can be solved through the involvement of the local administration, ERA and elderly people of the locality, taking the experiences of Chido-Sodo road construction. In addition, detours are temporary constructions which do not block the traffic.
* This road is connected to the Chido-Sodo road which is shorter and more convenien for traffic to reach Addis.
* The present condition of this road has many disadvantages such as
* Mother and children can not get health services on time.
* Farmers can not get fertilizers on time and sell their products when prices are high,
* Traders can not bring manufactured goods from Addis during the rainy season since drivers refuse to go on this road
* Development can not come to this area as expected

Transport cost is high which make the prices of goods high and beyond the reach of the people.

* Over one hundred lives are lost annually due to the road condition.
* Fuel tankers can not arrive on time and sometimes drivers are not willing to go to Hossaina, especially during the rainy season. This has caused shortages of fuel which is necessary for many things. Assab-Mojo is a two day drive, while Assab-Hossaina is a 6 day drive.
* There are a lot of problems when big trucks are stuck on the road since it involves renting a dozer and other machinery, in addition to the other problems created.
* Truck drivers are not willing to go to Hossaina and prefer to go to Dilla and Moyale which have an asphalted road. As a result, the region is losing a lot of benefits.
* There are 200,000 quintals of fertilizer that have to be transported every year to the area, and this is not done sometimes due to the lack of transport due to the road condition
* In the past harvesting season, 1.2 million quintals of wheat were transported to othe parts of the country, in addition to other farm products. If the road had been better more products would have been transported
* There are 400-500 vehicles using this road during the dry season.
* A bad road means a high transport cost which has many negative impacts on the users, traders etc.
* If the road were asphalted, mini-buses which are non-existent now, would improve some of the area, and would improve some existing problems faced by the people.
* Tourists who go to Omo would use this road if asphalted and would save time and money. This in turn would benefit hotel owners and others.
* The access to Addis would be improved for any person who has something to do there, be it private or business since it is the shortest distance and would be more convenient to mothers and children.
* People who are affected by road construction may see only their individual benefit. There is a case in the area, where a dozer operator has been attacked by a farmer, when a tree fell on his house by accident. This is a rare case, however, advance information for all peasant Associations by woreda administration is necessary to avoid any problem that may arise during the construction period.
* People who use Alemgena-Hossaina- Soddo road have no other alternatives. Others even if they want it, prefer the other road for the time being, since their vehicles would be out of use in a very short period of time
* In road construction, if there is damage to the properties of 10 persons and if the roa benefits 10,000 people, the beneficiaries outweigh the number of losers. This does not mean that the case of the 10 persons should be forgotten. There must be advanc information to those who would be affected and should be compensated in kind and cash, land should be replaced by the Peasant Association and the properties from th concerned parties.
* Traders buy farm products at a lower price considering the present road condition. I the road is asphalted, farmers can sell their products at a higher price, and get a bett return for their products.
* The asphalting of this road a long waited project and people will accept it, even if there are some damages to their properties. The road has been constructed by public contribution and there is an assumption that this road is their own.

* A woman from Soddo said that the benefits of asphalting this road is more beneficia to women than to men. This is because if a man is sick he can stay for some time before going to a health center, but a woman who is pregnant can not stay long and has to be taken immediately to a clinic to get some kind of assistance. Children who do not speak at all, also have to be taken to a clinic as soon as possible when they ar sick.
* Women are the producers of the future generation. There is only one hospital in the whole of Hadiya Zone and sometimes women who are in need of medical services are not able to get them because of poor transport facilities, sometimes they reach hospital in a very critical condition.
* Women's life in this area consists of going from one market to the other to get something to feed their family members. This is done by carrying heavy goods and walking long distances. It was indicated in the meeting that women sometimes face rape, theft etc. due to the circumstances. A good road is expected to alleviate the problems they are facing now, since transport facilities would improve.
* Girls' enrolment in school is expected to increase if there is a good road and transport, since parents who can pay can send their daughters to schools, especially for high school education.
* Integrated development should be encouraged in connection with road construction. Activities such as planting trees, protection against soil erosion, etc., should go hand in hand to preserve the natural environment.
* Malaria, lung diseases, water borne diseases, etc., are the most common health problems. Quarry sites have to be rehabilitated to prevent some of the above mentioned diseases, as they could be a breeding ground for mosquitoes.
* A question was raised, why ERA was not taking care of the environment such as protecting the soil against erosion on the roadsides, caused by the road construction. The response was that ERA is aware of the problem but due to budget constraints it could not involve in this activity.
* Resettlement has not been practiced as a result of displacement due to road construction or other development activities, in Hadiya-Kambata-Alaba-Timbalo, North Omo,and Guraghe Zones, which the road crosses. There is, however, a case where people resettled voluntarily when the road was opened, at a place called Mazoria which is an intersection of two roads.

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 Offic	Shinshicho
Sodo Woreda Council	Sodo
Women's Affairs Office	Sodo
Business community	Sodo
Business community	Sodo

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?

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?

NGO Questionnaire

- 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

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

CHECKLIST FOR SCOPING

Project: Alemgena - Hossaina - Sodo

	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		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	

Checklist for Scoping

	Potential Environmental Impact Area	Adverse Impacts	No Impacts	Beneficial Impacts	Evaluation Base
II	**Natural Environment**				
4	**Biological and Ecological Changes**				
	4.1 Impact 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		

Checklist for Scoping

	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	

Baseline Data/Physical and Natural Environment

Table 1 Mean Monthly Rainfall at Selected Towns

Month	Alemgena	Hosaina	Sodo
January	20	30	30
February	25	25	25
March	40	100	100
April	50	150	150
May	50	100	150
June	100	150	100
July	200	200	175
August	250	200	150
September	200	150	100
October	25	60	100
November	8	25	50
December	1	10	25
Annual			

Table 2 Mean Monthly Minimum Temperature (°C)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave.
Alemgena	8	8	12	10	12	10	11	11	11	11	10	10	
Hosaina	8	8	10	10	10	12	10	10	10	10	8	8	
Sodo	10	12	10	10	12	13	12	12	12	11	10	10	

Table 3 Mean Monthly Maximum Temperature (°C)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave.
Alemgena	25	23	23	23	25	24	20	20	22	22	22	22	
Hosaina	27	28	28	25	25	27	27	21	22	24	25	28	
Sodo	29	30	30	27	27	27	25	25	25	26	30	30	

Table 4 Mean Monthly Flows of Awash River at Melka Konture

January	4.62
February	4.83
March	6.62
April	9.37
May	10.07
June	22.79
July	183.53
August	346.52
September	210.07
October	41.61
November	13.00
December	5.59
Annual	**74.14**

Table 1

Population Size by Sex; by Urbanization by Sex along the Alemgena-Hossaina-Sodo Road

	Total	% Women	% Urban of	% Women
Oromia Region				
Mirab Shewa Zone	2,329,699	50	10	53
Alemgena woreda	118,099	<49	19	54
- Alemgena	4,654	53	-	-
- Awash Konture	2,195	58	-	-
Kersana Kondaltiti woreda	92,364	<49	2	55
- Lemen	1,981	55	-	-
SNNP Region	10,377,028	50	6	50
Gurage Zone	1,556,964	51	5	51
Sodo woreda	108,280	50	6	54
- Tiya	1,856	52	-	-
- Buie	2,497	53	-	-
- Kella	1,900	57	-	-
Meskanera Mareko woreda	227,135	50	13	51
- Butajira	20,509	52	-	-
Selti woreda	117,784	51	4	50
- Kibet	3,417	51	-	-
- Worabe	670	46	-	-
Dalocha woreda	123,303	50	4	49
- Wulbareg	1,549	51	-	-
Hadiya Zone	1,050,151	50	6	51
Limo woreda	299,166	51	13	51
- Fonko	2,000	51	-	-
- Belessa	710	48	-	-
- Hossaina	31,701	51	-	-
Kambata Alabana Timbaro Zone	727,340	50	7	49
Angacha woreda	154,837	<49	4	50
- Amecho Wato				
- Deyogena	3,633	50	-	-
Semen Omo Zone	2,605,435	50	6	50
Boloso Sore woreda	249,617	51	7	51
- Areka	12,294	51	-	-
Sodo Zuria woreda	200,866	50	18	48
- Sodo	36,287	48	-	-

Woredas 1,691,451
Towns 127,183

Table 2 A. Total Fertility Rate by the Regions and by the Zones, and By Towns with More than Ten Thousand Inhabitants (Total-Urban-Rural)

Oromiya Region	4.875	3.375	5.075
Mirab Shewa	5.175	3.405	5.400
SNNP Region	4.305	3.530	4.365
Gurage Zone	3.865	3.985	4.365
Hadiya Zone	3.810	2.885	3.875
KAT Zone	3.370	3.250	3.380
Semen Omo Zone	4.320	3.455	4.375
Butajira	3.8		
Hossaina	2.4		
Areka	3.2		
Sodo	3.8		

Table 2 B. The percentage of persons under 15 years of age of total population by region, by zon and by towns with more than ten thousand people

	Total	Urban
Oromiya Region	47	40
Mirab Shewa	46	41
SNNP Region	46	42
Gurage Zone	45	44
Hadiya Zone	47	47
KAT Zone	46	44
Semen Omo Zone	46	42
Alemgena	39	
Butajira	44	
Hossaina	43	
Areka	45	
Sodo	41	

Table 3. The average household size by regions and zones along the Alemgena-Hossaina-Sodo road. Persons per household.

	Total	Urban	Rural
Oromiya Region	4.8	4.5	4.9
Mirab Shewa	4.8	4.4	4.9
SNNP Region	4.7	4.6	4.7
Gurage Zone	4.7	4.6	4.7
Hadiya Zone	5.4	5.0	5.4
KAT Zone	5.3	5.2	5.4
Semen Omo	4.7	4.4	4.7

Table 4. Literacy Rate by Regions and by Zones by Sex - in percent

	Total		Urban		Rural	
	Men	Women	Men	Women	Men	Women
Oromiya Region	29	15	77	60	23	9
Mirab Shewa	32	14	77	56	27	9
SNNP Region						
Gurage Zone						
Hadiya Zone						
KAT Zone						
Semen Omo						

Table 5

Religions represented by the Alemgena-Hossaina-Sodo Road

	Religion				
	Orthod	Protestant	Catholic	Muslim	Traditio
Oromia Region					
Mirab Shewa Zone	80	6	<1	5	7
Alemgena woreda	92	1	<1	6	<1
- Alemgena	92	2	<1	5	-
- Awash Konture	98	1	-	<1	<1
Kersana Kondaltiti woreda	99	<1	<1	<1	<1
- Lemen					
SNNP Region	28	35	3	17	15
Gurage Zone					
Sodo woreda	96	<1	<1	2	-
- Tiya	93	4	<1	1	-
- Buie	86	4	<1	9	-
- Kella	95	1	-	2	-
Meskanera Mareko woreda	33	2	<1	65	<1
- Butajira	45	2	<1	51	<1
Selti woreda	3	<1	<1	96	<1
- Kibet	25	<1	-	72	-
- Worabe	3	1	-	95	-
Dalocha woreda	2	<1	<1	98	<1
- Wulbareg	35	4	-	60	-
Hadiya Zone	22	47	5	22	1
Limo woreda	18	22	<1	59	<1
- Fonko	11	20	-	68	-
- Belessa	9	48	5	36	-
- Hossaina	56	35	1	7	-
Kambata Alabana Timbaro Zone	12	49	6	30	2
Angacha woreda	12	73	9	2	<1
- Amecho Wato					
- Deyogena	21	67	9	1	<1
Semen Omo Zone	39	36	3	<1	18
Boloso Sore woreda	60	33	5	<1	<1
- Areka	64	22	7	5	<1
Sodo Zuria woreda	52	43	2	2	<1
- Sodo	63	27	1	7	<1

Table 6 A. Migration Pattern by Regions and by Zones along the Alemgena-Hossaina-Sodo Road in percent

I	Urban-urban
II	Rural-urban
III	Urban-rural
IV	Rural-rural

	I	II	III	IV
Oromiya Region	14	19	7	59
Mirab Shewa	14	21	10	54
SNNP Region	12	15	11	60
Gurage Zone	6	10	25	57
Hadiya Zone	11	16	15	57
KAT Zone	12	19	9	59
Semen Omo Zone	13	22	13	52

Table 6 B. The Percent Share of Migrants of the Total and Urban Population

	Total	Urban
Oromiya Region	14	44
Mirab Shewa	12	45
SNNP Region	10	40
Gurage Zone	10	37
Hadiya Zone	7	32
KAT Zone	6	30
Semen Omo Zone	8	43

Table 7

Availability of Radio, TV and Telephone

	Rural	Urban		
	Radio	Radio	TV	Telephon
Oromia Region		47	3.5	5.45
Mirab Shewa Zone		47	2.3	4.1
Alemgena woreda				
- Alemgena		55	4	5
- Awash Konture		39	1	3
Kersana Kondaltiti woreda				
- Lemen		34	2	2
SNNP Region	10	42	3	4
Gurage Zone	20	45	2	3
Sodo woreda				
- Tiya		44	-	-
- Buie		52	2	2
- Kella		37	-	-
Meskanera Mareko woreda				
- Butajira		44	2	3
Selti woreda				
- Kibet		41	2	7
- Worabe		45	-	-
Dalocha woreda				
- Wulbareg		36	1	-
Hadiya Zone	12	40	3	4
Limo woreda				
- Fonko		35	-	-
- Belessa		34	-	-
- Hossaina		49	5	7
Kambata Alabana Timbaro Zone	13	39	3	3
Angacha woreda				
- Amecho Wato				
- Deyogena		27	-	1
Semen Omo Zone	6	36	2	3
Boloso Sore woreda				
- Areka		25	1	1
Sodo Zuria woreda				
- Sodo		43	5	7

Table 8

Average Monthly Rent and Percentage of Rented Houses along the Alemgena-Hossaina-Sodo Road

I Average monthly rent per housing unit
II Rented from kebele - percent of all housing units
III Rented from private household - percent of all housing units
IV Owner occupied - percent of all housing units

	I	II	III	IV
Oromia Region	18.20	24	17	49
Mirab Shewa Zone	14.52	27	14	47
Alemgena woreda				
- Alemgena	11.65	28	9	38
- Awash Konture	15.08	28	10	40
Kersana Kondaltiti woreda				
- Lemen	13.70	23	14	52
SNNP Region	24.79	16	19	57
Gurage Zone	21.45	18	19	56
Sodo woreda				
- Tiya	15.97	11	13	72
- Buie	18.85	26	33	35
- Kella	9.28	38	11	45
Meskanera Mareko woreda				
- Butajira	16.23	16	18	61
Selti woreda				
- Kibet	12.92	34	11	49
- Worabe	23.23	7	23	63
Dalocha woreda				
- Wulbareg	12.18	21	11	62
Hadiya Zone	31.55	7	13	73
Limo woreda				
- Fonko	24.17	-	9	88
- Belessa	17.00	-	3	96
- Hossaina	35.95	9	18	65
Kambata Alabana Timbaro Zone	29.72	12	15	67
Angacha woreda				
- Amecho Wato				
- Deyogena	46.10	<1	5	92
Semen Omo Zone	21.07	15	17	59
Boloso Sore woreda				
- Areka	19.88	11	19	65
Sodo Zuria woreda				
- Sodo	24.52	19	18	49

Table 9A. Economical activity rates in Oromiya and SNNP Regions and Zones along the project road.

	Urban - percent		Rural - percent	
	Men	Women	Men	Women
Oromiya Region	61	36	86	71
Mirab Shewa Zone	58	40	89	81
SNNP Region *				
Gurage Zone				
Hadiya Zone				
KAT Zone				
Semen Omo Zone				

* The SNNP statistics will be provided later.

Table 9B. Unemployment rates in Oromiya and SNNP Regions and Zones along the project road.

	Urban - percent		Rural - percent	
	Men	Women	Men	Women
Oromiya Region	14	17	.55	.66
Mirab Shewa Zone	15	14	.60	.68
SNNP Region *				
Gurage Zone				
Hadiya Zone				
KAT Zone				
Semen Omo Zone				

* The SNNP statistics will be provided later.