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Ethiopian Roads Authority (ERA)

Feasibility Study and Environmental Impact Assessment for:

Assosa - Guba Road Project

(NDF Credit No. 207-TD1)

Final Environmental Impact Assessment

November 2001

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Transport Department

in association with

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ANNEXES

ACRONYMS AND ABBREVIATIONS

BOE	Bureau of Education
BOH	Bureau of Health
CSA	Central Statistical Authority
CSE	Conservation Strategy of Ethiopia
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Ethiopian Mapping Authority
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
EPE	Environmental Policy of Ethiopia
ERA	Ethiopian Roads Authority
EWCO	Ethiopian Wildlife Conservation Organisation
EWNHS	Ethiopian Wildlife and Natural History Society
RCS	Regional Conservation Strategy
EMB	Environmental Management Branch
BENRS	Benishangul-Gumuz National Regional State
ROW	Right of Way

EXECUTIVE SUMMARY

Project Description

The road project under consideration is located in the Benishangul-Gumuz National Regional State (BGNRS) in the western part of the country, about 680 km and 690 km from Addis Ababa for Assosa and Guba, respectively. It represents a potentially important intra-Regional link between Assosa in the south and Guba in the north (Annex A Map 2). The area of influence falls entirely within the Abay River (Blue Nile) basin and includes most part of its major tributary Dabus River Basin. The drainage flows predominantly in a northward direction, while the Abay itself turns westwards into Sudan near Bambudi in the north of the project area.

The road project is approximately 219 km long of which some 80 km is presently impassable and the remainder gravel or cleared access. Further, there is an approximately 250 meter unbridged river crossing over the Blue Nile about 50 km south of Guba, as well as a number of other river crossings. Some 80 km of the proposed road alignment is new, or follows only old trading tracks and/or Old Italian military roads. This part of the road will pass through a rolling to hilly area, for which there are few secondary data resources.

The current development objective of the road is to access agricultural potential in the Region and to provide intra Regional links in Benishangul-Gumuz. This is consistent with other development plans for the Region, notably the Abay River Basin Master Plan. Potential includes the development of large-scale irrigated agriculture in the Abay River Valley, and perhaps, the Dabus. In addition, the Region is believed to have mineral deposits, primarily gold, marble and base metals. The desire is to open the area to exploration and subsequent resource extraction.

The EIA

The EIA consisted of scoping according to Ethiopian EPA standards, a biological survey, a socio-economic baseline study, and five public consultations held with affected communities.

In order to assess the potential impacts of the road works, propose possible mitigation measures and establish an environmental management plan, the Consultant assumed a work methodology based on the normal approach that most contractors would apply to execute the types of works anticipated for the project road. The EIA was conducted very early in the road design process at a time when information about the alignment and the final road standard was still being developed. As a result, the EIA has played a very useful role in the site selection process.

This was particularly true of the results of the biological survey, which were needed to select among the alternatives for the part of the road that will be new construction. The result of the biological survey supported and confirmed the selection of Alternative IV, and is consistent with the approach of the engineering team in analysing alternatives.

An Environmental Management Plan (EMP) was prepared and scoped in terms of the institutional requirements for its implementation. Monitoring is a key component of the EMP and a critical activity to be conducted throughout all phases of the project cycle. A monitoring program has been outlined as well as the institutional requirements and responsibilities for implementing the environmental management plan. . At this early stage, the cost for implementing the EMP is anticipated to be 2-3% of total project costs.

Existing Conditions

Social Situation

The current access to parts of the project area (from Komosha Junction to the Blue Nile) is in very bad condition with access into the Region being quite limited. This has inhibited the delivery of services, which are not adequate to cover the basic health care or educational needs of the local population. Government statistics support this conclusion as the Region has some of the highest infant mortality and morbidity rates in the country.

The 1994 Census data indicates that the total population of the Region in 1994 was some 460,000 people, of whom 92% lived in the rural areas, and only 8% lived in the urban areas. By the year 2030 the population of the Region is expected to be almost double the current population. This will also be the case for those woredas in the ZOI.

The major ethnic groups in the Region were: Berta (Jeblawi) 25.1%. Gumuz 23.3%, Amhara (22.2%), Oromo (12.8%), Shinasha (7.0%) and Agew/Awingi (3.8%). Other groups made up 5.8% of the total population in the Region (see Table 4.21).

The data and indications from the Regional offices imply that there is still a considerable amount of migration into Benishangul-Gumuz Region from other Regions. Results from the Household Survey conducted during this study indicate that 14.5% of the survey samples are recent migrants, of which about one third live in the Mankush area. Recent migrants also tended to settle in the Komosha-Menge-Sherkole and Yarenje-Yabulu areas. About a third of the zone of influence population is of non-indigenous origin.

In 1994, some 262,000 people were economically active in the Region, i.e. approximately 57% of the total population of the Region. Within the zone of influence, the main occupation is farming (79% of respondents). 6% of respondents were traders and 5% were government workers. Nearly 40% of the households were involved in panning for, and selling, gold. Other activities from which income is derived are the sale of firewood, charcoal, thatch, and honey.

Men were mainly involved in wage employment (69% of respondents), and were also mainly responsible for income derived from the sale of charcoal (76%), thatch/grass (70%), honey (90%) and gold (52%). Women were mainly responsible for income from firewood (63%).

Women have the main transport burden, being responsible for collecting water and firewood (>55% of respondents). The Survey indicated that men make the most trips to the market (54%), and to the fields.

In the project area, donkeys are used for carrying goods by men, women and children, but mostly by men only (73%). Donkey carts are for the most part used by men for transporting crops (for example to and from markets or from the field). Women almost always walk and head-load. As women have limited access to the household income, their access to transport modes is restricted. Donkeys are generally controlled by men and are not made available for domestic transport unless the trip distances are relatively large.

Other forms of intermediate transport are hardly used in the project area; only 2.6% of the respondents used bicycles and these were all men. Reasons for this are probably cultural, as there is no tradition of using bicycles for loads.

Statistics show that there is a significant gender imbalance in literacy rate, school enrolment and attendance, both at national level and in Benishangul-Gumuz Region. Almost all primary school pupils in Ethiopia go to school on foot in both urban and rural areas. More than 90% of the secondary school pupil's walk to reach the school, while around 7% uses public transport. It seems unlikely that road improvement will have much direct impact on school attendance, since few families could afford to send their children by public transport, even if available, or to provide them with bicycles.

In the Assosa - Benshangul Mineralised belt there are four important primary gold occurrences with three base metal occurrence. The principal primary deposit is at Dul and the other area is Azale- Akendeyu, which is a potential deposit of copper and zinc. Indications are that there is a possible association of gold and silver and small-scale exploration works for gold and base metals are continuing on the course of Sherkole River, based on family mining.

Artisan gold mining is widespread throughout the BGNRS. Gold is currently recovered on a small scale by local people primarily from riverine sources. According to studies conducted by the M.E.D. (Mines and Energy Department), artisan miners are working in all three zones: Assosa zone, Metekel zone and Kemash zone. The number of artisan gold miners has been estimated to be between 55,000 to 65,000. On average 180 kg of gold is mined each month of the mining season (February-April).

The duration of mining operation varies from place to place, depending on the availability of water for washing the sediments of alluvial deposits. Generally, 3-4 members are employed in mining for income generation. It is observed that 65-70% women and 5% children actively work on artisan mining operations at Metekel zone and Assosa zone. Work conditions can be dangerous.

Biodiversity and the Natural Environment

Water is a limiting factor in the Region and as such must be treated as a sensitive environmental resource. The two principal vegetation types that occur in the project area are: the *Combretum-Terminalia* woodland and the riparian/riverine and swamp vegetation. The floristic composition of this vegetation type is dependent on altitude and geographical location. A number of unique species to Ethiopia and Benshangul were observed. These include: *Zygotritonia praecox* (known so far only from west Africa), *Crinum subcernum* (known so far only from southern Tanzania and Zimbabwe) (Annex B: Photo 3). In addition, rare plants such as *Gladiolus daleni* (Annex B: Photo 7) and *Merremia gallabatenis* (Annex B: Photo 8) are found in the general area. Thus the Region hosts a diversity of unique flora.

The swamp and wetland vegetation is very important, contributing to the biodiversity of the area. It consists mainly of sedges, grasses, orchids (Annex B Photo 4). The orchid flora is extremely diverse. The orchid flora of Benishangul covers over 30% of the 150 species of orchids in the whole country. This diversity is mainly in the wetlands.

Several wetlands areas were identified during the reconnaissance. These are not directly on the road alignment, but in the vicinity, and should be avoided if changes are to be made on the existing alignment. It has been proposed that given the potential

effects of induced development, any environmentally sensitive area within 10 km of the proposed works should be protected.

Due consideration need also to be given to some of the big trees in the riverine vegetation such as *Breonardia salicina and Hyphene thebaica.*

The faunal diversity (apart from the birds) is scarce. Some of the observed ones include: baboons, monkeys and duiker. Turtles were observed in the wetlands. However, C. Hermann who worked for the Department of Agriculture for the Region has documented much of the diversity of the bird life of Benishangul and Gumuz. Mr. Hermann has recorded over 500 species of birds in a two-year period, between 1999-2001 (personal communication May 2001). This represents over 60% of the bird life recorded (800) in the whole country.

Environmental Management Plan

Potential impacts and their mitigation are summarized in the EMP. Three principles guided the development of the environmental management plan for this project:

- Ensure good public participation through early and frequent contact
- The use of natural resources for energy, food, and construction purposes should be done in a controlled way. The right to harvest is with the local community.
- People directly affected by the road project should not be left worse off once it is completed and operational. ERA EMB has overall responsibility for implementing the EMP.

Environmental Impact	Measure to be taken	Responsible Organization
Soil compaction	Identify all activities for which there will be soil compaction and where this is likely to occur	Contractor and Engineer
	Locate these activities to avoid damage to farmland	Contractor, Engineer, Communities
	Monitor and identify all areas in which soil compaction has occurred	Engineer, Contractor
	Reinstate compacted soils: Loosening Spreading topsoil Seeding Watering	Contractor
Loss of topsoil	Identify all areas in which topsoil will be removed	Contractor
	Develop a plan to reuse topsoil	Contractor
	Locate topsoil storage sites for efficient maintenance and reuse	Contractor
	Preserve topsoil for re-use: Strip with care Segregate piles Protect against erosion Water and maintain	Contractor

Environmental Impact	Measure to be taken	Responsible Organization
Erosion	Limit stripping of vegetation by reducing area to be widened	Design Team
	Conduct earthworks in dry season	Contractor
	Compact embankments and slopes	Contractor
	Cover open soils with topsoil and grass seeds	Contractor
	Where animals and hoof traffic are a problem, plant in thorn scrub	Contractor
Water depletion	Map all springs, wells and small streams	Engineer and Contractor
	Identify water requirements of projects and potential sources	Engineer and Contractor
	Conduct consultation with community to plan water use	Engineer, Community Dev. Specialist
	Supply camp sites with boreholes, if needed	Contractor
	Monitor water availability and quality during construction	Engineer, Communities
Water pollution	Identify all project related sources of water pollution	Contractor and Engineer
	Locate camp sites 1km from local drinking water sources	Contractor and Engineer
	Provide camp sites with simple waste water connection and treatment (pit latrines) and pollution control structures / procedures for hazardous material storage and handling	Contractor
	Control vehicle washing and maintenance	Contractor
	Monitor fuel handling	Contractor
	Control waste disposal	Contractor
	Require and confirm technical fitness of contractors vehicles and equipment	Engineer
	Emergency Response Plan Accidental fuel release Worker accident	Contractor
	Train workers Fuel handling Waste disposal First aid Spill containment	Contractor Env. Advisor Engineer
Sedimentation	Identify all extraction sites on a map	Contractor and Engineer
	Prepare a plan and schedule for material extraction	Contractor and Engineer
	Consult with local community near sites	Engineer and Community Dev. Specialist
	Excavate materials from large rivers only	Contractor

Environmental Impact	Measure to be taken	Responsible Organization
	Do not use minor streams as source areas	Contractor
	Excavate during low flow periods	Contractor
	Do not alter the hydrologic profile	Contractor
	Prepare an area for the pump truck, stabilize the bank where the truck is parked for water extraction or install a small pump	Contractor
	Take proper measures during foundation excavation for bridges	Contractor
Air pollution	Perform regular maintenance on vehicles	Contractor
	Do not idle while standing	Workers
	Control speeds and acceleration	Workers
	Train drivers Expected maintenance Improved habits	Contractor and Env. Adviser
Noise pollution	Identify potential sources of noise exposure for workers	Contractor
	Monitor noise levels for and hearing damage in workers	Contractor
	Provide ear protection for key functions	Contractor
	Control speeds and acceleration	Workers
	Train drivers Expected maintenance Improved habits	Contractors
Loss of vegetation	Identify activities in which vegetation will be removed or damaged	Contractor and Engineer
	Identify important vegetative resources and consult with community on preservation	Contractor and Engineer
	Plan the sitting and construction of camp sites carefully	Contractor and Engineer
	Avoid all wetland areas	Contractor and Engineer
	Do not remove any large trees	Contractor and Engineer
	Protect single trees in the immediate vicinity of the site (fences)	Contractor and Engineer
	Locate camp site away from areas of dense vegetative cover	Contractor and Engineer
	All removed vegetation should be compensated (cash or replacement)	ERA
	Reduce the ROW width and widen to one side where possible	Design Team
	Plant trees and bushes for noise and dust protection	Contractor

Environmental Impact	Measure to be taken	Responsible Organization
	Plant trees to replace and provide fuel wood for camp site	Contractor
	Compensate for disturbance to woodland areas by replacement	Contractor
	Plant flowering trees such as Jacaranda and Flamboyant in villages	Contractor
	Involve villagers in re-vegetation schemes	Contractor
	Valuable habitat within 10 km of the road should be protected	EPA / ERA
Loss of fauna	Hunting and fishing by project staff should be restricted.	Contractor
Visual ugliness	Implement good engineering housekeeping practices at all construction activity sites	Contractor and Engineer
	Control stock handling, waste and spoil disposal	Contractor and Engineer
	Consult with the community regarding construction waste disposal	Contractor and Engineer
	Reinstate borrow-pits To natural contour (not original) Re-vegetate	Contractor
Loss of cultural / historical sites	Conduct consultation with local elders to identify and map known sites	Engineer and Com Dev. Specialist
	Avoid these sites	Contractor
	Protect sites that are in the immediate project vicinity	Contractor
	Collaborate with Ministry of Culture to establish procedures in the event of the discovery of a site	Contractor
	Train staff	Contractor
Degradation of public health	Prepare a social impact monitoring plan	Com Dev. Specialist
	Develop a program to prevent the spread of AIDS Increase awareness of workers and local women	Community Dev. Specialist and Contractor
	Make condoms available at a subsidized price	Contractor Camp Administrator
	Avoid overburdening the local health system	Contractor Camp Administrator
	Plan to increase the availability of treatments and drugs	Contractor Camp Administrator
	Provide and upgrade camp health facilities to limit use of local health care	Contractor Camp Administrator
	Anticipate problems	Contractor Camp Administrator
Loss of property	Prepare a social impact monitoring plan	Community Dev. Specialist

Environmental Impact	Measure to be taken	Responsible Organization
	Identify the number of businesses, homes, properties, and other road side activities that are likely to be effected by road construction	Com Dev. Specialist and ERA
	Prepare a relocation plan for each affected party and assist in resettlement	ERA
	Compensate for losses in accordance with Ethiopian practice	ERA
	Replace lost vegetation in villages, flowering trees such as Jacaranda and Flamboyant are recommended	ERA and Contractor
Uncontrolled growth of illegal permanent settlements	Prepare a social impact monitoring plan	Com Dev. Specialist
	Plan the siting of camp sites carefully	Contractor
	The location of camp sites must be approved by the Engineer	Engineer
	Do not permit the building of houses in the ROW	Local Authorities
	Require that houses that are built in response to the camps, be registered	Local Authorities
	Empower local communities through adequate consultation and participation	Engineer and Com Dev. Specialist
Inflation and economic hardship	Prepare a social impact monitoring plan	Com Dev. Specialist
	Locate the largest construction camps near the largest settlements, Assosa and Guba (where livelihoods are broader in scope) but with a sufficient distance to restrict interaction with the local community	Contractor and Engineer
	Monitor prices and the effect on the poor of the community	Com Dev. Specialist and Local Authorities
	Register new houses resulting from induced development to control rent levels	Local Authorities
	The camp administrator should not allow everyone in town at once on a shopping weekend	Camp Administrator
Increase in traffic accidents	Prepare a traffic deviation and safety plan	Contractor
	Provide properly planned and developed deviations with signs and protections as needed	Contractor
	Post flagmen in heavy traffic areas	Contractor
	Always maintain pedestrian access	Contractor
	Provide adequate separation between motorized and no-motorized traffic	Contractor
	Reduce speeds and post signs for construction workers	Contractor
	Inspect construction vehicles regularly	Contractor
	Train drivers	Contractor

It has been proposed that compliance with the avoidance and mitigation measures contained in the EMP be supervised by ERA EMB and the Engineer, and, during the construction phase, an Environmental Adviser appointed to the project. The Engineer shall ensure that all mitigation measures in the contract and agreed at the site are done in a proper and timely manner.

The Environmental Adviser will oversee the implementation of the EMP by providing relevant advice, visiting the site, monitoring issues and working with the Engineering team, construction staff, and the community to develop relevant solutions to problems. A minimum of 4 months for the Environmental Advisor is recommended.

After construction, the maintenance section of ERA will follow-up and report to the EMB about the condition and function of mitigation measures as implemented.

Project level committees (not the ERA Compensation Committee) should be set up by ERA for consultations along the alignment that include the following persons:

- Women as local users of the road
- Local elders
- People affected by the project at the village level
- Officials from BOPED and other relevant Regional and local offices
- Officials from relevant Ministries in central government
- A representative from the EPA
- Research institutions (representatives from the National Herbarium who have been working in the Region are very important)
- Relevant NGOs
- The Supervising Engineer
- The Environmental Inspector

Regular consultations with these committees should be held throughout the duration of the project. Clear and timely information should be provided to this group and certain individuals from the committee should be assigned to receive complaints and questions from the public.
It is strongly recommended that a community development/consultation specialist be included as part of the implementation team to ensure that the necessary consultation is carried out in an efficient and effective manner and to prepare the social impact monitoring plan. This will ensure that public participation in the process is systematic, relevant and beneficial. By having a team member with specialist skills, the concerns of the more vulnerable members of the community will be incorporated. A minimum of 4 months is recommended.

Conclusions and Recommendations

Key conclusions and recommendations are summarized as follows.

The proposed project is basically consistent with existing development plans for the Region.

Implementation of planned development is based on the establishment of improved or intensified agriculture in the form of large-scale commercial forms and migration of settlers into the area. From an environmental standpoint this raises questions about the affects of possible loss of subsistence based agriculture supporting indigenous

groups, land clearing and use conversion, as well as increased urbanization / induced development and pressures on resource availability.

Until a more strategic environmental assessment of the Abay River Basin Master Plan is performed, environmental sustainability must be built incrementally by including environmental considerations in each project.

For the proposed road project to be sustainable, it must be implemented in such a way as to conserve the existing biodiversity of the area and with full consultation of local indigenous groups.

This will require an environmentally proactive approach to project implementation. However, direct observation of current contractor practices, the remoteness of the location, the lack of adequate independent supervision of works, the institutional weaknesses of the EPA, ERA EMB, and the Regional BOPED and a lack of interagency cooperation on the issue of monitoring and enforcement, mitigation is unlikely to be implemented.

Evidence of this is no more obvious than in contractor methods that were observed being used to clear the alignment for the road from Komosha to Gizen (See Annex B: Photo 2b). When questioned, contractor workers, local and central level authorities were unaware of these problems, and had no plan, or means, to act in this case to correct methods.

Public consultations revealed a high acceptance of the project, largely based on the expectations that there will be opportunities for employment of local people and increased income. In practice, employment opportunities will be rather limited and of short duration. In the final analysis, these benefits are counter weighed by the potential for inflation, conflict between in-migrants, and increased competition for resources during the construction phase. If to this are added the long-term effects of induced development, it is likely that the most vulnerable members of the community may be further marginalized.

The implementation of post project monitoring of social impacts is key. This has been provided for be the collection off base-line socio-economic data for this project. However, this activity must be planned and budgeted by the EMB.

Local communities are the owners of all local resources and have the first right to use and harvest. To achieve this, local communities must be empowered by adequate and effective consultation. Public participation in road projects is a new activity in Ethiopia. The challenge is to implement a public consultation process that is effective for all parties. This will require specialist input and careful planning and coordination of related activities and follow-up. It is proposed that contact with local communities have expert facilitation.

Awareness of the important biodiversity of the area must be raised on all levels.

The area in the direct zone of influence of the road has yet unrealised tourist potential in the form of birding tours. The presence of rare orchids and other endemic plant species is also of great interest internationally. It has been estimated that some 70% of all bird species occurring in Ethiopia can be found in the project vicinity. To achieve this potential, local biodiversity must be maintained and intensified wherever possible. All remaining wetland areas must be preserved. Soil erosion must be controlled.

Vegetation removal must be strictly limited and every opportunity for increasing vegetative cover and habitat should be taken.

Awareness of the importance and effectiveness of good engineering practices must be raised on all levels, including workers.

Sustainable development is not an inhibiting factor for road project implementation. The implementation of the EMP does not pose a burden on the engineering team. In large measure it is simply the reiteration of good engineering practice. Much of this is contained in the customary contract specifications. The problem seems to stem from inadequate means to enforce implementation of contract environmental specifications, and a lack of technical expertise in terms of incorporating the EMP into site level activities. If this is to be overcome, a multidisciplinary team approach to managing the construction phase is required and the contractor must be held accountable.

Implementation of mitigation will require the systematic planning of proposed measures.

Several of the proposed mitigation measures require the systematic management of information and action. This requires the preparation of plans, which include, but are not limited to:

- Camp site design and siting (approach as a new village, confirm provision of resources and infrastructure, avoid or compensate vegetation loss – plant fuel wood species)
- The protection of trees and other vegetation (must be located on a map, obtain input and agreement from community, fenced and verified, train workers to not crush remaining vegetation or go off site for the wrong reason – to dispose waste, hunt, collect fire-wood, etc.)
- Public consultations on resources management (give public information on extraction or disturbance areas, obtain input and agreement, monitor conflicts, take corrective action)
- Sensitive area protection 10 km range (identify location, educate workers and communities, seek official protective status at central level, monitor)
- Social impact monitoring (both current and post – project evaluation, ERA EMB needs to budget cost and incorporate this activity into their work program, a sustained effort is required)

Emphasis must be placed on linking the plan to concrete actions. It is essential that the preparation of the plan not be the end goal, but rather the conversion of knowledge gained from analysis and planning into actual construction activities. It is furthermore essential that a clean-up program be implemented in the area after the construction phase is complete.

The contractor must be required to have a specific and practical plan for clean-up and waste disposal. The restoration of borrow sites, access roads, traffic deviations, etc. must be confirmed and final payment must be made dependent on the adequacy of the provision of environmental restoration and clean up.

Assumptions of this up-streamed EIA must be verified and corrected during detailed design.

As the current analysis was made early in the project cycle, it has emphasized input into the analysis of engineering alternatives and the route selection process. Assumptions on which this EIA is based and its conclusions will need to be updated during detailed design.

It is strongly recommended that the next step in the environmental management process for this project it to prepare and implement an awareness raising presentation for stakeholders.

Chapter 1
Introduction

November 2001

1. INTRODUCTION

1.1 Background

The road project under consideration is located in the Benishangul-Gumuz National Regional State (BGNRS) in the western part of the country, about 680 km and 690 km from Addis Ababa for Assosa and Guba, respectively. It represents a potentially important intra-Regional link between Assosa (UTM, N 668.500, E 1.1126.00) in the south and Guba (UTM, N 749.500, E 1.246.500) in the north (Annex A Map 2).

It is approximately 219 km long of which some 80 km is presently impassable and the remainder gravel or cleared access. Further, there is an approximately 250 meter unbridged river crossing over the Blue Nile about 50 km south of Guba, as well as a number of other river crossings. Some 80 km of the proposed road alignment is new, or follows only old trading tracks and/or Old Italian military roads. This part of the road will pass through a rolling to hilly area, for which there are few secondary data resources.

The current development objective of the road is to access agricultural potential in the Region and to provide intra zonal links in Benishangul-Gumuz. This refers to supporting the development of large-scale rainfed agriculture in the Abay River Valley, and possibly indirect support of irrigated agriculture in the Lower Beles and Dabus River Valleys. In addition, the Region is believed to have mineral deposits, primarily gold, marble and base metals. The desire is to open the area to exploration and subsequent resource extraction.

1.2 Objectives of the Environmental Study

The Environmental Impact Assessment (EIA) of the Assosa - Guba road project was conducted by the Carl Bro a/s team as part of Phase 1 of the Assosa – Guba Road Project that comprises a Feasibility Study (including Preliminary Engineering Design) and Environmental Impact Assessment. Phase 2 is Detailed Engineering Design and Tender Document Preparation.

The objectives of the EIA have been described in the Project's Terms of Reference (Annex K). To summarise, the study required the following to be undertaken:

- Environmental scoping;
- A description of the proposed road improvements;
- A description of the study area and the zone of influence of the road;
- A description of the environmental characteristics of the study area;
- Policy, legal and administrative framework relating to environmental conservation and protection in the country;
- Public consultation process;
- Identification of potential impacts due to the rehabilitation of the road, in relation to the project location, project design, construction works, and project operation;
- An analysis of the proposed road alignment(s);
- Identification of mitigation measures, and the preparation of an Environmental Management Plan;
- The preparation of an Environmental Monitoring Plan.

1.3 EIA Approach and Methodology

The first step in conducting the EIA was to scope the area of influence of the road, and the activities and impacts that would be studied. This included describing the proposed road improvements, as these were currently understood, defining the study area, and collecting data on the existing environment in the zone of influence. A review of the current status of the regulatory framework for EIA in Ethiopia was also performed.

A preliminary field survey of the existing section of the road from Assosa to Sherkole was conducted in May 2001 in order to plan public participation activities and the subsequent biological survey, and to identify stakeholders and data sources. In accordance with the TOR for the EIA (Annex K), public consultations were held five locations:

- Assosa Woreda
- Sherkole Woreda
- Komosha Woreda
- Menge Woreda
- Guba Woreda

The public consultations focused on qualitative aspects of the communities and their relationship to the road / transportation. Summary of the public consultations can be found in Annex E. The objectives of the public consultations were as follows:

- To inform the public / to present details regarding the proposed road, its design and anticipated function (the reason it is being built), steps to implement the road and timeframe;
- To ask local residents about their transport needs (both short term and long term)
- To ask local residents about problems with the existing road and improvements they feel are needed
- To explore whether or not the proposed road is consistent with their needs and goals
- To ask local residents about problems with current or past road construction and any issues or conflicts that need to be resolved

In addition, a detailed household survey was conducted in the ZOI involving some 580 respondents to establish baseline conditions for the socio-economic impact analysis. Results have been summarized Section 4.3 Socio-Economic Profile. The Household Survey Questionnaire is presented in Annex D.

The biological survey was conducted during July and consisted of walking the length of the preferred alignment alternative and sampling transects. The objectives were to survey resources in the ZOI, to identify sensitive areas, and to assess impacts and change to local natural resources that might be induced by the road. The Terms of Reference for the biological survey can be found in Annex F. The results have been incorporated throughout the EIA.

The EIA was conducted very early in the road design process at a time when information about the alignment and the final road standard was still being developed. As a result, the EIA has played a useful role in the site selection process. This was particularly true of the results of the biological survey, which were needed to select

among the alignment alternatives for the part of the road that will be new construction. Results of the biological survey supported and confirmed the approach of the engineering team in analysing alternatives.

An Environmental Management Plan (EMP) was prepared and scoped in terms of the institutional requirements for its implementation. Monitoring is a key component of the EMP and a critical activity to be conducted throughout all phases of the project cycle. A monitoring program has been outlined. At this early stage, the cost for implementing the EMP is anticipated to be 2-3% of total project costs.

Finally, one goal of the EIA was to assess the need for land taking and resettlement of people. At this stage of the project, it was not possible to estimate the number of affected properties or households. This issue will be reviewed later during detailed design.

1.4 Project Route References

Links

During the feasibility study the project road was for study purposes divided into links and sections as follows:

Link	Sect.	From	To	Length (Km)
1	1	Assosa	Km 20	20 (km)
	2	Km 20	Komosha Jt.	17 (km)
2	1	Komosha Jt.	Menge	20 (km)
	2	Menge	Sherkole	30 (km)
3		Sherkole	Blue Nile	Four different alignment alternatives I-IV were investigated for this link varying in length from 80 – 110 km. (See Annex A, Map 1)
4	1	Blue Nile	Existing Gravel Road Guba Bambudi	Four different alignment alternatives A-D were investigated varying in length from 0.2 km – 12 km. (See Annex A, Map 1)
	2	Existing Gravel Road	Trunk Road Guba - Chagni	43 (km)
5	-	Trunk Road Guba Bambudi Guba-Chagni	Guba	9 (km)

Alignment Alternatives

For the part of the project road between Sherkole and the Blue Nile, four different alignment alternatives I-IV (see annex A – Map 1) were investigated varying in length between 80 and 110 km.

Likewise from the Blue Nile to the encounter with the existing gravel road, Guba – Bambudi, four alignment options A-D were identified and investigated.

Reference is made throughout the report to the links and alignment alternatives mentioned above.

Chapter 2
Institutional and Legal Framework

November 2001

2. INSTITUTIONAL AND LEGAL FRAMEWORK

2.1 Environmental Protection and Management at National Level

The fundamental right of all persons to a clean and healthy environment is embedded in the Constitution of the Federal Democratic Republic of Ethiopia (August 1995) under Article 44.

In response to the requirements of the Constitution of 1995, the Environmental Protection Authority (EPA) was established under Proclamation No 9/1995. Its mandate is to " ensure that all matters pertaining to the country's social and economic development activities are carried out in a manner that will protect the welfare of human beings as well as sustainably protect, develop and utilise the resource bases on which they depend for survival". The Authority carries the overall monitoring responsibility for the implementation of the Environmental Policy, at community, woreda, zone and Regional level.

The Ethiopian Investment Authority is also required to ensure that any investment activity complies with conditions stipulated in the environmental protection laws (Proclamation No 37/1996).

The formulation of Conservation Strategy of Ethiopia (CSE) was undertaken by the EPA, in conjunction with the Ministry of Economic Development and Cooperation and the World Conservation Union (IUCN), in three phases from 1989 to 1998. Phase I of the CSE focused on the identification of key environmental and development issues. During Phase II, a policy, the institutional framework and an action plan were developed. The third phase involves the finalisation and implementation of Regional state action plans and development programmes, focussing on capacity building within the Regions.

The Environmental Policy of Ethiopia (EPE) is the outcome of Phase II of the CSE. The overall goal of the policy is "to improve and enhance the health and quality of life of al Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs" (refer EPA, Environmental Policy, April 2 1997). It incorporates sectoral as well as cross-sectoral policies. The EPE was approved by the Council of Ministers of the Federal Democratic Republic of Ethiopia in April 1997.

2.2 Environmental Impact Assessment

EIA guidelines for the transport sector, among others, were developed in June 1997 and subsequently revised in March/April 1999. The EPA has also prepared an Environmental Impact Assessment Guideline Document (EPA, July 2000), which describes the EIA process, standards and guidelines. The document lists general issues to be considered for sectoral EIAs in the country, covering agriculture, industry, transport, mining, dams and reservoirs, tanneries, textiles, hydropower generation, irrigation and resettlement. The EPA's EIA process involves pre-screening consultation, screening, scoping, the EIA study, review of the environmental impact statement, decision making and conditions of approval, and finally, auditing. The process is depicted in Annex C.

The procedural guideline categorizes projects into three schedules. Schedule 1 projects are those that may have adverse and significant environmental impacts and, therefore, require a full EIA study. Schedule 2 project have the potential to cause some significant impacts, but are not likely to warrant a full EIA unless preliminary study indicates that this is needed. Schedule 3 projects have no impact and do not require an EIA.

Schedule 1 transport projects include:

- Major urban roads
- Rural road programmes
- Rail infrastructure and railways
- Airports with a basic runway length of 2,100m or more
- Tran-Regional and international highway

Schedule 2 transport projects include:

- Upgrading or rehabilitation of major rural roads
- Airports with basic runway length less than 2,100m

All projects in environmentally sensitive areas should be treated as equivalent to Schedule 1 activities irrespective of the nature of the project. Sensitive areas include:

- Land prone to erosion
- Land prone to desertification
- Areas of threatened or endangered species
- Areas of particular historic or archaeological interest
- Primary forest
- Wetland of national or international importance
- National park and protected areas
- Important landscape
- Religiously important area

Currently, EIA is not mandatory. However, the Draft Environmental Impact Assessment Proclamation (dated May 2001) has recently been approved by the Environmental Protection Council. At the time of writing, it had been presented to the Council of Ministers for approval, after which it will proceed to Parliament. This Proclamation will make EIA a legal requirement.

2.3 Classification of the Assosa-Guba Road Project

Assosa- Guba Road project is a 219 km rural road, which for the most part exists in a very poor state. Approximately 80 km of the proposed works could be classified as new, although this is not through virgin territory; as there is an existing track. The area is home to the Bertha and Gumuz ethnic groups who will not be primary beneficiaries of the road.

The approach to the design of the road is to avoid sensitive areas and will result in improvements with respect to erosion. The concerns that categorise the 80 km of new construction into Schedule 1 include:

- The high biodiversity of the area
- The presence of rare plant species in the ZOI

- The presence of untouched woodland within 10 km of the road
- The presence of indigenous peoples (Bertha and Gumuz)

The remainder of the road can be categorised into Schedule 2 and although a full EIA is not required, care should be taken that a proper Environmental Management Plan is implemented. Regardless of the documentation that is required, in order to preserve the natural environment and to secure the intended benefits of the road, it is essential that two things happen:

- The awareness of all stakeholders (ERA / EPA, BOPED, local administration, Resident Engineer, and construction workers) regarding the richness of the natural environment of the ZOI be raised
- The participation of the affected people be central to the road planning and implementation process

2.4 Environmental Management in the Roads Sector

ERA is the implementing agency of the Assosa - Guba road project. The Right - of-Way Branch (ROB) and the Environmental Monitoring Branch (EMB) are the two ERA units involved in the identification and the mitigation of social and environmental impacts (Annex). The EMB is accountable for planning and monitoring while the ROB is accountable for the implementation of expropriation/compensation operations when required. The EMB addresses analytical issues such as Terms of Reference (TORs), Resettlement Action Plan (RAPs), EIA reviews, and evaluations, while the ROW is accountable for registration of (Project Affected People) PAPs, establishment of compensation committees, assessment and establishment of compensation rates and payment of compensation.

In 1998, the EMB produced EIA guidelines for the road sector. These are in the process of being revised. The Branch has also prepared a draft manual on environmental standards methods and procedures. While mitigation methods described in this report on the Assosa- Guba Road Project will be included into the tender documents and will be the responsibility of the contractor and the supervising engineer, EMB will have the overall task for ensuring that the measures are in fact incorporated.

2.5 Regional Policies on Environment

Environmental policy of the Benishangul-Gumuz National Regional State (BGNRS) has been set out in a five-volume document recently prepared by the Secretariat for the Regional Environmental Coordinating Committee of Benishangul-Gumuz Bureau of Planning and Economic Development (BOPED) in Assosa. An environmental policy statement, prepared on the basis of the results of the Regional Conservation Strategy, has been submitted to the local parliament and is in the process of review and approval leading to final adoption.

A review of the document, as well as discussions with key responsible staff at BOPED, indicate that EIA review and the monitoring of projects should be conducted in full cooperation with Regional offices. Environmental management is a relatively new area of activity for which participation in the EIA process for the Assosa-Guba Road EIA is an important opportunity. It is suggested that all EIA activities conducted by ERA for this road project, include full collaboration with BOPED in Assosa. This is especially true of monitoring, both during construction and operation.

Chapter 3
Description of the Proposed
Road Project

November 2001

3. DESCRIPTION OF THE PROPOSED ROAD PROJECT

3.1 General

Several alignment options were identified between Sherkole and the Blue Nile (alig. Options I-IV) and between Blue Nile and the existing gravel road between Guba and Bumbardi (alig. Options A-D) (see Annex A, Map 1).

It is recommended that the new road follows alignment option IV and option A. For other parts the road will following existing roads with only minor and local realignment (if any). The selection of alignment option IV and A were based upon economic engineering and environmental considerations.

3.1.1 Construction Options

Three different construction options were investigated during the feasibility study.

- "Minimum Gravel": The standards of this scenario will be slightly below a RR 50 gravel road, with a total width of 6.0 m (5.0 m and 0.5 m shoulder on each site). All river crossings (except the Blue Nile) will be passed by Fords/Irish Crossings or by natural drifts. Pipe culverts will on average number 1 per km.

  The alignment will follow the terrain as much as possible to minimize earthworks. Future upgrading of the road to sealed standard will require re-alignment and earthworks as well as structures for the river crossings.

- "High Gravel": This will be a 7.0 m wide (6.0 m and 1.5 m shoulder) gravel road of such a standard that it is possible to upgrade to sealed standard by minimum widening of the carriageway and by adding the pavement. All river crossings will be passed by 2 lane bridges, 9.0 m (6.0 m and 1.5 m shoulders). Pipe culverts will on average number 2 per km.

- Sealed: This will be a sealed road – most likely a "Double Bituminous Surface Treatment" (DBST) with a total width of 9.0 m (6.0 m and 1.5 m shoulders). Complete with all structures as 2 lane-bridges. Pipe culverts will number 3-4 per km.

The economic evaluation has revealed that it is feasible to construct the project road, however, it has not be possible to make a clear recommendation for the standard, since the choice of standard is dependent on some critical assumptions of traffic behaviour. The Consultant has therefore recommended that, either, minimum gravel or high gravel be used as the standard during the detailed design. The exact decision to be made at the outset of the detail design.

3.1.2 Blue Nile Crossing

The Consultant has considered the following options for the Blue Nile River Crossing:

- 1) - A complete 2-lane bridge, (design load HS 20-44 and 30%, 7.32 m carriageway width plus a sidewalk of 0.8 m in each side).
- 2) - A one-lane bridge (prepared to be upgraded to 2 lanes).

- 3) - An Irish Crossing with some 70 – 90 reinforced concrete pipes with a diameter of 1.8 – 2.0 m
- 4) - A cable ferry.

Option 2) to 4) have been discarded for technical reasons. The Consultant has therefore recommended that a two-lane bridge with a length of approx. 265 m be constructed. This has been evaluated and found economical viable.

3.2 Construction Features

The preliminary quantities for the two options found economical feasible are as follows:

	Unit	Minimum Gravel	High Gravel
Clearing and Grabbing	Ha	382	432
Earthworks	m^3	1,100,000	1,625,000
Sub-base	m^3	267,000	352
Base Course	m^3	200,000	265
Concrete Pipe	ml	2,440	4,790
Structures		See note 1	See note 2

Note 1: Structures Minimum Gravel
5 Fords @ 20 m
3 Fords @ 30 m
1 Ford @ 50 m

Note 2: Structures High Gravel
6 Bridges @ 12 m
1 Bridge @ 2 x 20 m
1 Bridge @ 20 m
1 Bridge @ 6 m

3.3 Expected Type of Works

The expected types of road construction works will vary significantly from link to link, ranging from maintenance to the construction of a new road. The description of the expected works will therefore be related to the different links.

3.3.1 Assosa – Komosha Junction

This section of the project road forms part of the main trunk road. At present, the road is a gravel road in poor status. The horizontal and vertical alignment is in general satisfactory, and there is no need for widening of the road. Approximately 20 culverts are located along the road. The construction works will be limited to the following activities:

- Grading and re-shaping of the road profile;
- Spot wise improvement of the subgrade and subbase
- Regravelling of entire road with sub-base and wearing course material;
- Repairs/replacement of existing culverts;
- Construction of new culverts
- Erosion protection, where needed.

3.3.2 Komosha Junction – Menge

This section of the project road is a dry weather road located along a ridge between Tumet and Menge river basin. No culverts are found along the road. There is no surfacing material on top of the prepared subgrade. It is expected that the construction works will include the following activities:

- Shaping the subgrade and minor realignment to improve the alignment. This will include some minor earth works;
- Improvement of subgrade with selected material;
- Placement of subbase and wearing course material along the section;
- The existing road/track is expected to be sufficiently wide to accommodate the new road width.
- Construction of new culverts.
- Erosion protection if required.

3.3.3 Menge – Sherkole

This section follows the cleared track to Sherkole and Gizen town. The road standard is dry weather access, having neither surfacing material nor drainage structures. Two bridges will be required for crossing the Menge and Shegol Rivers. The subgrade is mainly sandy gravel. It is expected that construction works will include the following activities:

- Shaping of the subgrade, construction of ditches and some minor realignment. This will include some minor earth works;
- Improvement of subgrade with selected material;
- Placement of subbase and wearing course material along the section;
- Widening might be required for local stretches;
- Construction of new culverts.
- Construction of the river crossings at Menge and Shegol rivers
- Erosion protection where required.

3.3.4 Sherkole – Blue Nile

This is a new road, although evidence is found of older routes. The route has previously been used by military vehicles, crossing the Blue Nile by a pontoon ferry, and was apparently scheduled for construction during the Italian Occupation. It is expected that the works will include the following activities:

- Clearing of a corridor
- Earthworks to provide a reasonable alignment. The terrain appears to be flat to rolling and extensive earthworks are therefore not anticipated.
- Grading and reshaping of the road profile;
- Construction of subgrade (shaping and compaction of earth base);
- Improvement of subgrade, by adding selected material;
- Construction of pipe culverts
- Construction of a number of structures for river crossings. (Option High Gravel: box-culverts and bridges sufficiently wide to accommodate a 2 lane road; Option Minimum Gravel: Irish crossings and fords).

- Placing and compaction of sub-base and wearing course material along the entire section;
- Erosion protection. If longitudinal and/or traversal slopes with potential erosion problems are detected, drainage works will have to be constructed. The principal solution will be to collect the runoff through longitudinal ditches and discharge it in a controlled way through mitre drains, lined channels etc. This will be done with prudent consideration to villages and settlements located along the road.

3.3.5 Blue Nile River Crossing

Construction of a 265 m two lane bridge is anticipated.

3.3.6 Blue Nile - Guba

This section of the project road is a dry weather road. Some 90 culverts were found along the road (depending on choice of route alignment). Three bridges were found along the road, all 2-lane bridges in reasonable condition. It is expected that construction works will include the following activities:

- Shaping of the subgrade and minor realignment to improve the alignment. This will involve minor earth works;
- Improvement of subgrade with selected material;
- Placement of sub-base and wearing course material along the section;
- The existing road/track is expected to be sufficiently wide to accommodate the new road width;
- Repairs to existing culverts;
- Minor repairs of existing bridges;
- Erosion protection if required.

3.4 Expected Duration of Project

The Consultant has assumed that a duration of 36 months will be required for the entire project.

3.5 Anticipated Work Methods

3.5.1 General

The works are planned to be executed with funds from the World Bank, and it is thus expected that a Contractor will be appointed through a standard tender/ bidding process, which rarely specifies the exact work methodology, borrow pit locations, or source of labour to be applied for the project.

The tender documents normally specify the final product, with a detailed description of the quantities and the quality of the work (eg. 25 cm of gravel complying with certain specifications, compacted to a certain standard). In addition the tender documents have some general specifications - eg. environmental and labour standards and requirements, local legislation, regulations and other general limitations.

It is then up to the Contractor, within the framework presented in the tender documents, to propose an approach and offer a corresponding price for the works. Consequently it is impossible at present to describe the exact work methodology and approach, the exact locations from where material will be extracted, the composition of the labour force etc. It is up to the Contractor to propose solutions for these parameters, again within the general framework of the tender documents.

During the tender evaluation, the Contractor's proposals will be evaluated from both an economic and technical point of view to determine if the proposal conforms to the specifications in the tender documents, including the environmental requirements.

3.5.2 Anticipated approach

In order to assess the potential impacts of the road works, propose possible mitigation measures and establish an environmental management plan, the Consultant has assumed a work methodology based on the normal approach that most contractors would apply to execute the types of works anticipated for the project road.

The assumptions made should, however, be verified at later stages - first during the detailed design phase and later during the tender process. The Environmental Management Plan will therefore have to be modified and adjusted according to the actual approach as the project progresses.

3.6 Description of Anticipated Activities

3.6.1 Contractors Facilities and Camps

It is expected that the Contractor will work from both ends of the road, and would therefore establish two main camps in Assosa and Guba. The main bases will be equipped with administration facilities as well as facilities for equipment repair and casting of reinforced concrete pipes for pipe culverts. The living quarters for the engineers, administration and logistical staff, will most likely also be located in the proximity of these two camps.

In addition to these two permanent camps it is expected that the Contractor will establish semi-permanent camps along the road according to the progress of the work. These work sites will be semi-permanent – functioning from a couple of months to a couple of years. The camp at the bridge construction site at the Blue Nile (or camps – one on each side of the river), will probably function for the duration of the project, since this is considered the critical activity.

3.6.2 Workforce Composition

The local population will most likely occupy the unskilled positions such as casual labourers, watchmen, etc, and some positions as masonry and truck drivers, at least at the beginning of the project. There might however be a very strong economic incentive for the Contractor to train local people to take over certain skilled positions, since the expected duration of the project is three years.

The unskilled workforce could amount to 700 – 1000 labourers, these being recruited locally; but this number depends very much on the approach adopted by the

Contractor. The skilled workforce could amount to 100-200 (machine operators, truck drivers, foremen, masons, carpenters, etc). At the start of the project the major part of the skilled workforce will be non-locals, but this would most likely change during the course of the project, simply because the cost of employing locals is lower. The professional and administrative staff will number between 10-20 people, and will most probably comprise non-local people.

3.6.3 Right of Way - Clearing of Corridor

According to Ethiopian standards, the minimum Right of Way (ROW) for this type of road is 30 m. This is not expected to be a problem on the sections Assosa-Komosha and Blue Nile-Guba, where the required ROW is in place. On the sections from Komosha to Sherkole additional ROW will have to be obtained to comply with the required width of 30 m. SATCON is currently engaged in heavy maintenance on the road from Komosha to Sherkole, which includes provision of required ROW. Provision of ROW will be an issue between Sherkole and the Blue Nile, since this section of the road will be entirely new.

3.6.4 Earth Works

Material that is not reused, as fill will be generated from the earthwork cuts. In addition, it will most likely be necessary to import suitable material for some earthworks fill, which will be treated as borrow pit material. The amount of material of cut and fill material is currently not known.

Construction Material Sites
Borrow pits should ideally be located at least every 20 km as close to the project road as possible to minimize haulage. The material from the borrow pits shall mainly be used for: improvement of subgrade, subbase and wearing course. It is at present impossible to estimate the quantities. All the materials will be gravel materials; hence there is no need for crushing equipment. All material will be extracted mechanically without necessitating the use of any types of explosives.

Sand Resources
Sand is mainly used for concrete works such as structures, culvert head- and wing walls and for the reinforced concrete pipes. The concrete work quantities will mainly be related to the structures on the section from Sherkole to the Blue Nile, the Blue Nile crossing and two bridges between Menge and Sherkole. Sand will also be required for repair of existing culverts, casting of new reinforced concrete pipes and installation of new culverts, but the quantities required for culvert works are small compared with quantities required for structures.

It is expected that part of the structures (wing walls, part of abutments) and most of head and wing walls for culverts will be constructed by masonry, which will diminish the need for concrete and, therefore, sand. (Masonry work is more labour intensive compared with concrete, another advantage in relation to this project).

Sand is normally extracted from the riverbeds. A number of river crossings are found along the project road and availability of sand is not expected to be a problem.

Water Resources
Water will be used for watering the gravel materials during placement to secure good compaction, and for the control of dust. Water will furthermore be used for concrete

works. Given the number of river crossings along the road and the fact that all these rivers contained water in April (end of dry season), water is not expected to be a problem. However, as the sources anticipated to be used for road construction are the same as those used for domestic purposes, water extraction should be closely monitored for conflict with local users.

Traffic Deviation
Traffic deviations will be required on sections during earthworks, culvert works, construction of culverts, realignment, improvement of subgrade etc. This is not considered to be a major problems given the relatively flat and sparsely areas which the road trespasses.

Construction of Bridges
Most of this activity takes place close to or in the rivers, and there is thus a potential risk of sediment pollution of the river. Another potential problem is damming or diversion of the rivers to allow the construction inside the riverbed.

Generation of Dust
The construction will involve extraction, haulage and placing of large quantities of gravel material, which especially during the dry season could result in dust problems.

Access Roads
Access roads are those tracks that are cut in addition to the principal alignment that facilitate construction activities. Access roads are likely to be created in association with quarrying areas, water extraction sites, work force campsites, and staging and stockpile areas.

Chapter 4
Existing Conditions

November 2001

4. EXISTING CONDITIONS

4.1 Location of the Project Road

The project road connects the two towns of Assosa and Guba, in the BGNRS, as previously described. The project area is on the border with Sudan. The project area falls entirely within the Abay River Basin. Abay River with its tributes (Beles and Dabus) drains to the Mediterranean via the Blue Nile through Sudan. As a result, the downstream environmental effects of the project road and the development of the Region are most likely to be felt across the border, particularly in the Roseires Reservoir.

It is important to mention here the trans-boundary character of the project setting. However, it was not possible to adequately investigate potential interrelations and effects exclusively from the Ethiopian side. It is for example, difficult to find data distribution maps for the project that span the area across the border.

Given historical linkages, it is suspected that economically, culturally and environmentally the two countries interfere in the Benishangul-Gumuz, and the international border is only an artifice from this standpoint. This is well illustrated by project maps that are truncated at the border. Opening the border to Sudan is a factor that may affect the project area and, therefore, influence the prediction of long term effects, however, consideration of these effects was beyond the scope of this particular work. See Annex A: Map 3.

4.1.1 Zone of Influence – Study Area

For the purposes of this study, the (zone of influence) ZOI of the project road is defined into three levels, namely, direct, indirect and regional zones, as shown in Annex A: Map 4. The direct zone of influence is defined as a 30 km wide corridor, straddling 15 km on either side in flat/rolling terrain of the proposed road. This is based on the assumption that a person would feasibly travel, by foot or by pack animal, and return the same or next day.

The direct influence area of the road is estimated to have a total land area of 5,450 km², encompassing substantial parts of the administrative woredas of Assosa, Komosha, Menge and Sherkole, within Assosa zone to the south and west of the Abay, and part of Guba woreda within Metekel zone, north of the Abay. The direct zone of influence thus represents about 11% of the total area of BGNRS. The indirect zone of influence includes the adjacent areas beyond the 15 km radius, which a prospective motorized traffic could derive in the future. The indirect area possibly covers a further 4,400 Km ^{2} (9% of the Region), covering areas of Kurmuk and the Dabus Valley. The Regional area incorporates the areas, which would interact economically due to the construction of the road. As shown in the map 4, the area encompasses the remaining part of Benishangul-Gumuz, Oromiya, Amhara and Gambela Regions.

Table 4.1: Estimated Area of Influence

Woreda	Estimated Area of Influence	
	Area of Direct Influence km²	Area of Indirect Influence km²
Assosa	375	400
Komosha	550	250
Menge	875	550
Sherkole	2,650	1,100
Kurmuk	0	1,500
Guba	1000	600
Total	5,450	4,400

Source: Study Estimates.

4.1.2 Administrative Structure

In 1994, Benishangul-Gumuz National Regional State was established under the new Constitution of Ethiopia. The Region is structured into zones, woredas and kebeles (farmers association). In the urban centres or towns, the equivalent to farmers associations are the kebeles.

Zonal administrations do not have councils, but report to the Regional Council. Members of the zonal administration are elected from the Regional Executive Committee. The Zonal Executive Committee coordinates and controls activities in the woredas, and enforces the proclamations, policies, regulations and decisions of the Regional Council. The Zonal Executive Committee is also required to prepare proposals for social service and economic development for the zone. It is accountable to the Regional Executive Committee.

Typically, the organisational structure of the zonal administration should comprise a High Court, a Social Department having offices for Education, Health and Disaster Preparedness and Prevention, an Economy Department consisting of Agricultural, Trade and Industry and Finance offices, and a Security and Justice Department.

The Woreda Council Administration consists of representatives from the kebeles who are elected by the people. Members of the Woreda Executive Committee are elected from the Woreda Council. The Woreda Council is accountable to the people of the woreda, the Zonal Executive Committee, and through the latter, the Regional Executive Committee. The Woreda administration is mandated to enforce laws, policies, regulations and directives issued by the Regional State. They are also responsible for, *inter alia*, the administration of elementary schools and junior health institutions, the construction and maintenance of small rural roads, the levy of certain taxes and protection of the natural resource base, etc. Another of the woredas duties is to prepare social service and economic development plans for decision and implementation.

The organisational structure of the woreda administration comprises the judiciary body, the Office of the Prosecutor, the Security and Police Forces Offices, and the Economic Development and Social Sectors Offices.

The Kebele Administration Assembly (*Shengo*) consists of the Executive Committee together with the judicial, security, social and economic development bodies. Members of the Kebele Assembly are elected by the people, and so the Assembly is accountable to the people, the Woreda Council and the Woreda Executive Committee.

The Kebele Assembly are required to implement plans and directives issued by the Woreda Council, and higher bodies.

The table below lists the zones and woredas in the Region. These are mapped in Annex A: Map 2.

Table 4.2: Zones and Woredas in Benishangul-Gumuz Region

Zone	Woreda	Town / Urban centre	No. of Kebeles	No. of Farmers Associations
Metekel	Dangur	Manbuk	1	47
	Guba	Mankush	1	22
	Wonbera	Debre Zeit	1	45
	Mandura	Genete Mariam	1	24
	Dibate	Dibate	1	34
	Bulen	Bulen	1	32
Total	6	6	6	204
Pawe Special Woreda (SW)		Mender 7 (Ketena 2) Almu Mender 4 (Felege Selam)	1 1 1	45
Total	-	3	3	45
Assosa	Menge	Menge	1	64
	Kurmuk	Kurmuk	1	21
	Assosa	Assosa	2	74
	Bambasi	Bambase	1	37
	Sherkole	-	-	41
	Oda Godere	-	-	26
	Komosha	-	-	14
Total	7	4	5	277
Tongo SW	-	-	-	9
Kamashi	Yaso	-	-	25
	Sirba Abay	-	-	19
	Kamashi	-	-	13
	Agalo Mite	-	-	15
	Belo Jegonfoy	-	-	20
Total	5	0	0	92

Source: CSA, *The 1994 Population and Housing Census of Ethiopia, Results for Benishangul-Gumuz Region*, Volume I Statistical Report, February 1996.

Since the 1994 Population Census there have been a number of changes in the composition of the Region. The Region now consists of three zones (Metekel, Assosa and Komosha) and two Special Woredas (Pawe and Tongo), which do not belong to any zone (source: BOPED, *Regional Profile of Benishangul-Gumuz National Regional State*). Furthermore, Sherkole Woreda now has 23 farmers associations, as opposed to 41.

The project area covers two of the three zones, namely Metekel and Assosa, and five woredas: Guba, Sherkole, Menge, Komosha and Assosa.

4.1.3 Services

Access to the area is extremely limited and is believed to account for the low levels of services found in the Region.

Health Infrastructure
Medical and Health facilities and medical personnel of the National and the Region in 1999/2000 are presented in the following table.

Table 4.3: Health Facilities and personnel in Ethiopia and Benishangul-Gumuz Region

		National	Benishangul-Gumuz Region
I	**Health Facilities**		
1	Hospitals	81	2
2	Hospital beds	8.068	254
3	1 bed per inhabitants	7.870	2.111
4	Health Centers	354	7
5	Health Stations	2.627	72
II	**Medical Personnel**		
1	Doctors	1.151	26
2	1 doctor per inhabitants	55.165	20.622
3	Nurses	4.748	205
4	Pharmacists	53	2
5	Sanitarians	791	21
6	Health Assistant	8.393	136
7	Technicians (Lab, X-ray + Pharmacy)	1.168	37

Source: Statistical Abstract 2000, Central Statistical Authority, Addis Ababa, March 2001.

As shown above, the BGR data on the number of inhabitants per bed and per medical doctors are lower than the national average. This could mainly be attributed to the small and scattered population of the Region. Looking these indicators to the area they serve would show higher figures of the national average.

The health service coverage in the Benishangul-Gumuz Region was 27% in 1998, assuming that the radius within which where hospitals, health centres and stations provide services is 10 km. In 1999, 46% of the population in the Region had access to health facilities. The respondents of the Household Survey stated that the main problem with regard to the health sector is that there are not enough, or no, health facilities in their kebeles.

From the 72 health stations in the Region, 63 are under the government. Of the governmental health stations only 13 meet the required standard in terms of structure; the others are mud huts. Out of the total healths stations, forty nine (68%) of them are found in Pawe and Assosa, the remaining 23 (32%) health stations are in the other 18 woredas in the Region, located mainly in urban areas.

Table 4.4: Health Facilities in Benishangul-Gumuz Region

Zone/Special Woreda	Percentage of the population	No. of Hospitals	No. of Health Centres	No. of Health Stations
Assosa	42.1	1	2	36
Metekel	36.0		2	12
Kamashi	11.0			10
Pawe SW	7.80	1		13
Tongo SW	3.10			4

Source: Bureau of Planning and Economic Development of BGNRS and BOH, *Regional Profile of Benishangul-Gumuz National Regional State*, May 2001

Almost half of the health staff (49%) are based in Assosa Zone and cover 42% of the population. The rest of the Region, comprising almost 58% of the population, shares 51% of the health staff.

Distribution of Drugs

Drugs are distributed from the Region to zone to woreda. The distribution of drugs in the Region is a great problem. Medicines have to be transported to the northern parts of the Region through Addis/Gojam/Bahar Dar then on to Metekel. Alternatively, they are transported via Bure, taking on average 7-8 days to reach Metekel and Guba from Assosa. The staffs have to be paid allowances for these travelling days. Breakdowns are frequent, as there is much wear and tear on the Bureau's vehicles.

NGOs

There are only a few NGOs working in the health sector most likely because of poor road conditions. Most of the NGOs started their activities 2-3 years ago. They often work on the condition that the Regional Government helps facilitate their activities through e.g. infrastructure. NGOs reported to be active in the Region:

- ZOA, Refugee Camp of Netherlands, assist the refugees in training in Komosha in trade/income generating projects and activities.
- Healthnet International (Kamashi)
- CISP, an Italian NGO in water development in Assosa
- Food for Hunger, which is based only in the Kamasha zone, in one woreda
- Cipar (no further information)
- MSF who work along the border with Sudan
- Berra, a local NGO
- Mekane Yesus (no further information)
- Oxfam in Menge for health, agriculture and education
- Comboni Sisters are setting up to work in the health sector in Mandura, Metekel zone.

Education Infrastructure

The Bureau of Education and Culture in the Region is of the view that the maximum distance to primary school should be no more than 3 km. In 1998, the coverage of first cycle (grade 1-4) of primary education for this distance was only 19% of the Region's area. The distribution of schools in the Region varies greatly: some parts of the Region, like the area to the north of Sherkole town up to the Abay River, have no schools at all. Sherkole and Guba Woredas have 5 and 6 primary schools respectively. By contrast, the densely settled areas, such as Menge and Assosa, are well supplied with schools (13 and 22 primary schools respectively). In general, primary schools were located within a distance of 9 km for 83.1% of the households. Access is given as one of the main reasons for the poor distribution of schools.

However, the population density in a specific area probably dictates the demand for schools to be built rather than access.

Poverty Reduction
As a part of their Poverty Reduction strategy[1], the Ethiopian Government wants to upgrade the educational system with higher primary enrolment, increased girls participation, new schools and upgrading of the existing, training of teachers and better access to basic education to fight against poverty. Regional efforts to fulfil these goals are not effective as long as the access within the Region is difficult, expensive and time consuming.

4.2 Environmental Conditions

The Consultant has performed the biological survey for road alignment, performed in corporation with staff from the National Hebrarium at Addis Ababa University. Scope of Work for the study is included in Annex F. Data for this section describing environmental conditions, obtained from field survey has been supplemented by secondary sources where needed.

4.2.1 Topography, Climate and Rainfall

The zone of influence is characterized predominantly by flat to rolling terrain, sloping from a general elevation of around 1600m near Assosa in the South to about 700m near Guba in the north. There are a number of isolated hills and outcrops rising a few hundred meters above the prevailing elevation of the sloping plateau.

The average annual rainfall is around 1200mm near Assosa, reducing northwards and westwards down to about 800mm. The rainfall pattern is uni-modal with about 6-7 months dispersion from April to October. The area generally has a relatively high moisture deficit, which is most pronounced close to the Sudanese border and to the north. Mean and peak annual temperatures rise towards the north, reflecting the change in altitude. The area around Guba is extremely hot.

4.2.2 Geology and Soils

The geology of the area comprises predominantly outcrops of very old pre-cambrian rocks, mainly upper complex and syntectonic grantitoids.

Deep clayey red soils (Dystric Nitosols) predominate in most of the zone of influence south of the Abay including Assosa area. These have good physical properties with agricultural potential. Between Sherkole and Menge, however, the soils are very stony and lower agricultural potential. North of Abay around Guba and Bambudi, and along sections of the Abay River, the predominant soils (Orthic Acrissols) are chemically poorer and have more limited agricultural potential. However, there are patches of darker brown, more fertile soils with high agricultural potential (Chromic and Orthic Luvisols) around Mankush.

[1] *Ethiopia Interim Poverty Reduction Strategy Paper 2000/01-2002/03*, November 2000, Addis Ababa, Ethiopia

4.2.3 Mineral Resources

The western Precambrian formation in the project area holds most of the known mineral deposits. These are represented mostly by gold and base metals (copper, lead, and zinc). Non-metallic occurrences are primarily marble. All are located in isolated areas where no local energy is available. Blocks of marble are carried by truck to plants in Addis Ababa and Awash. The deposits are mined at a small scale and have high freight charges.

The lack of access into the Region has hindered exploration and so little is known of the quality and quantity of the deposits. Currently, the two principal marble areas are outside of the access area of the road. Proposed road improvements, therefore, are not expected to influence the production of marble in the Region.

In the case of gold, however, as one of the development objectives of the road is to open the area to commercial exploration, it is believed by local planners that with improved access, the costs of mine development will be lowered and will attract investors. Priority areas for exploration were identified by the Abay River Basin study (Annex A: Map 6) and are largely outside the project area. The Ministry of Geology and Mines, however, indicates several sources close to the road north of Menge, and just south of Sherkole. Other deposits that may be accessed from the project road are those along the Dabus River valley.

In the Assosa - Benshangul Mineralised belt there are four important primary gold occurrences with three base metal occurrence. The principal primary deposit is at Dul and the other area is Azale- Akendeyu which is a potential deposit of copper and zinc and has been subject to considerable exploration. Indications are that there is a possible association of gold and silver so this area is considered to be important. Exploration works for gold and base metals are continuing on the course of Sherkole River.

Artisan gold mining is widespread throughout the BGNRS. Gold is currently recovered on a small scale by local people primarily from riverine sources. According to studies conducted by the M.E.D. (Mines and Energy Department), artisan miners are working in all three zones: Assosa zone, Metekel zone and Kemash zone. The number of artisan gold miners has been estimated to be between 55,000 to 65,000. On average 180 kg of gold is mined each month of the mining season (February-April).

The duration of mining operation varies from place to place, depending on the availability of water for washing the sediments of alluvial deposits. Mining is family based. Generally, 3-4 members are employed in mining for income generation. It is observed that 65-70% women and 5% children actively work on artisan mining operations at Metekel zone and Assosa zone.

Table 4.5: Artisan Gold Mining Sites in Metekel Zone

No	Woreda	Kebele/River	Duration of Mining Operation
1	Mankush	Arenja /Abay Beles /Beles Fangusa/Beles Babzinda/Beles	February - April February - April February - April February - April
2	Manbuk Dangur	Dachigir/Beles	March - April
3	Mandura	Dabuh Giorgis/Libit Jajem Dafile/sah	No data
4	Dibate	A Ibasa- Korka zourice Galesa/Taba Golfun Donben-Gerber Zuria Zegi/shar	No data
5	Bullen	GechiDuki/Kila Elgood Kompaneger Gusher river	No data
6	Wonbera	Dekoka/Dura Ajoba Wabo/Abay Mendija Baniyam Kiseya Begala Bengound Atshaga Kebele Jelekata Merare & Yousa river Epar/Beles.	December - May

Source: Mines and Energy Department of the Region. 1997

In the Metekel zone artisan miners mine mostly along riverbanks. There are seasonal rivers, which are dry in the summer season, and mining activities are conducted only in the rainy seasons.

Table 4.6: Artisan Mining Operation Sites in Assosa zone

No	Woreda	Kebele/river	Duration of mining operation
1	Kurmuk	Dul hode Duta worke Azale Dul shetalo	No data
2	Gizen		No data
3	Sherkole		No data
4	Menge	Menge river	No data
5	Oda Godere	Tumet river	No data

Source: Mining and Energy Department of the Region 1997

Table 4.7: Artisan Mining Operation Sites in Kamashi Zone

No	Woreda	Kebele/river	Duration of mining operation
1	Kamash	Chibi river Godare river	No data
2	Agaloimetti		No data
3	Sirba Abbaya		No data

Source: Mining and Energy Department of the Region 1997

4.2.4 Hydrology and Drainage

The majority of the Region falls entirely within the Abay River basin and includes most part of its major tributary Dabus River Basin. The drainage flows predominantly in a northward direction, while the Abay itself turns westwards into Sudan near Bambudi in the north of the project area.

4.2.5 Water Sources

Although the Region is rich in surface water, studies indicate that ground water potential is low or insufficient. The Abay River Basin Study indicates that many rivers and springs have potential for irrigation works and to some extent for hydroelectric power generation, but the investment requested is very high. The percentage of people supplied with potable drinking water is estimated to be about 22%. See Annex A: Map 7.

Surface water

The road project area is dominated by two river basins, the Abay and the Dabus, both perennial rivers. These are currently used for irrigation, water supply, and have been proposed for mini-hydroelectric power production. Some study has been done regarding Regional rivers in regard to the area of land to be irrigated and kilowatt power to be generated by the respective rivers, and the results are summarized in the table below.

Table 4.8: Rivers Found in the Region and their Hydrological Condition

No	Name of Rivers	location zone/woreda	Proposed irrigated land in ha	Remark
1	Abay	in the Region	no available data	No available data
2	Dabus river	Assosa	5,100	5500 ha rain fed
3	Didesa river	Kamashi		no available data
4	Gilgel beles river	Metekel	881	
5	Beles river	Metekel	163,200	include N/W Gojam Region
6	Sonka river	Assosa/ Bambese	-	by float method
7	Bull Negero R.	Assosa	187 hector	by float method
8	Lypapo river	Metekel	150 hector	by float method
9	Selga river	Assosa	350 hector	by float method
10	Suare-Debsa	Metekel Bullen	44.86 hector	by float method
11	Hoha river	Assosa	650 kw hydro elec.power 700 ha irrigation	by recorded return measure
12	Hardy river	Metekel	no proposed irrigable land	by recorded return measure
13	Budisky river	Metekel	no proposed irrigable land	by recorded return measure
14	Dender river	Metekel	no proposed irrigable land	by recorded return measure
15	Dura river	Metekel	no proposed irrigable land	by recorded return measure
16	Baro river	Border of B/G/R	2,000	at the border of BGR

Source: Hydrology Department, Ministry of Water Resources.

The Dabus is a principal tributary of the Abay in the lowlands. The total area of the drainage basin of the Abay is approximately 200,000 km², and of the Dabus 21,000 km². The lowlands are characterized by many intermittent streams remaining dry for months at a time.

Ground Water

Groundwater is almost exclusively confined to consolidated rocks whose retention capacity is low. These structures do not filter very well and the water quality can be affected by pollution. This, plus other critical geophysical factors, limit the potential storage and recharge capacity of the aquifers.

Groundwater sources are suspected of becoming depleted and recharge rates seem to be declining possibly due to de-vegetation in the Region. Twelve test 12 bore holes were drilled for test by the Regional Water Resource Bureau and MWR, Geologic Institute of Ethiopia Water Well Drilling Enterprise in 1994 – 1996. Many came up dry even at the maximum depth of 138 m.

Water is a limiting factor in the Region and as such must be treated as a sensitive environmental resource.

4.2.6 Vegetation/Flora

The biological survey was performed in two parts. The first part covered the area between Sherkole and the Abay River, a distance of approximately 82 km; the second part covered the area between Mankush and Abay River a distance of 50 km. Forty-one sampling plots each, 20x20m quadrant. These sites represent the major vegetation types in the area.

The vegetation of Ethiopia is divided into nine major vegetation types:

- Desert and semi-desert scrubland
- Lowland (semi-) evergreen forest
- *Acacia-Commiphora small-leaved, deciduous* woodland
- *Combretum-Terminalia broad-leaved, deciduous woodland and savanna*
- Evergreen scrub
- Moist evergreen montane forest/ *Afromontane rainforest*
- Dry evergreen montane forest and grassland
- Afro-alpine and subafroalpine zone
- Riparian/riverine and swamp vegetation

(**Friis, 1992; White, 1983; Sebsebe Demissew et al.**, 1996; The Conservation Strategy of Ethiopia, 1997; **Friis & Sebsebe Demissew,** 2001).

Of these vegetation types, the two that occur in the project area are: the *Combretum-Terminalia* woodland and the riparian/riverine and swamp vegetation.

Combretum-Terminalia, broad-leaved, deciduous woodland and savanna
This vegetation type is characterised by small to moderately sized trees with fairly large deciduous leaves. Species of *Terminalia, Combretum, Lannea*, etc. and *Boswellia papyrifera, Anogeissus leiocarpus* and *Stereospermum kunthianum* are common. The solid-stemmed lowland bamboo *Oxytenanthera abyssinica* is prominent in river valleys and locally on the escarpment of western Ethiopia. The ground cover is a tall stratum of perennial grasses, including species of *Cymbopogon, Hyparrhenia, Echinochloa, Sorghum* and *Pennisetum.*

This vegetation type has been burned annually for such a long time, that the plants show clear adaptation to fire, and it must be assumed not to be adversely affected by controlled annual fires. It occurs along the western escarpment of the Ethiopian Plateau, from the border Region between Ethiopia and Eritrea to western Kefa and the Omo Zone; it is the dominant vegetation in what is now Benshangul-Gumuz and Gambella Regions, where it occurs at 500-1900 m. At the upper limit it frequently abuts on to Afromontane Moist Evergreen forest. It penetrates into the Ethiopian plateau along the large river valleys.

Riparian and swamp vegetation

This vegetation type consists of at least two physiognomically different types, riverine and riparian forest, and open, almost treeless swamp vegetation. Typical trees in riverine forest are *Celtis africana, Ficus sycomorus, Mimusops kummel, Tamarindus indica, Syzygium guineense, Kigelia aethiopum* and species of *Acacia*.

The floristic composition of this vegetation type is dependent on altitude and geographical location. Only a brief summary can be given here. Common tree species in these forests are species of *Ficus, Lepisanthes senegalensis, Nuxia oppositifolia, Salix mucronata, Trichilia emetica, Diospyros mespiliformis, Mimusops kummel, Tamarindus indica, Acacia albida, Tamarix nilotica, Breonadia salicifolia,* and *Phoenix reclinata*. There is often a shrub layer, and lianas and vascular epiphytes occur. The ground cover includes grasses, ferns, and a few herbaceous dicotyledons. The swamps are dominated by species of Cyperaceae, grasses and many herbs.

The list of all plant species encountered during the reconnaissance period is shown in Annex G.

Sherkole to the Abay River

The dominant vegetation on this section consists of woodland (Annex B: Photos 2A and 6), riverine (Annex B: Photo 9) and swamp vegetation (Annex B: Photos 4a and b).

The woodland vegetation consists of trees: *Albizia* malacophylla, *Combretum collinum, Entada abyssinica, Erythrina abyssinica, Hymenodiction floribundum, Ptercoarpus lucens, Strychnos innocula, Oxythenantera abyssinica, Terminalia macroptera, Sterospermum kunthianum.* The shrub layer includes *Clerodendrum myricoides, Grewia mollis, Maytenus sengelensis, etc.* The Herbaceous flora is also very rich particularly of monocots.

A number of unique species to Ethiopia and Benshangul were observed. These include: *Zygotritonia praecox* (known so far only from west Africa), *Crinum subcernum* (known so far only from southern Tanzania and Zimbabwe) (Annex B: Photo 3). Thus the Region hosts a diversity of unique flora.

The riverine vegetation mainly consists of trees such as *Albizia grandibracteata, Syzygium guineense, Breonadia salicina, Sapium ellipticum, Mimuops kummel* and *Phoenix reclinata* at higher altitudes and *Hyphaene thebaica* and *Anogeissus leiocarpa*. the shrub layer includes; *Maytenus gracilipes, Bridelia micrantha, Grewia ferruginea.*

The swamp and wetland vegetation is a very important part contributing to the biodiversity of the area. It consists mainly of sedges, grasses, orchids (Annex B Photo 4). The orchid flora is extremely diverse. The orchid flora of Benishangul covers over 30% of the 150 species of orchids in the whole country. This diversity is mainly in the wetlands. Some of the orchid species occurring in the area include:

Eulophia guineensis (Annex B: Photo 5), E. caricifolia, Habenaria bracteosa, Habenaria zambesina Habenaria aethiopica, Habenaria malacophylla ,Habenaria chirensis, Habenaria chirensis, Habenaria cirrhat, Habenaria vaginata, Platycoryne crocea, Disa hircicornis Rchb.f., Disa scutellifera, Disa aconitoides subsp. goetzeana, Satyrium aethiopicum

The following wetland spots/sites have been identified during the reconnaissance. These are not directly on the road alignment, but in the vicinity, and should be avoided if changes are to be made on the existing alignment. Wetlands were located:

At about 37 km along Assosa-Guba road (altitude 1390 m, Lat: 10° 19.691' N, Long: 34° 39.372' E).

Between Ashanshako village (altitude 880 m, Lat: 10° 44.735' N, Long: 34° 54.467' E) and Awalabegu village (altitude 760 m, Lat: 10° 42.938' N, Long: 34° 59.000' E) along Assosa-Guba road.

About 8 km from Toiba to Ashanshako village along Assosa-Guba road there is a wet site with black to gray clay soil (altitude 830 m, Lat: 10° 41.342' N, Long: 34° 51.864' E).

Due consideration need also to be given to some of the big trees in the riverine vegetation such as *Breonardia salicina and Hyphene thebaica.* There occur mainly at about:

29 km (altitude 1390 m, Lat: 10° 19.691' N, Long: 34° 39.372' E)
31 km (altitude 1480 m, Lat: 10° 17.518' N, Long: 34° 37.403' E)

Guba to the Abay River

The new road construction starts as an offshoot from the existing gravel road between Guba and Bumbadi. This road leads towards the Abay. In the reconnaissance survey carried out, the two alternative routes were surveyed, A and B (Annex A: Map 1).

The road for Alternative A has already been cleared by the UNHCR and much of the vegetation on the road alignment has been cleared. For both alternative routes, much of the vegetation on both sides of the roads starting from the entrance has been cleared (Annex B: Photos 11A & 11B). However, there is more undisturbed vegetation in Alternative B.

The natural vegetation consists of the woodland and the riverine vegetation types. The woodland vegetation (Annex B: Photo 6) in general consists of trees, shrubs and herbs. The tree layer includes *Adansonia digitata, Acacia polyacantha, Lonchocarpus, Cordia africana, Piliostigma thonongii, Combretum molle, terminalia brownii, etc.* The shrub layer includes *Oxythenanthera abyssinbica, Grewia mollis, Gardenia ternifolia, and species of Phyllanthus and Vernonia.* The Herbaceous and grass layer includes species of *Anthericum, Dioscorea, Hypparhenia.* A number of unique and rare plants such as *Gladiolus daleni* (Annex B: Photo 7) and *Merremia gallabatenis* (Annex B: Photo 8) are found in the general area.

Riverine vegetaion (Annex B: Photo 9) in general consists of trees, shrubs and herbs. The tree layer includes *Acacia polyacantha, Lonchocarpus, Cordia africana, Borassus aethipicus, Hyphaeane thebaica* (Annex B: Photo9), *Piliostigma thonongii, Combretum molle, etc.* The shrub layer includes *Grewia mollis, Gardenia ternifolia, Ricinus communis, and species of Phyllanthus and Vernonia.* The Herbaceous and grass layer includes species of *Aspilia, Mormordica,. Commelina Panicum.*

4.2.7 Wildlife/Fauna

Sherkole to the Abay River
The faunal diversity (apart from the birds) is scarce. Some of the observed ones include: baboons, monkeys and duiker. Turtles were observed in the wetlands.

Five hundred species of birds have been recorded in two years (1999-2001)[2], which present cover 60% of the bird life recorded in the whole country. Till this recorded, little was known about the bird life in the Region. The figure amply indicates the importance of the vegetation in the area in supporting the diversity of birds. A partial listing of some bird species occurring in Benishangul and Gumuz Region are shown in Annex H.

Guba to the Abay River
The faunal diversity observed (except the birds) was not as high as expected. The species that have been observed during the reconnaissance are: the common fox, Bush buck, Eland, Gazelle, Defassa Waterbuck, Duiker, Patas Monkey and Warthog, According to informants from the area: Lions, Leopards and Greater Kudu are also known in the area.

These roughly correspond to the principal tourist areas and many were once officially designated as controlled hunting areas. Discussions with local authorities in BGNRS indicate that hunting is no longer allowed in these areas.

4.2.8 Forests

Other than the areas of relatively intensive cultivation that are close to Assosa, and more limited areas around Menge and Guba, the zone of influence is characterized mainly by open, bushed shrub or wooded grassland. The predominant climax vegetation in the central zone is defined as *Hyparrthenia Filipendula* grassland, with mixed deciduous woodland and savanna to the north and around Gizen and kurmuk. These remain important strands of lowland bamboo.

The predominant land use along the alignment is slash and burn agriculture (Annex A: Map 5 and Annex B: Photos 2a and 10b).

Sherkole to the Abay River
From Sherkole to the Abay River, the alignment follows an existing track. In some places, the old road is covered by *Acacia seyal* and *Ziziphus mauritiana* and *Dalbergia melanoxylon,* which indicate disturbance. In addition, there are a number of settlements along the alignment. These include:

Toiba village, about 10 km from Sherkole (altitude 805 m, Lat: 10° 35.819' N, Long: 34° 47.056' E). This is a relatively densely populated village.

Ashanshako village (altitude 880 m, Lat: 10° 44.735' N, Long: 34° 54.467' E). There are about 40 households.

Awalabegu village (altitude 760 m, Lat: 10° 42.938' N, Long: 34° 59.000' E). There are about 30 households.

[2] This has been recorded by Mr. Hermann of the Bureau of Agriculture of the Region.

Abigndow village (altitude 640 m, Lat: 10° 46.557' N, Long: 35° 04.052' E) is with about 20 households. The village is located on the Abigndow River bank. The residents are engaged in riverbank farming and produce crops there times a year.

Bapararo village (altitude 540 m, Lat: 10° 51.353' N, Long: 35° 12.585' E) is with about 40 households. The village is located on the Abay River bank. Both Berta and Gumuz people live in this village.

Goat rearing is the major animal production of Berta people along the Assosa-Guba Road. A household may posses up to 300 goats. Donkeys are also very important domestic animals in the life of Berta people. There are three donkey breeds: large, small and intermediate (hybrids between the two). A household may posses 1 to 6 donkeys. A household without a donkey is considered as poor. The people also raise chickens; however, egg selling is taboo in the society. Cattle rearing is uncommon and was rarely observed. While it was rare to see cows, oxen were observed. These may have been purchased from the highlanders.

Guba to the Abay River

There are only few settlements on the road close to the road alignment between Mankush and Abay. This is mainly due to the lack of perennial rivers. Some of the rivers that were crossed such as Abuja River at about 18 km from the junction (altitude 750 m, Lat: 11° 09'N, Long: 35° 19.389' E) and Ay Gumba River at about 25 km from the junction (altitude 790 m, Lat: 11° 06.568'N, Long: 35° 16.498'E) have very little water even during the wet season when the visit was made. The Yabulu River at about 7 km (altitude 770 m, Lat: 11° 12.31' N, Long: 35° 22.310'E) has got a relatively better water supply, but settlement in the area has not been observed.

A settlement was seen at about 24 km (altitude 790 m, Lat: 11° 07.239'N, Long: 35° 16.837'E) close to Ay Gumba River at about 25 km from the junction; and Yarenja Kebele, at about 50 km from the junction on Alternative III (altitude 630 m, Lat: 11° 03.400'N, Long: 35° 11.862'E).

The largest settlement was seen at Yarenja Refugee Camp, close to the River Abay, at about 50 km on alternative Alternative IV, (altitude 530 m, Lat: 10° 59.430'N, Long: 35° 11.227'E). From informal discussion with local informants thousands of refugees are to be settled in the area. This activity clearly hastens vegetation destruction in the area (Annex B: Photos 10A & 10B).

4.3 Socio-Economic Profile

The Socio-Economic Profile presented here is based on data gathered from numerous documents listed in the References in Annex D. Population and migration data is based primarily on the *1994 Population and Housing Census of Ethiopia Results for Benishangul-Gumuz Region*, in particular Volume I Statistical Report and Volume II Analytical Report. Other information has been sourced from the *Regional Profile of Benishangul-Gumuz National Regional State* (BOPED), and the *Statistical Report on the 1999 National Labour Force Survey March 1999* (CSA, November 1999).

In addition, the information in this section has been supplemented by data from a household survey conducted during the course of this study in the project's zone of influence (ZOI). In all, 580 interviews were conducted in the ZOI, of which 19.5% of

respondents were women. The Minutes of Community Consultations are presented in Annex E.

4.3.1 Demographic Structure

The analysis here is based on *de jure* population, ie the usual population who belong to an area and usually reside there at any given time.

The 1994 Census data indicates that the total population of the Region in 1994 was 460,459 people, of which 92% lived in the rural areas, and only 8% lived in the urban areas.

The ratio of men to women in the Region was almost in balance. However in urban areas of Assosa Zone, the male:female ratio was 53% : 47%, while in Metekel Zone it was 47% : 53%. Kamasha Zone does not have any urban area.

The gender distribution described above is similar for the current situation.

4.3.2 Population Density

Table 4.9 below shows the population and population densities of the Region by zone and woreda for 1994 and projected for 2000. The woredas falling within the Zone of Influence of the project road have been highlighted.

Table 4.9: Population and Population Density of Benishangul-Gumuz Region by Zone and Woreda (1994 and 2000)

Region	Zone	Woreda	Area sq km	Popn '94 Total	Popn '94 Urban	Popn '94 Rural	Density 94 /Km²	Popn '00 Total	Density '00 /Km²
Benishangul-Gumuz			49,289.46	460,459	36,027	424,432	9.34	536,183	10.88
	Metekel		26,272.38	201,521	19,607	181,914	7.67	234,662	8.93
		Dangur	8,387.19	30,741	3,253	27,488	3.67	35,796	4.27
		Guba	3,896.10	7,962	729	7,233	2.04	9,271	2.38
		Wonbera	7,134.53	41,686	2,429	39,257	5.84	48,541	6.80
		Mandura	1,003.76	22,593	1,448	22,145	22.51	26,308	26.21
		Dibate	2,425.32	41,570	2,912	38,658	17.14	48,406	19.96
		Bulen	2,857.97	21,111	3,264	17,847	7.39	24,583	8.60
	Pawe Sp		567.51	35,858	5,572	30,286	63.18	41,755	73.58
	Assosa		14,166.12	208,155	16,420	191,735	14.69	242,387	17.11
		Menge	1,500.63	28,970	185	28,785	19.31	33,734	22.48
		Kurmuk	1,434.07	10,614	322	10,292	7.40	12,360	8.62
		Assosa	1,991.41	73,954	11,749	62,205	37.14	86,116	43.24
		Sherkole	3,204.22	13,989	0	13,989	4.37	16,290	5.08
		Bambasi	2,210.16	34,475	4,164	30,311	15.60	40,145	18.16
		Oda Godere	1,387.19	22,320	0	22,320	16.09	25,991	18.74
		Komesha	645.78	9,762	0	9,762	15.12	11,367	17.60
	TongoSW		1,792.66	14,071	0	14,071	7.85	16,385	9.14
	Kamashi		8,850.96	50,783	0	50,783	5.74	59,134	6.68
		Yaso	2,789.07	7,771	0	7,771	2.79	9,049	3.24
		Sirba Abay	1,308.44	9,221	0	9,221	7.05	10,737	8.21
		Kamashi	1,622.50	8,335	0	8,335	5.14	9,706	5.98
		Agalo Mite	1,519.07	14,190	0	14,190	9.34	16,524	10.88
		Belo Jegonfoy	1,611.88	11,266	0	11,266	6.99	13,119	8.14

Source: CSA, *The 1994 Population and Housing Census of Ethiopia Results for Benishangul-Gumuz Region*, Volume I Statistical Report, February 1996

Assosa Zone currently has the highest population in the Region at 242,387 persons (according to projections for 2000 based on growth rates and base populations from the 1994 Population Census). The highest urban population is found in Assosa town,

followed by Bambasi, Dibate and Debre Zeit in Wonbera Woreda. The highest population densities are found in Pawe Special and Assosa Woreda (73 and 43 people per sq km respectively as per 2000 pop. data). The large gap between the two most densely populated areas may be explained by the fact that Pawe Special was first established as a resettlement area. Within the project road's ZOI, Assosa and Menge are the most densely populated. The least densely populated woredas are Guba, Dangur and Sherkole, with 2, 4 and 5 people per sq km, respectively. Guba and Sherkole both fall within the ZOI.

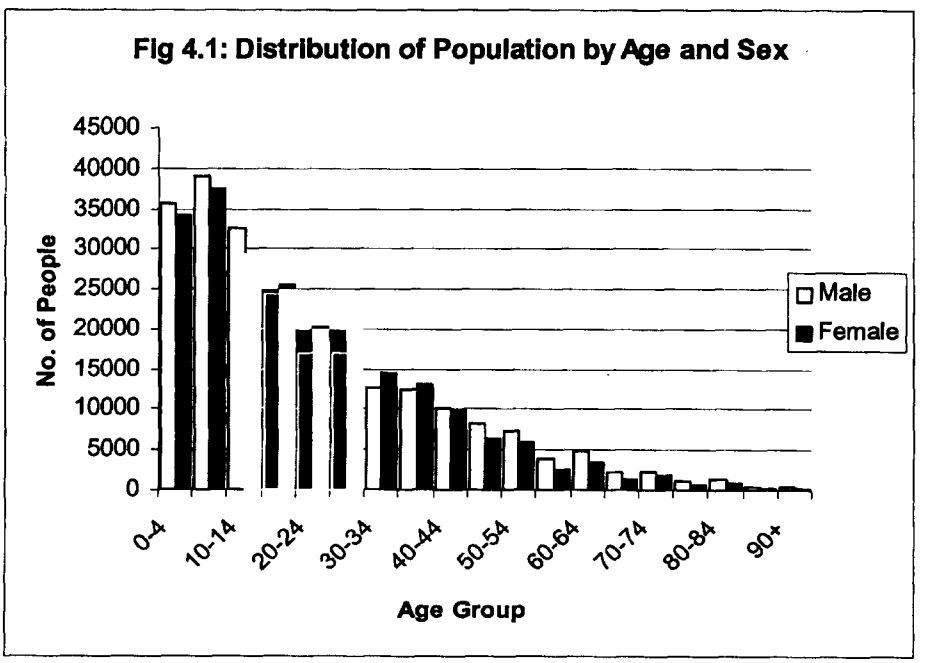
According to projections for 2000 based on growth notes and the 1994 population census, the population densities of Ethiopia and Benishangul-Gumuz Region are found to be 57.7 and 10.9 persons per sq km respectively. This shows clearly the small population size of the Region when compared with the national average.

It must be noted that the areas of the Region, zones and woredas differ between CSA and Regional documents. The BOPED *Regional Profile* gives the total land area of the Region as being 50,381 sq km, while the CSA's 1994 Population Census states the Region's area as 48,289 sq km. It also gives a combined area for Sherkole and Komosha Woredas, which differs from the CSA value. However, the total population for both these woredas is consistent. Therefore, in order to calculate population densities for the purposes of this study, figures for area and population from the *1994 Population and Housing Census Results for Benishangul-Gumuz* (CSA, February 1996) have been used.

4.3.3 Distribution of Population by Age

Figure 4.1 below illustrates the distribution of population in the Region by age and sex for 1994.

Fig 4.1: Distribution of Population by Age and Sex



Source: CSA, *The 1994 Population and Housing Census Results for Benishangul-Gumuz Region*, Volume II Analytical Report

4.3.4 Demographic Indicators and Population Projections

Demographic indicators help to provide insight into the trends in population growth. Indicators such as life expectancy, total fertility and infant mortality rates are often also used for assessing the level of development and level of poverty. The demographic indicators for the population projections are provided in Table 4.10 below.

Table 4.10: Demographic Indicators for Population Projections

Indicator	1995-2000	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
Total Fertility Rate	6.26 (6.52)	5.63	5.18	4.71	4.23	3.76	3.35
Male Life Expectancy	47.55 (50.60)	50.05	52.55	55.05	57.55	60.05	62.35
Female Life Expectancy	48.55 (52.92)	51.05	53.55	56.05	58.55	61.05	63.55
Infant Mortality Rate per 1000 births	131 (109)	117	104	91	79	67	56
Under 5 Mortality Rate per 1000	196 (161)	173	151	131	112	93	76
Crude Birth Rates per 1000	43.00 (44.17)	40.00	37.20	34.10	31.20	28.30	25.70
Crude Death Rates per 1000	17.30 (14.96)	14.60	12.60	11.0	9.70	8.60	7.70
Rate of Natural Increase %	2.70 (2.92)	2.54	2.46	2.31	2.15	1.97	1.80
Growth Rate %	2.70 (2.92)	2.54	2.46	2.31	2.15	1.97	1.80
Urban GR %	4.70 (4.38)	4.40	4.30	4.20	4.00	3.80	3.70
Rural GR %	2.50 (2.74)	2.40	2.20	2.10	1.90	1.70	1.50

Source: CSA, *The 1994 Population and Housing Census of Ethiopia Results for Benishangul-Gumuz Region*, Volume II Analytical Report, January 1999.
Note: Figures in brackets indicate country level figures for 1994 and are sourced from CSA, *The 1994 Population and Housing Census of Ethiopia Results at Country Level*, Volume I Statistical Report, June 1998.

The indicators given in Table 4.10 have been used to make population projections for the Region as well as for the woredas in the Zone of Influence of the road (ZOI). The analyses adopts the medium variant scenario, based on the assumption the current high level of fertility will decline to attain a total fertility rate of 4 by 2020, as a result of various Government initiatives outlined in the *National Population Policy* of 1993. It is predicted that this decline will continue at a slower pace until 2030 (refer CSA, January 1999). Migration effects are excluded at this stage.

Table 4.11: Population Projections by Zone and Woreda from 1994 to 2030 (in 1000)

Zone	Woreda	Projection Year							
		1994*	2000	2005	2010	2015	2020	2025	2030
Benishangul-Gumuz		460.4	536.1	607.8	686.3	769.3	855.7	943.4	1,031.4
Metekel		201.5	234.6	266.0	300.3	336.7	374.5	412.8	451.4
	Dangur	30.7	35.7	40.5	45.8	51.3	57.1	62.9	68.8
	Guba	7.9	9.2	10.5	11.8	13.3	14.7	16.3	17.8
	Wombera	41.6	48.5	55.0	62.1	69.6	77.4	85.4	93.3
	Mandura	22.5	26.3	29.8	33.6	37.7	41.9	46.2	50.6
	Dibate	41.5	48.0	54.8	61.9	69.4	77.2	85.1	93.1
	Pawe Sp	35.8	41.7	47.3	53.4	59.9	66.6	73.4	80.3
	Bulen	21.1	24.5	27.8	31.4	35.2	39.2	43.2	47.2
Assosa		208.1	242.3	274.7	310.2	347.8	386.8	426.4	466.2
	Menge	28.9	33.7	38.2	43.1	48.4	53.8	59.3	64.8
	Kurmuk	10.6	12.3	14.0	15.8	17.7	19.7	21.7	23.7
	Assosa	73.9	86.1	97.6	110.2	123.5	137.4	151.5	165.6
	Sherkole	13.9	16.2	18.4	20.8	23.3	25.9	28.6	31.3
	Bambasi	34.4	40.1	45.5	51.3	57.6	64.0	70.6	77.2
	Oda Godere	22.3	25.9	29.4	33.2	37.2	41.4	45.7	49.9
	Komosha	9.7	11.3	12.8	14.5	16.3	18.1	20.0	21.8
	Begi	14.0	16.3	18.5	20.9	23.5	26.1	28.8	31.5
Kamashi		50.7	59.1	67.0	75.6	84.8	94.3	104.0	113.7
	Yaso	7.7	9.0	10.2	11.5	12.9	14.4	15.9	17.4
	Sirba Abay	9.2	10.7	12.1	13.7	15.4	17.1	18.8	20.6
	Kamashi	8.3	9.7	11.0	12.4	13.9	15.4	17.1	18.6
	Agalo Mite	14.1	16.5	18.7	21.1	23.7	26.3	29.1	31.7
	Belo Jegonfoy	11.2	13.1	14.8	16.7	18.8	20.9	23.1	25.2

Source: base population from CSA, *The 1994 Population and Housing Census of Ethiopia Results at Country Level*, Volume I Statistical Report, February 1996

It can be seen that by the year 2030 the population of the Region will be almost double the current population. This will also be the case for those woredas in the ZOI.

The population estimates and projections for the ZOI presented in Tables 4.11 and 4.12 below have been based on detailed analysis of village locations and farmers association boundaries on maps obtained from the CSA Cartographic Department. The ZOI passes through 138 farmers associations. Within the ZOI there are 269 villages and three urban areas: Assosa town, Menge town and Mankush. In 1994, there were in the Region of 23,500 households within the ZOI, being concentrated mainly in the urban centres.

Table 4.12: Summary of Population in Zone of Influence

Zone	Woreda	No. of Farmers' Associations in ZOI	No. of Villages in ZOI	No. of Households in ZOI	Population in 1994 in ZOI
Assosa	Komosha	13	31	2,261	9,762
	Assosa	32	70	10,197	33,481
	Assosa Town			2,262	11,749
	Sherkole	27	37	2,281	9,968
	Menge	47	105	4,480	18,713
	Menge Town			52	185
Metekel	Guba	16	23	1,376	4,485
	Mankush			150	729
	TOTAL	135	266	23,059	89,072

Source: CSA, *The 1994 Population and Housing Census of Ethiopia Results at Country Level*, Volume I Statistical Report, February 1996

Table 4.13: Population Projections for the Zone of Influence from 1994 to 2030

Zone	Woreda	Popn in ZOI 1994	Population Projections for the ZOI						
			2000	2005	2010	2015	2020	2025	2030
Assosa	Komosha	9,762	11,321	12,746	14,211	15,768	17,324	18,847	20,303
	Assosa	33,481	38,828	43,716	48,741	54,078	59,415	64,640	69,635
	Assosa Town	11,749	15,477	19,195	23,692	29,103	35,409	42,667	51,167
	Sherkole	9,968	11,986	13,495	15,046	16,694	18,341	19,954	21,496
	Menge	18,713	21,701	24,434	27,242	30,225	33,208	36,128	38,920
	Menge Town	185	244	302	373	458	558	672	806
Metekel	Guba	4,485	5,201	5,856	6,529	7,244	7,959	8,659	9,328
	Mankush Town	729	960	1,191	1,470	1,806	2,197	2,647	3,175
	TOTAL	89,072	105,718	120,935	137,304	155,376	174,411	194,214	214,830

Source: base population from CSA, *The 1994 Population and Housing Census of Ethiopia Results at Country Level*, Volume I Statistical Report, February 1996

By 2030 the population of the ZOI will have doubled. The urban areas will show the most pronounced rate of growth: Assosa, Menge and Mankush towns will have grown by over 3 times their current population during that time.

Table 4.14 summarises the projected population by road link. It can be seen that the population is, and will be, concentrated around the southern end of the project road, ie between Assosa and Komosha (Link 1). From Komosha, the population decreases pointedly, with the population being focussed around Menge town. Beyond Sherkole the population is very low, picking up again north of the Abay River. This distribution may be somewhat modified by assumptions regarding increased inward migration resulting from possible future agricultural development induced by the project road.

Table 4.14: Population in the ZOI by Road Link

Link No.	From – To	Woreda	Popn	Population Projections						
			1994	2000	2005	2010	2015	2020	2025	2030
1	Assosa - Komosha	Assosa	33,481	38,828	43,716	48,741	54,078	59,415	64,640	69,635
		Assosa Tn	11,749	15,477	19,195	23,692	29,103	35,409	42,667	51,167
		Komosha	6,170	7,155	8,056	8,982	9,966	10,949	11,912	12,833
	TOTAL		51,400	61,460	70,967	81,416	93,148	105,773	119,219	133,635
2.1	Komosha - Menge	Komosha	3,592	4,166	4,690	5,229	5,802	6,374	6,935	7,471
		Menge	11,826	13,715	15,441	17,216	19,101	20,986	22,832	24,596
		Menge Tn	185	244	302	373	458	558	672	806
	TOTAL		15,603	18,124	20,434	22,818	25,361	27,918	30,438	32,873
2.2	Menge - Sherkole	Menge	6,887	7,987	8,992	10,026	11,124	12,222	13,296	14,324
		Sherkole	2,544	2,950	3,322	3,704	4,109	4,515	4,912	5,291
	TOTAL		9,431	10,937	12,314	13,730	15,233	16,736	18,208	19,615
	Sherkole - Blue Nile	Sherkole	7,424	9,036	10,174	11,343	12,584	13,827	15,042	16,205
4and5	Blue Nile - Guba	Guba	4,485	5,201	5,856	6,529	7,244	7,959	8,659	9,328
		Mankush	729	960	1,191	1,470	1,806	2,197	2,647	3,175
	TOTAL		5,214	6,161	7,047	7,999	9,050	10,156	11,306	12,503
TOTAL ZOI			89,072	105,718	120,936	137,306	155,376	174,410	194,213	214,831

4.3.5 Migration and Settlement Trends

In the northern and central highland areas of Ethiopia, increased population, combined with the disruption of the rural economy due to deforestation and resultant soil erosion/ degradation, led to a continuous decline in production. The situation was exacerbated by recurrent and severe drought, which affected these areas for many decades. In response to these conditions, a large number rural people moved out of these highlands areas, usually to nearby towns, and sometimes to neighbouring Regions.

The then Government drew up a resettlement policy which aimed to reduce further pressure on land resources in the northern and central highland areas, and resettle people in new areas in order to realise the potential in those areas. Resettlement activities occurred in two separate periods. The first (early) resettlement activity took place before the 1984 famine disaster, when over 23,000 people were settled in and around Assosa in 17 settlement sites (source: National Atlas of Ethiopia, January 1988).

The second resettlement activity was implemented during the 1984 famine. Some settler farmers were relocated to areas with low population densities and sufficient cultivable land (integrated resettlement), while others were resettled in newly planned villages. Most of the people who were relocated from Welo and Tigray were resettled in the former Welega Region, which now forms most of Benishangul-Gumuz Region. Approximately 100,000 people were moved to what is now Benishangul-Gumuz Region (National Atlas of Ethiopia, January 1988).

Current Status of Migration in the Region
The latest available data (CSA, November 1999) indicate that 32.5% of the population in Benishangul-Gumuz Region are migrants, and 22.5% of these are "recent" migrants (ie have moved within the last five years of the time of data collection).

Figures from 1994 show that approximately 28% of the population in each of the zones in the Region were immigrants, of which 34.2% had immigrated since 1989. Labour Force Survey (1999) data imply a substantially faster population growth rate (4.7%) than assumed by the 1994 Census projections (2.6%), arising from an accelerated rate of inward migration. Higher growth rates are also adopted for the non-migrant population.

Results from the Household Survey conducted during this study indicate that 14.5% of the survey samples are recent migrants, of which about one third live in the Mankush area. Recent migrants also tended to settle in the Komosha-Menge-Sherkole and Yarenje-Yabulu areas.

Table 4.15: Benishangul-Gumuz Region Migration Status for Urban and Rural Areas in 1994 and 1999

Region / Zone	Group	1994*				1999#			
		All Persons	Migrants	Non-Migrants	Not Stated	All Persons	Migrants	Non-Migrants	Not Stated
Benishangul	Urbanan dRural	460,325	129,331	326,679	4,315	609,459	197,834	411,625	-
Gumuz	% of Total		28.10	70.97	0.94		32.46	67.54	-
Region	Urban	35,905	23,063	12,475	367	47,347	28,510	18,837	-
	Rural	424,420	106,268	314,204	3,948	562,112	169,324	392,788	-
Metekel Zone	Urban and Rural	201466	55734	144704	1028				
	Urban	19553	12644	6802	107				
	Rural	181913	43090	137902	921				
Assosa Zone	Urban and Rural	208076	59837	145868	2371				
	Urban	16352	10419	5673	260				
	Rural	191724	49418	140195	2111				
Kamashi Zone	Urban and Rural	50783	13760	36107	916				
	Urban	0	0	0	0				
	Rural	50783	13760	36107	916				

Source: CSA, *The 1994 Population and Housing Census of Ethiopia Results for Benishangul-Gumuz Region*, Volume I Statistical Report, February 1996; CSA, *Statistical Report on the 1999 National Labour Force Survey March 1999*, November 1999.

The majority (86%) of the migrants reside in the rural areas of the Region (CSA, November 1999). Using figures from 1994, most of the migrants live in Metekel and Assosa Zones (43% and 46%, respectively), with only 10.6% living in Kamashi Zone.

Forms of migration are usually described as being rural-rural, rural-urban, urban-rural, and urban-urban, for inter-Regional migration and intra-Regional migration. Data for recent migration shows that rural-rural migration was the most predominant form of movement in the Region, for both inter- and intra-Regional migration. The data shows that of all the Regions in the country, Benishangul-Gumuz had the highest proportion of recent rural-rural in-migration, in terms of both inter-Regional migration (66%, cf country average of 28%) and intra-Regional migration (60%, cf country average of 29%). The Region also had the highest percentage nationwide for recent inter-Regional rural-rural out-migration (58%, cf country average of 19%).

The Household Survey revealed that 15% of the respondents were intra-Regional migrants, 13% had moved into the project area from outside the Region, and 3.5% and 5% had been returnees from a neighbouring country and another country, respectively. Table 4.16 illustrates forms of migration for recent migrants.

Table 4.16: Percentage of Distribution of Recent Migrants by Form of Migration

	Form of Migration				Total for All Forms
	Rural/ Rural %	Rural/ Urban %	Urban/ Rural%	Urban/ Urban%	
Country (Whole)					
Inter-Regional Migration					
In migrant	25.0	21.5	18.0	35.6	707,736
Out migrant	25.0	21.5	18.0	35.6	707,739
Intra-Regional Migration					
In migrant	43.4	24.4	14.7	17.5	1,534,414
Total Migration					
In migrant	37.6	23.5	15.7	23.2	2,242,150
Benishangul-Gumuz					
Inter-Regional Migration					
In migrant	66.0	6.7	6.4	20.8	29,639
Out migrant	57.9	4.2	18.9	19.0	9,765
Intra-Regional Migration					
In migrant	60.1	12.5	13.9	13.5	15,999
Total Migration					
In migrant	63.9	8.8	9.1	18.2	45,638

Source: CSA, *Analytical Report on the 1999 National Labour Force Survey March 1999*, December 2000

Recent migrants in the Region numbered 45,638 persons. This means that 7.5% of the Region's population are recent migrants, and 4.9% of the Region's population has migrated here from other Regions between 1994 and 1999 (see Table 4.15). Thus about 1% of the population each year between 1994 and 1999 were immigrants from other Regions.

Table 4.17: Origin of Recent Immigrants to BGR by Region

No. of Recent Migrants	Benishangul Gumuz	Tigray	Amhara	Oromiya	Other	Total
Total UandR	15,999	72	11,331	15,746	2,490	45,638
% total imm	35.0	0.2	24.8	34.5	5.5	
Urban	4,386	63	3,123	3,381		
Rural	11,613	9	8,208	12,365		

Source: CSA, *Statistical Report on the 1999 National Labour Force Survey March 1999*, November 1999.

The data and indications from the Regional offices imply that there is still a considerable amount of migration into Benishangul-Gumuz Region from other Regions. Rates of immigration are indicated in Table 4.19 below as calculated from two different sources.

It will be noted that the 1994 Census data gives a figure of 7.2% for immigration rates between 1990 and 1994, while the Labour Force Survey (1999) gives a figure of 5.3%. The latter document shows little change in immigration rates between 1990 and 1999. As figures for inter-Regional migration before 1994 are not available, the table below gives rates for total immigration.

Table 4.18: Rates of Immigration in BGR from 1984 to 1999

	1994 Census Data			Labour Force Survey 1999		
BGNS	1984 & before	1985-1989	1990-1994	1989 & before	1990-1994	1995-1999
Total Migrants	74,524	91,219	129,331	117,234	152,196	197,834
Immigrant GR		0.0413	0.0723		0.0536	0.0539
GR%		4.13	7.23		5.36	5.39

Source: CSA, *The 1994 Population and Housing Census of Ethiopia Results for Benishangul-Gumuz Region*, Volume I Statistical Report, February 1996; CSA, *Statistical Report on the 1999 National Labour Force Survey March 1999*, November 1999.

Reasons for Migrating

Reasons for migrating are tabulated in Table 4.19.

Table 4.19: Reasons for Recent Migration by Percentage

Reason	Average (%)	Male (%)	Female (%)
Education	5.0	5.6	4.5
Marriage arrangement	13.8	1.5	23.9
Marriage dissolution	2.1	1.0	2.9
Search for work	12.2	16.0	9.1
Job transfer	6.8	12.2	2.5
Displacement	3.6	3.9	3.3
Along with family	37.9	32.2	42.5
Returned back home	6.9	8.6	5.5
Shortage of land	4.3	7.3	1.9
To live with relatives	4.5	8.5	1.3
Health problems	0.5	0.4	0.7
Lost family/caretaker	0.0	0.0	0.0
Other reasons	1.4	1.4	1.4
Not Stated	1.0	1.4	0.7

Source: CSA, *Analytical Report on the 1999 National Labour Force Survey March 1999*, December 2000.

4.3.6 Ethnicity, Language and Religion

Table 4.20: Ethnic Composition in Benishangul-Gumuz Region

Ethnic Group	Benishangul-Gumuz Region	Urban areas in the Region	Rural areas in the Region	Assosa Zone	Metekel Zone	Kamashi Zone
Berta	25.1%	7.8%	26.6%	54.31%	0.16%	4.39%
Gumuz	23.3%	1.1%	25.5%	0.60%	33.23%	77.36%
Amhara	22.2%	43.7%	20.3%	25.98%	23.77%	0.18%
Oromo	12.8%	23.2%	11.9%	11.0%	13.42%	17.47%
Shinasha	7.0%	9.5%	6.8%	0.03%	15.90%	0.02%
Agew/Awingi	3.8%	8.1%	3.4%	0.18%	8.51%	0.03%
Others	5.8%	6.6%	5.5%	7.9%	5.01%	0.55%

Source: *The 1994 Population and Housing Census of Ethiopia Results for Benishangul - Gumuz Region*, Volume II Analytical Report, January 1999.

The following extract explains briefly about the [redacted].

The Gumuz

(excerpt from the BGNRS Regional Conservation Strategy 1997, Vol1:Ch3)

In 18th and early 19 th centuries the people of Gumuz lived in the higher altitudes of central and southern Gojjam from where they retreated down to the lowlands due to their exposure to intermittent slave raids and conflicts (James Bruce, Salt and Beke- as quoted in Wendy James, 1986, P.121). The Bruce expedition (1768-1773) observed trading in wildlife and agricultural products including elephants, ivory, rhinoceros horn, gold in small pellets, and very fine cotton. These commodities were exchanged with the Agew for cattle, honey, butter, wheat, hides and wax. (James Bruce- as quoted in Wendy James, 1986, P.119). Continue next page...

After leaving the highlands, the Gumuz continued to carry out some trade activities with their neighbours, and adapted agricultural practices, which enabled them to produce crops and good quality cotton. Since the people of [redacted] the use of improved of farming and techniques of increasing productivity have not been adopted among the society. Similar to [redacted], shifting cultivation is the primary occupation of the Gumuz people. (Alesandro triulzi 1976, PP,3-5 and pattrik Wallmark in M.L. Bender, 1981 , 85).

In the early times, the communal ownership of land prevailed, which gradually turned to the clan owner ship of the land, particularly in the south eastern parts of Gumuz occupied areas (Kamashi and Gumuz Villages in Oromiya territory). The same principle is applied in Berta, Mao and Komo areas where land is owned based on kinship and bloodline relation. According to Pattric Wallmark (in M.L Bender, 1981, P.83) in Southeastern parts of Gumuz areas, every family has one river side field, one to three forest fields, and one main field which, may be separated by two to ten km.

Among the Gumuz, farmers live inside their clan territory which they consider to be their own land. Inside his own territory a clan member can farm as much land as he can. The size of farms depends on the farmer's initiative and the size of his family. A man may, but is not obliged, to share land with another having less or poorer land, but he will very rarely do so with brothers in the agnostic lineage. Land is not sold under any circumstances either inside or out side the clan of the Gumuz particularly of the Southern back of Abay River. (Pattrick Wallmark, 1981, PP. 83-85)

As indicated above, shifting cultivation has been practiced also among the Berta for the long span of their history, which partly resulted in the indiscriminate cutting of trees and the setting forest fires. This has diminished the forest density. The Berta cultivate any plot of land not used by others, provided it is within the traditional boundaries of their immediate kin group or village. In addition to reclaiming cultivable land, Berta also burn pasture land periodically in order to eliminate disease and useless weeds. This traditional practice resulted in aridity. (Aleasandro Iriulzi ,1976, P.4).

The tradition of small scale gold mining activities in the Region and tribute paying to the central government in gold (kind) has a long recorded history beginning in the Aksumite Empire. As the Region is rich in gold deposits, gold mining is said to have been known in antiquity, and the area appears to have been a regular supplier of gold since Aksumite times (Sergew Hable Sellassie, 1972, P.233- as quoted in Alessandro triulzi,1976, P.1-2). Gold mining activities in Benishangul-Gumuz area, where women play significant role, were one of the traditional practices linking the subjugated peoples of Berta and Gumuz, with the high land ruling classes which persistently derived gold tributes.

The aboriginal nationalities were under brutal oppression and exploitation for a long time. They were unable to move further away to freely and effectively act upon their own traditional knowledge of natural resources and environment. The traditional values, beliefs and practices with reference to natural resource utilization and environmental management which emerged from indigenous communities were not encouraged and supported. Rather there was serious negation and abuse towards such traditions, which resulted in a loss of self confidence and sense of ownership on the part of the local people.

The recent phenomena of resettlement programmes and the immense influx of people from different parts of the country into the Region has brought various cultures and traditions of national resource utilization and environmental management together. This has created greater pressure on local natural resources and on the environment and has lead to a deterioration in natural wealth of the Region.

Language wise, almost a quarter of the people in the Region used Jeblawigna (language of the Berta) as their mother tongue. Gumuzigna was spoken by 23% of the population, Amharic by 23% and Oromigna by 16%.

The largest religious group in the Region were Muslims, comprising 44%. Orthodox Christians made up 35%, while traditional religions comprised 13%. Protestants were in the minority with 6%. In urban areas the number of Orthodox Christians were in the majority with 68%, while the proportion of Muslims decreased to 26% and traditional religions comprised only 0.3%.

More than 90% of the Berta were Muslims. The majority of Amhara, Shinasha and Omoro were Orthodox Christians, while the Gumuz mainly followed traditional religions.

4.3.7 Employment

Status of Employment in the Region

In 1994, 262,200 people were economically active in the Region, ie. approximately 57% of the total population of the Region.

Table 4.21: Economically Active Population of the Region Aged 10 Years and Above in Rural and Urban Areas, 1994

	Urban and Rural			Urban			Rural		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Benshangul-Gumuz Region									
Economically Active	262,200	136,410	125,790	14,591	9,001	5,590	247,609	127,409	120,200
% male:female	100.0	52.0	48.0	100.0	61.7	38.3	100.0	51.5	48.5
Employed	260,398	135,328	125,070	13,539	8,320	5,219	246,859	127,008	119,851
Total Unemployed	1,802	1,082	720	1,052	681	371	750	401	349
Unemployment rate%	0.69	0.79	0.57	7.21	7.57	6.64	0.30	0.31	0.29
Metekel Zone									
Economically Active	116,174	59,028	57,146	8,489	4,592	3,897	107,685	54,436	53,249
% male:female	100.0	50.8	49.2	100.0	54.1	45.9	100.0	50.6	49.4
Employed	115,309	58,568	56,741	8,019	4,304	3,715	107,290	54,264	53,026
Total Unemployed	865	460	405	470	288	182	395	172	223
Unemployment rate%	0.74	0.78	0.71	5.54	6.27	4.67	0.37	0.32	0.42
Assosa Zone									
Economically Active	115,145	61,862	53,283	6,102	4,409	1,693	109,043	57,453	51,590
% male:female	100.0	53.7	46.3	100.0	72.3	27.7	100.0	52.7	47.3
Employed	114,287	61,289	52,998	5,520	4,016	1,504	108,767	57,273	51,494
Total Unemployed	858	573	285	582	393	189	276	180	96
Unemployment rate%	0.75	0.93	0.53	9.54	8.91	11.16	0.25	0.31	0.19
Kamashi Zone									
Economically Active	30,881	15,520	15,361	0	0	0	30,881	15,520	15,361
% male:female	100.0	50.3	49.7	0	0	0	100.0	50.3	49.7
Employed	30,802	15,471	15,331	0	0	0	30,802	15,471	15,331
Total Unemployed	79	49	30	0	0	0	79	49	30
Unemployment rate%	0.26	0.32	0.20	0	0	0	0.26	0.32	0.20

Source: CSA, *The 1994 Population and Housing Census for Benishangul-Gumuz Region*, Volume I Statistical Report, February 1996

The unemployment rate for the Region as a whole was therefore less than 1%. In the rural areas of the Region, the unemployment rate was even lower. This reflects the predominance of family-based farming in the economy. However, in the urban areas of Metekel and Assosa Zones, unemployment was high. The high unemployment rates in Assosa Zone applied mainly to Assosa town where people were migrating to in search of work (from rural areas within the Region and also from outside the Region). The highest unemployment rates among migrants were found in the 20-24 year age range.

A comparison of employment characteristics for 1994 and 1999 indicates a modest rise in the number of economically active people. However, unemployment rates had

increased by around 5% overall, ranging from about 4% in the rural areas to nearly 20% in the urban areas.

Table 4.22: Changes in Regional Employment Characteristics between 1994 and 1999

	Urban and Rural			Urban			Rural		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Benishangul-Gumuz 1994*									
Economically Active	262,200	136,410	125,790	14,591	9,001	5,590	247,609	127,409	120,200
% male:female	100.0	52.0	48.0	100.0	61.7	38.3	100.0	51.5	48.5
Employed	260,398	135,328	125,070	13,539	8,320	5,219	246,859	127,008	119,851
Total Unemployed	1,802	1,082	720	1,052	681	371	750	401	349
Unemployment rate%	0.69	0.79	0.57	7.21	7.57	6.64	0.30	0.31	0.29
Benishangul-Gumuz 1999and									
Economically Active	279,814	144,040	135,774	22,723	11,300	11,423	257,091	132,740	124,351
% male:female	100.0	51.5	48.5	100.0	49.7	50.3	100.0	51.6	48.4
Employed	265,346	139,299	126,047	18,454	10,078	8,376	246,892	129,221	117,671
Total Unemployed	14,468	4,741	9,727	4,269	1,222	3,047	10,199	3,519	6,680
Unemployment rate%	5.17	3.29	7.16	18.79	10.81	26.67	3.97	2.65	5.37
Country 1999and									
Economically Active	27,068,310	14,755,896	12,312,414	3,671,609	1,786,541	1,885,068	23,396,701	12,969,355	10,427,346
% male:female	100.0	54.5	45.5	100.0	48.7	51.3	100.0	55.4	44.6
Employed	24,896,578	14,117,785	10,778,793	2,702,469	1,458,859	1,243,610	22,194,109	12,658,926	9,535,183
Total Unemployed	2,171,732	638,111	1,533,621	969,140	327,682	641,458	1,202,592	310,429	892,163
Unemployment rate%	8.02	4.32	12.46	26.40	18.34	34.03	5.14	2.39	8.56

Source: CSA, *The 1994 Population and Housing Census Results for Benishangul-Gumuz*, Volume I Statistical Report, February 1996; CSA, *Statistical Report on the National Labour Force Survey March 1999* (November 1999).

About 8% of the total employed population in the Region was urban-based, and 92% of the work force was based in the rural areas. The main employment category in the Region was the agricultural sector (which also includes hunting, forestry and fishing), comprising 89% of the rural population and 22% of the urban population. Other activities in the urban areas were wholesale and retail (18%), hotels and restaurants (16%) and manufacturing (4%).

Within the zone of influence, the main occupation is farming (79% of respondents). 6% of respondents were traders and 4% were government workers. Other types of employment are accounting for 11%.

Reasons For Not Being Economically Active

The Labour Force Survey 1999 indicates that 30% of people aged 10 or more were not economically active. Almost half of these were students, 20% were classed as homemakers and 14% were considered too young to work. Only 0.6% of the total non-active population were unable work owing to disability.

Table 4.23: Reasons for Not Being Active (as a % of Total Non Active Population)

Reason	UrbanandRural			Urban			Rural		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total Non-Active Pop	121,846	53,151	68,695	14,260	5,361	8,899	107,586	47,790	59,796
Home makers	19.9	4.0	32.3	23.2	3.2	35.3	19.5	4.1	31.8
Students	47.5	73.0	27.8	64.0	85.1	51.3	45.3	71.6	24.3
Disabled	0.6	0.6	0.5	0.2	0.3	0.1	0.6	0.7	0.6
Illness	7.7	4.7	10.0	4.3	4.1	4.4	8.1	4.7	10.8
Too young	14.3	12.1	15.9	1.4	2.2	1.0	16.0	13.2	18.1
Prostitutes	0.1	0.0	0.3	0.7	0.0	1.1	0.1	0.0	0.1
Old age/pensioned	7.3	4.5	9.5	5.2	3.7	6.1	7.6	4.6	10.0
Others	2.1	0.7	3.2	0.5	1.0	0.3	2.3	0.7	3.6
Not stated	0.5	0.4	0.6	0.4	0.4	0.3	0.5	0.4	0.6
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: CSA, *Statistical Report on the 1999 Labour Force Survey March 1999*

The age distribution of the population is depicted in Figure 4.1 in Section 4.3.3. It shows that the 5-14 year age bands comprised about 140,000 individuals who are now part of the economically active group, and about 70,000 of these only became economically active in 1999. Consequently there are more people seeking employment.

Another reason not mentioned here could be that there is not enough work being generated in the Region to employ some of these people. Development in all the sectors is slow due to various reasons, including lack of funds, lack of capacity, lack of infrastructure and the remoteness of the Region. Agricultural and mining potential, if they exist, have not been fully exploited.

4.3.8 Household Income and Expenditure

Sources of Income

The main source of income for the people within the ZOI is agriculture. Of the households interviewed during the survey, 21% had one or more members in wage employment. Nearly 40% of the households were involved in panning for, and selling, gold. (See also the extract about the traditional Mining next page).

Other activities from which income is derived are the sale of firewood, charcoal, thatch, and honey.

Men were mainly involved in wage employment (69% of respondents), and were also mainly responsible for income derived from the sale of charcoal (76%), thatch/grass (70%), honey (90%) and gold (52%). Women were mainly responsible for income from firewood (63%). Some respondents had two or more sources of income.

Traditional Gold Mining

A study prepare for BOPED reported that 65,000 persons in Benishangul-Gumuz, of whom 75 perecent are women, earn their living by illicit, artisanal gold mining. The greatest concentration of persons engaged in such mining is in three very poor woredas (districts): Oda Goderrie and Kumruk in Assosa zone, and Guba woreda in Meketel zone. In these three of the Region's 20 woredas, which have a combined population of 47,000, most of whom are indigenous people, almost all the women and a large number of children are engaged in the activity, which is illegal, unprotected, and dangerous. In all, the output is about 180 kg of gold each month of the mining season. The work is heavy and perilous: the women dig by hand, excavating pits of up to 40 meters in depth, carrying the excavated soil on their backs down to the water sources in the valleys, and panning to retrieve the gold ore. The BOPED study report "(..) production is risky and many fatal accidents (are) recorded due to land collapse in pits.... All mining sites are affected by dig chaotic earth moving and overturned fertile soil (is) covered by gravel. Deforestation is also common at all sites under mining. Deep pits abandoned open after ore extraction affecting human life, wild and domestic animals." Several government officials stated that in some woredas the children abandon their schooling to pan for gold. According to local informants, although the work is almost entirely done by women and children, those who extract the gold do not earn from it; all the ore is turned over to their men folk for sale.

As the output is unlicensed, it is smuggled across the border into the Sudan, or into urban Ethiopia. "Most of the potential, benefit is lost due to lack of legal and fiscal framework, and inefficient production, processing and marketing arrangements"

BOPED officials have proposed a project to create awareness among local officials, legalize and license the trade, improve the water supply and mining methods, organize participants, and provide technical support, to improve the life of miners. Nothing has as yet come of the draft proposal.

Source: BOPED project document, 1997

Income Level

Table 4.24: Income in Birr per Household per Annum in Percentage

	Less than 2,000 Birr	2,000-5,399 Birr	5,400-12,599 Birr	12,600 Birr or more
Country level	16.88	51.38	27.04	4.69
Rural	15.13	54.25	27.34	3.27
Urban	26.53	35.6	25.38	12.50
Benishangul-Gumuz	13.12	60.71	23.41	2.76

Source: The Federal Democratic Republic of Ethiopia, Central Statistical Authority, *Revised Report on the 1995/96 Household Income, Consumption and Expenditure Survey*, Addis Ababa, June 1998

Expenditure Level

The Household Survey found that the majority of respondents above (60%) spend less than 2000 Birr per year, while only 0.6% spends more than 12599 Birr per year. Above one third of the respondents spend between 2000 and 5399 Birr per year. These findings imply that the people in the project area's ZOI are in fact much poorer than indicated in Table 4.24 above.

In order to gain an overview of the poverty level in the ZOI, the household survey asked whether the respondents possessed an iron roof, a radio, a kerosene stove or a watch. About 4% had all these items, 23% had only one item, 35% had two and three items and 38% had none. The most affluent area appears to be the Komosha-Menge area, while the poorest area is north of the Abay River (Yarenje and Yabulu).

At country level households with an income of less than 12,600 Birr spent more than half of their income on food and around 4% of their income on transport. For households with an income more than 12,600 Birr the expenditure on transport doubled to almost 9% while the expenditures for food decreased to 42%. For the Benishangul-Gumuz Region as a whole the expenditure for food per household was 57% and for transport the figure was only 0.7% (figures for transport alone were not available).

Table 4.25: Expenditures on Food, Transport and Other Items for the Different Income Groups at Country Level

	Less than 2,000 Birr	2,000-5,399 Birr	5,400-12,599 Birr	12,600 Birr or more
Food	58.5	55.37	52.11	42.17
Transport	0.4	0.38	0.64	2.52
Public transport	3.68	3.66	3.86	6.4
Other items	37.82	40.59	43.39	48.91

The Federal Democratic Republic of Ethiopia, Central Statistical Authority, *Revised Report on the 1995/96 Household Income, Consumption and Expenditure Survey*, Addis Ababa, June 1998

The Household Survey supports the figures in Table 4.25, revealing that more than half (55%) the people interviewed spend less than 100 Birr per year on transport, and 52% of respondents spend between 1000 and 3000 Birr on food annually. The survey indicates that for the majority of households, expenditure was less than 200 Birr on school (84% of respondents), medical expenses (84%), water (92%), and agricultural inputs (89%). This underscores further the poverty level in the project area.

4.3.9 Health

According to the *Regional Profile of Benishangul-Gumuz National State* (June 1998), Ethiopia has one of the world's worst health statuses because of poor socio-economic conditions resulting in low living standards, poor environmental conditions and inadequate health infrastructure and services. Within Ethiopia Benishangul-Gumuz Region has one of the worst health statuses.

Table 4.26 compares Health Status Indicators (HIS) for Benishangul-Gumuz Region and Ethiopia as a whole. Infant, child and (partly) maternal mortality rate is higher for Benishangul-Gumuz compared to the national level. Life expectancy in Benishangul-Gumuz Region is 48.6 and 47.7 years, for females and males respectively. In Ethiopia as a whole, the corresponding figures are 52.9 and 50.6 years.

Table 4.26: Health Status Indicators in Benishangul-Gumuz Region

Health Status Indicator (HSI)	Benishangul-Gumuz	Ethiopia
Infant Mortality Rate (IMR)	131	110
Child Mortality Rate (CMR)	196	161
Maternal Mortality Rate (MMR)	750*	560-850
Life Expectancy (LE) Female	48.6	52.9
Life Expectancy (LE) Male	47.6	50.6

Source: CSA, *The 1994 Population and Housing Census of Ethiopia Results at Country Level*, Volume 1 Statistical Report, June 1998; *Regional Profile of Benishangul-Gumuz National Regional State*, Bureau of Planning and Economic Development of BGNRS

The ten main causes of morbidity in Benishangul-Gumuz Region are given in the table below.

Table 4.27: Main Causes of Morbidity

	Diagnosis	No of Cases 1997/98	Percentage in 1997/98
1	Malaria	62,970	20.9
2	Helminthiasis (intestinal parasitosis)	39,668	13.2
3	Pneumonia	31,630	10.5
4	Infections of skin and subcutaneous tissue	21,037	7.0
5	Dysentery (all kinds)	19,130	6.3
6	Rheumatism	16,556	5.5
7	Malnutrition	15,528	5.1
8	Pyrexia of unknown origin	14,371	4.8
9	Gastritis	13,465	4.5
10	Amoebiasis	8,520	2.8
	Others	58.393	19.4

Source: *Regional Profile of Benishangul-Gumuz National Regional State*, Bureau of Planning and Economic Development of BGNRS

Of these cases, 55.4 % are considered preventable. Other widespread diseases in the Region are tuberculosis, maternal and prenatal death, measles and sexually transmitted diseases including HIV/AIDS.

In the ZOI, malaria was considered to be the main cause of morbidity, followed by diarrhoea and stomach disorders. The distribution of the incidence of these illnesses was more or less uniform throughout the survey area.

HIV/AIDS

Data on HIV/AIDS specifically related to the Region was insufficient; the only useful source was the Regional Profile[3]. The report mentions that at national level in 1997 it was estimated that 2.5 million people were infected, among them 150,000 children. The HIV prevalence is much higher in urban than in rural areas. In 1997 the infection rate for adults was estimated to 21% in urban and 4.5% in rural areas.

For the Benishangul-Gumuz a high prevalence of HIV/AIDS is also expected, although a figure for the whole situation is not available. A three-month surveillance study of HIV/AIDS conducted at Assosa Hospital in 1999 showed that 33.7% (337 out of 1000) of the tested persons were HIV positive. The infection rate was 40.2% for males and 28.8% for females. All age groups were infected but 91% of the tested people belonged to the 16-40 years age group. While the survey is not considered representative of the population at large, it suggests that HIV/AIDS is likely to be a problem in the Region.

Access to Health Services

Table 4.28 below shows how far people have to travel to reach the nearest health facility in the three zones in Benishangul-Gumuz Region. 73% of the population of Assosa Zone are within 9 km of a health facility (cf national rural average of 61%). Metekel Zone is close to the average (58.8%), while Kamashi Zone is poorly served (25%).

Table 4.28: Percentage Distribution of Households by Km to the Nearest Health Service

Zone	Less than 1km	1-4 km	5 - 9 km	10 - 14 km	15 - 19 km	20 km & over
Metekel	18.0	20.6	20.2	6.7	20.3	14.3
Kamashi	8.0	9.2	8.0	48.8	11.1	14.9
Assosa	21.7	29.8	22.2	12.8	2.1	11.4
Assosa town	60.5	39.5	--	--	--	--
Country Level	11.8	25.7	29.3	15.3	10.7	7.1
Rural	5.7	21.8	33.9	17.8	12.4	8.3

Source: The Federal Democratic Republic of Ethiopia, Central Statistical Authority, *Report on the 1998 Welfare Monitoring Survey*, November 1999

More than 90% of the national population walk to the nearest health facility. Only 3% of the rural population use public transport to reach health facilities. These figures are likely to apply to Benishangul-Gumuz Region too: 30.6% of those interviewed during the Household Survey ranked the long distances to reach health facilities as being the second major problem with regard to the provision of health services.

Table 4.29: Percentage Distribution of Households by Usual Mode of Transport To Health Services

	Foot	Public transport	Cart/animal transport
All households	91.4	3.6	4.3
Rural residents	91.3	3.2	4.7
Urban residents	91.7	5.7	1.9

Source: The Federal Democratic Republic of Ethiopia, Central Statistical Authority, *Report on the 1998 Welfare Monitoring Survey*, November 1999

[3] Regional Profile of Benishangul-Gumuz National Regional State, Bureau of Planning and Economic Development of BGNRS (year unknown but in references the year 2000 is mentioned)

It is difficult to get trained staff to work in remote areas, in part because of bad road conditions. For similar reasons, relatively few NGOs are working in the health sector in the Region, and most started their operations only 2-3 years ago. They often work on the condition that the Regional Government gives assistance through provision of roads.

Apart from the issue of costs to the consumer, the distribution of drugs in the Region is a major issue for the Bureau of Health in respect of the long travel time between Assosa and Metekel Zones. The cost of health services, the lack of medicines, and the lack of qualified staff are also reflected in the Household Survey as major issues.

4.3.10 Education Profile

School Enrolment and Attendance

The following table gives figures for school enrolment of the Benishangul-Gumuz Region within the ZOI.

Table 4.40: School Enrolment for Primary and Secondary Schools (1999/2000)

Student Enrolment in Primary Schools (gr.1-8) for woredas in ZOI			
Woreda	Both	Male	Female
Asosa	20626	12542	8084
Menge	4663	3484	1179
Sherkole	2556	1866	690
Komosha	311	172	139
Guba	1470	1009	461
Total	29626	19073	10553
Student Enrolment in Secondary Schools (gr.9-12) for woredas in ZOI			
Woreda	Both	Male	Female
Asosa	1209	768	441
Menge	-	-	-
Sherkole	-	-	-
Komosha	-	-	-
Guba	-	-	-
Total	1209	768	441

Source: Bureau of Education and Culture, Assosa.

In the past, school attendance was very low. In 1994, 81% of the population had no formal education. However, this has changed dramatically over the last few years. From 1994/95 to 1999/2000, absolute student numbers increased by 135%, while gross enrolment rates (GER) increased by 131% (BOPED, *Regional Profile*). Over the same period, GER for males increased from 50% to 105%, and from 20% to 57% for females. The absolute number of primary school students increased from about 40,000 in 1994/95 to over 90,000 in 1999/2000.

The Household Survey results show that 27% of the sample had no education, 14% were educated to primary level, and 4% had secondary education. The majority of people with no education were from the Yarenje and Yabulu areas, but these areas also had the most respondents with primary school education. However, 57% and 48% of respondents said they had at least one boy or girl, respectively, at school.

The main problem with education services is that the schools are too far away. Other problems quoted by the survey respondents are the expense, lack of uniforms and books, and that there were not enough education facilities in the kebele.

Dropout Rates

According to the *Report on the 1998 Welfare Monitoring Survey* the national dropout rates for rural areas were 20.3% for primary school and 24.3% for secondary schools. In urban areas the corresponding figures were 6.2% and 10.3%.

In the Benishangul-Gumuz Region the dropout rate is highest in grade 1 and higher for females (32%) than for males (27%). It decreases gradually to zero around grade 4 for both sexes.

The two main reasons for dropping out from school at all levels seem to be that the pupil either had to work or failed the examination (BNRS, *Education Assessment*, May 2000). In the rural areas the main reason for withdrawal from school was that the students are needed to work in the farms. However, for females in rural areas and all pupils in urban areas, the main reason for withdrawal from school was failing their examinations.

A further issue is the high proportion of over-aged children in a given grade, arising in part from high repetition rates, but also the remoteness of some villages from schools, which discourages parents from sending their children to school at a young age.

Literacy Rates

Table 4.41: Literacy Rates in Benishangul-Gumuz Region

Literacy rate %	Urban and Rural			Urban			Rural		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
National Level	26.6	36.3	17.1	69.0	81.0	59.0	18.8	28.8	8.8
Benshangul-Gumuz	17.7	24.9	10.5	60.7	71.9	49.6	13.9	20.7	6.9
Assosa Zone	18.5	24.5	12.3	70.4	76.9	62.8	13.6	19.3	7.8
Metekel Zone	18.6	26.6	10.7	52.2	66.8	39.9	14.8	22.5	7.0
Kamashi Zone	11.4	19.5	2.9	--	--	--	11.4	19.5	2.9

Source: The Federal Democratic Republic of Ethiopia, Central Statistical Authority, *Report on the 1998 Welfare Monitoring Survey*, November 1999

The Household Survey indicates high literacy levels in urban areas of Assosa zone (Assosa town and its environs between 54% and 58%). The lowest literacy levels were found in Yarenje and Yabulu (7.7% and 1.7% respectively).

Gender Aspects

Statistics show that there is a significant gender imbalance in literacy rate, school enrolment and attendance, both at national level and in Benishangul-Gumuz Region. Some reasons for this are:

- Parents consider it less important to educate girls than boys (as girls get married off soon after they reach puberty);

- Girls are more likely to lack school materials than boys, and consequently they find it difficult to follow the classes;
- Parents may not allow girls to attend schools that are too far away;
  Religious reasons - in Guba and Sherkole there are a lot of Muslims, who do not send their girls to school;
- Students from different ethnic groups and different cultures may not be compatible. For example, Gumuz girls wear minimal clothing, whereas Muslim girls must be covered.

Results from the Household Survey reinforce the above reasons. In Teiba and Yarenje/Yabulu girls are not sent to schools for traditional reasons. In Komosha and Menge, respondents said that girls had chores to do at home, and also some parents did not want their girls to interact with different cultures.

Access Issues

Almost all primary school pupils in Ethiopia go to school on foot in both urban and rural areas. More than 90% of the secondary school pupil's walks to reach the school, while around 7% use public transport.

It seems unlikely that road improvement will have much direct impact on school attendance, since few families could afford to send their children by public transport, even if available, or to provide them with bicycles.

However, road provision and improvement could have a positive indirect impact on the quality of education by making it easier to construct schools of durable materials and to attract teachers to work in otherwise remote locations. For example, two schools in northern Sherkole have had to be closed because of inaccessibility and limited attendance.

Upgrading the education system is seen by both the Federal and Regional Governments as a crucial component of its Poverty Reduction Strategy (Ref. 29) through higher primary enrolment, increased participation by girls, new schools and upgrading the existing ones, training of teachers and better access to basic education. Better access is perceived by the Regional Government as a critical precondition for achieving these goals.

4.3.11 Perceived Impacts of the Project Road

The Household Survey indicates that the majority of respondents (41.2%) regarded access to markets as being the most important benefit derived from the road, and 26.7% regarded access to health facilities as being the major benefit. 17.7% of respondents believed that main advantage of the road would be cheaper and better transport facilities.

Most women respondents also felt that the most important benefit derived from the project road would be access to markets (37% of women respondents). 23.2% of women interviewed said that the main benefit of the road would be better and cheaper transport facilities, and 20.4% responded that access to health facilities would be the major advantage.

When asked to rank the major problems during or as a result of constructing the road, the majority of respondents (73%) said there would be no problem. 8.8% of

respondents ranked an increase in the number of accidents as being the most important negative impact. However, issues ranked as being the second most important problems were immigration into the area (20%), destruction of crops (15.6%), an increase in the number of accidents (14%), increased pressure on land resources by people coming into the area (11.9%), and the spread of diseases (10.8%). Impacts ranked as being third in importance were the spread of diseases (20.9%), destruction of crops (16.6%) and accidents (16.6%).

4.3.12 Community Participation in Road Projects

In the survey area, 30% of respondents had participated in a road project of one sort or another (this is considered a high percentage). 92.3% of respondents were willing to work on road projects.

Most respondents (86.2%) had no objection to women working on the road. These respondents felt that women could work as labourers (41.2%), or provide food and water to the workforce (38.7%). 10.6% said that women could work as supervisors, while 7.2% said that they could work in the stores.

Of those who said that women should not work on road projects, the main reason given was that road work was not a woman's job; secondly, they said that women had other chores to do at home, and thirdly, women should not work on roads because of traditional reasons.

4.3.13 Gender and Transportation

Mobility, for men, women, children and goods, depends on the availability, affordability and efficiency of such transport systems. Although mobility is not always productive, improved transport systems can increase accessibility, reduce poverty and isolation, and enhance social and economic development.

It is important to capture women's travel activities and the time used directly for them as male household heads often under-estimate the time women spend travelling for domestic purposes. It is also necessary to assess women's accessibility to means of transport and other means, e.g. financial income. From observations in the field, reinforced by the findings of the Household Survey, it is apparent that the means available to women (both in terms of transport and financial resources) are very limited. A significant change in cultural attitudes would be needed so that the benefits of the road will be meaningful to women.

Women have the main transport burden, being responsible for collecting water and firewood (>55% of respondents), although men and children are also involved. The Survey indicated that men make the most trips to the market (53.69%), and to the fields. However, from observations, a substantial number of women also take goods and produce to the market.

In the project area, donkeys are used for carrying goods by men, women and children, but mostly by men only (72.6%). Donkey carts are for the most part used by men for transporting crops (for example to and from markets or from the field). Women almost always walk and head-load. As women have limited access to the household income, their access to transport modes is restricted. Donkeys are generally controlled by men and are not made available for domestic transport unless the trip distances are relatively large.

Other forms of intermediate transport are hardly used in the project area; only 2.6% of the respondents used bicycles and these were all men. Reasons for this are probably cultural and economical, as there is no tradition of using bicycles for loads.

Both men and women, but women in particular, spend several hours a day on travel and transport. The main potential for increased use of pack animals is in domestic transport, water and fuel. Women have the main responsibility for the latter two. As long as women are restricted access to transport modes (in this case donkeys), they will reap little benefit in terms of time and energy savings from the improvement of the road.

4.4 Consistency with Planned Development of the Region

The Abay River Basin was the subject of an intensive master planning exercise undertaken by the Ministry of Water Resources in 1999. The result was the Abay River Basin Master Plan containing detailed recommendations for economic development and physical planning of the basin including the Benishangul-Gumuz Region. The Abay River Basin Master Plan has not been adopted by the government; but it gives a good picture of the future development of the Region based on a systematic consideration of existing data and development trends.

While the proposed Assosa – Guba road is not part of the road infrastructure proposed by the plan; it is possible to place the road in the context of the prevailing development scenario as described by the planning study. The overall conclusion regarding the Benishangul-Gumuz was that while there is an excess of land in the lowland areas for the extension of agriculture, there are not enough people to do the farming needed to achieve the agricultural (=development) potential of the Region. As a result, it is predicted development will occur through large-scale commercial farming and immigration of smallholders from other areas of Ethiopia.

Economic development was viewed by planners primarily in terms of commercial farming and in respect to the proposed project is centred on the Mankush side. Priority was based on both physical potential and need. The high priority development zone for commercial farming is the Pawe Area in the upper Beles Valley, which is not directly served by the proposed road. The next priority is the lower Beles Valley, in closer to the road, but still so uncertain as to magnitude and location that it is not possible to assess potential interaction. A large area served by the road to the south and west of the Abay River is considered to have moderate potential for rainfed cultivation.

Smallholder agricultural development is focused on the Assosa side linked to the development of the town itself and is anticipated to be limited and relatively slow. As stated in the Plan, a principal inhibiting factor in the area is lack of access.

The Master Plan has established development zones for the entire basin (See Annex A: Map 8). A large part of the ZOI of the project road has been designated a conservation area (Annex A: Map 8), however the total picture along the alignment is as follows:

Agricultural Intensification around Assosa to Amba 11 and again near Komosha
Conservation from Komosha up to just north of Sherkole extending eastward to include the left bank of the Dabus River.

Agricultural extension from north of Sherkole to the Abay crossing and across the Abay to Mankush. Roughly more than half of the alignment falls in the Conservation Zone.

Agricultural intensification refers to highland areas with a high potential for smallholder agricultural intensification that are already well populated. *Conservation* zones refer to lowland areas with unfavourable characteristics (i.e., physiographic, control of tse-tse, lack of access) for agriculture during the planning period, and generally uninhabited. Conservation includes developing the area as wildlife reserves or merely conserving for the future. *Agricultural extension* refers to lowland areas with potential for rainfed cultivation under either smallholder or mechanized conditions.

This brief and simplistic diversion into the Abay Master Plan and how the proposed project road fits into the context of the Plan is meant to support the conclusion that the road appears to be basically consistent with planned development.

Chapter 5
Assessment of Impacts

November 2001

5. ASSESSMENT OF IMPACTS

Identification and assessment of impacts include the potential positive and negative direct and indirect effects of the proposed project. For this project, the following environmental issues were found to be of relevance and analysed:

- Impacts to Soils and Soil Erosion
- Impacts to Ground and Surface Water
- Noise and Air Pollution
- Impacts to Fauna and Flora
- Changes in Existing Land Use/ Induced development
- Road Safety
- Visual Impacts
- Impacts to Sites of Cultural or Historical Significance (includes archaeological resources)
- Social Impacts
- Public Health
- Employment and Livelihood
- Poverty Alleviation
- Loss of Property
- Changes in Traditional Culture
- Access
    - -To education
    - -To administrative centers
    - -To markets
    - -To water resources
    - -To firewood
    - -To health services

Impacts were assessed first, with respect to the likelihood of their occurrence; second, with respect to the seriousness or magnitude of the impact; and third, with respect to the possibility of mitigating negative effects. The determination of the possibility of mitigating negative effects was based on specific practical knowledge of the Ethiopian context and was not assessed with respect to whether or not mitigation is possible in absolute or universal terms.

What this means is that for most of the impacts that are anticipated to occur, while mitigation may be possible in a more developed context, it has been assessed as uncertain given the existing situation in Ethiopia. In most instances, the supports, in terms of capacity, budget, and regulations, for example, needed to ensure that mitigation is implemented, are not available. Therefore, it has been concluded that mitigation is uncertain.

If the necessary supports were put into place, even on a modest scale within the framework of this project, uncertainty regarding mitigation would be largely removed. This approach places greater emphasis on the actual mechanics of implementing mitigation, a concern that is reflected in Chapter 6 on Mitigation of Impacts and the Environmental Management and Monitoring Plan and Chapter 7 Cost Estimate for Environmental Management and Monitoring that follow below.

The consideration of impacts has been organized into two categories, those associated with construction and those with operation. This assessment is being made very early in the project cycle. It is important to stress that all the assumptions on

which this assessment is based should be verified as the project progresses - first during the detailed design phase, when the scope of works will be detailed, and later when a Contractor has been appointed through the tender process. Discussion of the main issues as these are currently understood follows.

5.1 Environmental Impacts During Construction

5.1.1 Impacts to Soil and Soil Erosion

Soils in the area are susceptible to erosion and several locations along the road corridor have been severely degraded by sheet, rill and gully erosion, which is primarily caused by a lack of proper road maintenance on the existing road. Clearing of the ROW for the ongoing road upgrading project from Komosha Junction to Gizen (part of which coincides with the proposed road project corridor) has created optimum conditions for massive soil loss and erosion given the large width of unprotected soil that has been exposed to the erosive action of rain and animal hooves, and the simple side-casting of all spoil. Factors contributing to unstable soil conditions in the area include:

- clearing of vegetation
- intense rainfalls
- steep and often unstable slopes
- inappropriate agricultural practices

This situation will be further exacerbated by road construction activities of the proposed project unless specific and aggressive measures are taken to prevent further loss of soil resources. There are three principal potential impacts to soil that can occur during project construction: (1) compaction of the soil, which will affect potential for future agricultural use; (2) erosion, which causes soil loss, property damage and negative health effects on biological systems; and (3) contamination / pollution. Other potential impacts associated with the project include:

- loss of fertile top soil
- degradation of agricultural land
- siltation of water courses which are sources for drinking water and/or washing places

During construction, compaction of soil to some degree will occur at the workers camps and all staging areas; in all areas in which heavy equipment is moved and used; and at traffic deviation sites and haul roads. Erosion will be a problem associated with any place where vegetation is removed, and cuts and spoil piles are left exposed to rain, wind, and traffic, such as along temporary access or traffic deviation roads, borrow pits and quarrying sites, as well as during right of way clearing. The construction of bridge footings and stream crossings will require particular attention.

Contamination of soil resources can occur through spillage of hazardous substances both intentional and accidental, as well as the uncontrolled disposal of construction waste such as excess concrete, bitumen, paint or solvents (potentially used on bridges), and some types of domestic waste at the camp-sites. Solid waste also poses an important soil pollution problem, but depending upon its nature, is more easily corrected. The most serious impacts are primarily likely to occur at fuel

handling and storage facilities, and at vehicle storage and maintenance yards. However, accidental spills from tankers servicing the project are also possible.

Based on direct observation in the field, if unmitigated, the impact to soils is predicted to be high and irreversible.

5.1.2 Impacts to Ground and Surface Water

Water is the key limiting natural resource in the zone of influence, and is, as such, environmentally sensitive. The protection and management of ground and surface water resources during construction will be very important.

Sources of impacts during construction include high levels of water usage for project activities, sedimentation from erosion and activities conducted near streams, and contamination from pollution, especially fuel or the indiscriminate disposal of construction waste. The most critical impacts in terms of water is possible reduction in availability, conflicts with local users, and reduction of water quality, especially drinking water, which is often drawn from surface sources.

Water will be used for watering the gravel materials during placement to secure good compaction. Water will furthermore be used for concrete works, dust control, and equipment maintenance. Workers camps will also place demands on the existing water supply. As the sources anticipated to be used for road construction are the same as those used for domestic purposes, high levels of water extraction are likely to lead to conflict with local users.

Impacts to water resources are also likely during the construction of proposed bridges and stream crossings. A specific concern is the extraction of sand from riverbeds. Most of this activity takes place close to or in the rivers, and there is thus a potential risk of sediment pollution of the river. Another potential problem is damming or diversion of the rivers to allow the construction inside the riverbed. The contractor will need to draw up a plan regarding river diversion and the activity should be monitored and corrective action taken as required. In addition, there is the possible modification of surface water flow in borrow pits and through stream diversion, during cut and fill operations.

Traffic deviations, required on sections during earthworks, culvert works, construction of culverts, realignment, improvement of sub-grade etc., are another potential source of impacts to water resources by causing increased turbidity and sedimentation with possible downstream effects. This can also occur if the surface of the new detour or spoil piles are not stabilized and erosion from these sends sediment into adjacent streams. Another area of potential impact is at stream crossings.

Given the number of river crossings along the road and the fact that all these rivers contained water in April (end of dry season), the displacement of sediment into surface water from temporary deviations adjacent to and crossing the streambed is likely. However, given the low levels of traffic on the existing alignment, the release of sediment form this particular source is expected to be localized and of short duration. Repeated crossings at riverbeds by construction equipment may exacerbate this potential problem and increase the significance of its effects.

Pollution of ground water may result from waste-waters, equipment cleaning, materials storage and handling of harmful substances like oil, petroleum, and lubricants. Therefore, construction campsites and equipment fuelling and maintenance areas pose a significant source of water contamination. Waste generated in the 4 campsites is also a potential problem, although it is relatively easily monitored and corrected. The availability of waste disposal and waste-water treatment facilities and alternative options will need to be explored further.

In addition, the indiscriminate disposal or storage of spoil from ROW clearing poses a significant threat to existing patterns of drainage. Drainage that is diverted or blocked can aggravate erosion, lead to flooding and property damage. This was observed to be the case of the current clearing for the ROW for the road from Komosha to Gizen. Unless contractor awareness, habits, and skills are upgraded, this is likely to be the case on the proposed road.

Finally, modification of groundwater recharge has been known to occur from cut and fill operations during both construction and operation. However, as it is too early in project design to know the extent and character of cut and fill and precise locations vis a vis groundwater resources, effects are not possible to predict.

Unmitigated, the impact to local water resources resulting from the proposed project is assessed as significant.

5.1.3 Noise and Air Pollution

Given currently low traffic and development levels, the project area is relatively free of noise and air pollution. Sources of air and noise pollution during construction are primarily limited to vehicles and equipment. Given the existing condition of construction vehicles and equipment, pollution from exhaust in a local context is significant. This is equally true of trucks currently operating on the route. The possibility of significant standing traffic is extremely low, however. Air pollution from exhaust emissions, therefore, is expected to be highly localized and of short duration.

Noise could pose a nuisance at sensitive receptors, such as homes, schools, and clinics adjacent to the roadside and should be monitored. Special attention should be paid to noise problems at schools and clinics / hospitals, and they should have some access to mechanisms to correct the problem. However, the number of sensitive receptors that will be directly affected by noise is not currently known and should be assessed during detailed design in order to anticipate problem spots.

The principal air pollutant is dust, which is expected to be generated from a variety of construction activities including materials extraction and haulage, the operation of equipment and vehicles and earthmoving. Dust is a critical problem along the road, and construction during the dry season in particular will have additive effects.

Currently, a negative impact from noise is expected to be isolated and, therefore, low, and air pollution from exhaust during construction is expected to be minimal and localized. The potential negative effects of both noise and exhaust emissions can be mitigated. The negative effects of dust, however, can be quite high and are considered very significant if left uncorrected.

5.1.4 Impacts on Fauna and Flora

The critical impact to flora and fauna resulting from construction of the road is the destruction of habitat from right of way clearing, widening, and off-road activities such as traffic deviation, opening of borrow pits, camp site and haul road establishment that require vegetation clearing or changes in the configuration of river banks and stream beds. Increased exploitation of the woodland areas for firewood is anticipated from the increased demand placed on resources from the campsites, and the use of firewood by crews along the road.

It is difficult at this stage to estimate the amount of vegetation loss to corridor clearing since much of the alignment is existing and the method to be used by the contractor is not currently known. According to Ethiopian standards, the minimum Right of Way (ROW) for this type of road is 30 m. On the section from Sherkole to the Blue Nile, the expected corridor width is 40m. As most of the existing alignment does not obtain standard ROW width and as there is approximately 80 km of new construction, vegetation loss is expected to be significant when taking into account possible induced development and subsequent land use conversion during the operation phase.

There is the additional likelihood of destruction of plantings during ROW clearance and reduction of riverine woodlands to accommodate bridge footings. Vegetation can also be lost by indirect means including the indiscriminate disposal of spoil waste and a related reduction in slope stability as well as alterations in the availability of water.

The road alignment on both sides of the Abay River, between Sherkole and Abay, and between the existing gravel road Guba - Bambudi and Abay follow already existing routes. The route between Sherkole and Abay is only rudimentary and has been used in the past, while the road between the existing gravel road Guba - Bambudi and Abay has been partially constructed by UNHCR in order to settle refugees at Yarenji Camp near the Abay River. Thus the impact of the road construction will be low if the existing alignment is used.

However, it should be pointed out that there are sensitive sites in the wetlands, woodlands and the riverine vegetation in the vicinity of the road, which are home to unique species of plants and birds. While these are outside the immediate road alignment, adequate care should be taken to protect them.

These wetland areas contain unique and rare plants, turtle, butterflies and birds. They also serve as the sources of water for wild animals, rural people and their domestic animals. They are also the best habitats for turtles and birds. If the wetlands are destroyed, birds might have a chance to fly to neighbouring wetlands, but turtles and plants will perish unless due consideration is given not to trample and destroy the site during road construction.

While observing some localities, near Assosa some of these wetlands have been drained for vegetable cultivation and the orchid diversity had dwindled. Thus due consideration should be given to avoid settlement in such spots even after the road construction. Future settlement should also be controlled if the unique biodiversity of Benishangul, which includes over 60% of the total bird life of Ethiopia and 30% of the total 150 species of orchids known in Ethiopia, is to survive.

Fauna are directly threatened by a loss of vegetative cover and water availability. Some species are sensitive to noise and dust and will migrate out of the area.

Poaching by the workforce also poses a special problem, but is possible to limit through awareness and the establishment of appropriate controls on the part of the contractor.

The direct impacts to fauna resulting from construction are anticipated to be relatively low, in large part because there are no indications of major populations of wildlife inhabiting or migrating through the area. The land immediately adjacent to the road is for the most part under cultivation or has long since been subjected to slash and burn activities and pastoral practices that have resulted in original habitat destruction. Existing wildlife are, therefore, adapted.

5.1.5 Changes in Land Use (Direct / Induced)

Construction material pits might ideally be located at least every 20 km as close to the project road as possible to minimize haulage. However, the area closest to the road is often the most well developed in terms of land use and therefore, some land use conversion is expected from this construction activity, in particular conversion from agricultural / harvest uses to quarry / borrow-pit. It is at present impossible to estimate the quantities or number of sites, so the magnitude of effects from material extraction cannot be fully assessed. As work proceeds, the following issues should be addressed: location, ownership/royalty of borrow pits, conditions during exploitation and reestablishment / rehabilitation after use.

The need to acquire land to accommodate obtaining the standard ROW width is not known and, if necessary, will induce the conversion of land use. Given the sparsely populated area through which most of the alignment is passing and the fact that much of the alignment is existing, the effects of land acquisition and concomitant land use conversion is not expected to be extensive.

It is concluded, therefore, that changes in land use and the negative effects that this can induce will not be significant in regard to strictly construction phase activities. Borrow pits need either to be restored or put to productive use, for example and very little land taking is anticipated a this point. However, improvement o f the road is very likely to result in intense strip-development, which usually results in dramatic changes in existing land use patterns as has been the case elsewhere in Ethiopia, during operation. More is said on this effect below.

5.1.6 Road Safety

Possible problems in terms of road safety come primarily from possible conflict between existing road users and construction traffic. Most of the existing traffic on the road is pedestrians, pack animals and animal herds. Deviations for traffic, both motorized and non-motorized, will be required on sections during earthworks, culvert works, construction of culverts, realignment, improvement of sub-grade etc. This is not considered to be a major problem given the relatively flat and sparsely areas which the road trespasses, but should be done with prudent consideration to proximity to settlements, campsites or villages, and driving safety, and most importantly to reducing any conflict between non-motorized and motorized traffic. Pedestrian access (protected where needed, especially near schools) should be maintained at all times.

In sum, conflicts with local traffic, especially non-motorized traffic, is expected to be the greatest concern with respect to road safety during construction. Given the predominantly flat to rolling terrain, the currently low levels of traffic on the road, and the adaptability of the local people, the magnitude of the impact is expected to be low if simple precautions are taken. This assumes that non-motorized and pedestrian traffic will be accommodated at all times.

5.1.7 Visual Impacts

Potentially negative impacts during the construction phase will come from the establishment and operation of material extraction sites, borrow pits, temporary access roads (which are not maintained and tend to stay in place after construction) and construction camp sites and staging areas. Visual blight tends to be generated by poorly operated and managed sites and can be avoided through good engineering housekeeping.

Borrow pits can have very serious negative visual effects and as they are ideally located as close to the project road as possible to minimize haulage, they are likely to be very visible. Given the poor state of the existing road, especially from Komosha junction to the turnoff to Gizen and elsewhere where erosion is high, visual impacts during construction from extraction activities are expected to be minimal.

Right of Way or corridor clearing, however, is of greater concern given the width to be cleared, especially in regard to haphazard spoil disposal. This is especially true in areas such as those from Sherkole to the Blue Nile that are sparsely populated and currently support important stands of woodland and other vegetative biomes including vestiges of bamboo forest. Some of the vistas in this area are long and potentially will be in the estimated view-shed of construction activities.

Another important source of visual impacts are the construction camps and staging areas that are not following good housekeeping practices and that are not organized and operated in an orderly manner. Proper collection and disposal of waste is critical.

Overall, visual impacts are assessed to be significant given current contractor habits with respect to spoil storage and disposal, borrow site restoration, and camp-site sitting, preparation, organization and operation.

5.1.8 Sites of Cultural or Historical Importance

Land taking, ROW clearing, the establishment of borrow pits and haul roads are the principal sources of conflict with sites of cultural / historical and archaeological importance. So far, no such conflicts are anticipated, as based on consultations with residents. However, as detailed road survey has not been conducted yet, and the location of material resource areas are not known, the assessment of the magnitude of impacts to cultural resources will need to be revisited as work proceeds.

Local residents have expressed concern for the destruction of big trees, mosques, churches and graveyards; but have indicated that if the road follows the current proposed alignment, this would not occur. The participation of communities in assessing and protecting these resources is extremely important.

5.1.9 Social Impacts

Most of the critical social impacts during construction come from the presence of the workforce and their interaction with the local community. The following excerpt from the recent analysis of the road sector illustrates this point.

Labour Camps

Construction camps are one of the characteristic features of any road construction project. Once established, the camps will have several impacts on the surrounding environment. Most impacts are temporary but some are long lasting. ERA camps are built for temporary use, but turn out quite often to be permanently settled, and many 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 is mainly done by private contractors and is open also to foreign tenders. However, no big changes are to be 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 (decrease) number of workers residing in the camps.

There can be 150-250 people residing in the main camp. Many 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 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 are discussed and agreed together with the local administration.

For the contractor is more economical to lodge all the workers in one place than have dispersed lodging in the surrounding area. The fact that workers live in the camp make 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.

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. Many temporary daily labour workers, which consist of 300-400 persons, whatever is wanted by the construction workers.

Most food such as meat, grain, vegetables, etc. is bought from local markets to the camp kitchen. Sometimes bigger quantities of items either not locally available or due to the increased local prices, are bought and transported with trucks from the nearby bigger towns. Fire wood is sometimes bought from the construction site if the site is situated in bushy land or it is bought from local markets.

The 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.

Impacts

Temporary inflation of prices benefit business people while those local people, and especially poorer section of the community, who are dependant on the same purchases will suffer from 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. Some employment possibilities opens to the local people. Also women re hired to the construction work. The Ministry of Labour and Social Affairs is empowered to ensure that local labour is hired in accordance with the law.

The camps have also impacts on the physical environment. The increased need for the fire wood and charcoal means that more trees are cut down to be sold and even more wood is wasted to produce charcoal with inefficient local methods. The supply areas might be considerable because of the absence of near forest/tree resources.

The people who settle down are also put some pressure on local public services. The drinking water situation might be difficult in some places, and boreholes are often needed at 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 clinics for, the workers and migrants, put also pressure to the local health services.

These impacts are directly felt only so long as the camp exists.

Occasional and personal conflicts happen, especially during shopping-week-ends, often due to heavy drinking. More cash available among the migrant workers can cause personal conflicts over available resources between locals and migrants.

Families are not allowed to stay in 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 disease increases, also among the local population. Many temporary relations result in pregnancies and 'milk payment' court cases increase.

Source: ERA, Environmental Impact Analysis of the Road Sector, Final Report, October 1997.

Public Health

Impacts to public health during construction are likely to come from the following sources:

- dust emissions
- noise emissions
- spread of HIV/AIDS, from road construction and migrant labour force
- conflict between non-motorized traffic and animals and construction equipment
- hazardous, poorly secured construction sites and stockyards
- contaminated water and soil from petroleum products and water borne sediments
- improper solid waste and sewage disposal from camp-sites

All of these potential impacts are considered to be very likely and significant if specific steps are not taken to protect the public by enforcing contractors to comply with basic contract specifications, and to provide HIV awareness training (and condoms) to the work force.

Employment

The local population will most likely occupy the unskilled positions such as casual labourers, watchmen, etc, and some positions such as masonry and truck drivers, at least at the beginning of the project. There might however be a very strong economic incentive for the Contractor to train local people to take over certain skilled positions, since the expected duration of the project is three years. The unskilled workforce could amount to 700 – 1000 labourers, these being recruited locally; but this number depends very much on the approach adopted by the Contractor.

The skilled workforce could amount to 100-200 (machine operators, truck drivers, foremen, masons, carpenters, etc). At the start of the project the major part of the skilled workforce will be non-locals, but this would most likely change during the course of the project, simply because the cost of employing locals is lower. The professional and administrative staff will number between 10-20 people, and will most probably comprise non-local people.

Construction phase impacts with respect to employment are anticipated to be:

- Increased employment opportunities during construction (temporary)
- Influx of migrant labour (size not estimated)

In public consultations, women have expressed the desire to be included in the project workforce. Opportunities expressed by women in the community consultations included providing labour, supplies such as wood and water), bringing materials closer to the construction site, and preparing food. One positive benefit expected to be achieved during the construction phase is an increase in employment opportunities for local people in general and women in particular. Positive benefits are, however, recognized to be limited to those who manage to gain a foothold in the construction induced economy and market and it will be of short duration.

Poverty Alleviation

No significantly positive benefit is expected during construction with respect to poverty alleviation. Employment may be provided for some, but the number of jobs available (700 – 1000) is not significant and is temporary (at best three years). The opportunities for increased income through sales or services provided to the migrant workforce is also expected to be small and isolated, but nonetheless important for local beneficiaries who have very low levels of income.

For people outside the construction economy and its market, conditions can actually become worse as local prices often have a tendency to rise in the face of increased temporary demand. Therefore, any incremental positive benefits for some local people are expected to be balanced against the negative effects of rising prices for the majority, and in the absence of additional data and testing, are therefore assessed as qualitatively neutral.

Land Acquisition / Loss of Property

Land acquisition is not expected to be a problem on the sections Assosa-Komosha and Blue Nile-Guba, where the required ROW is in place. On the sections from Komosha to Sherkole additional ROW will have to be obtained to comply with the required width of 30 m. SATCON is currently engaged in heavy maintenance on the road from Komosha to Sherkole, which includes provision of required ROW.

Provision of ROW will be an issue between Sherkole and the Blue Nile, since this section of the road will be entirely new. The area that the new road trespasses is relatively flat and apparently sparsely populated, thus no major constraints on the alignment are anticipated. Therefore, the intent is to take proper care during the detailed definition of the alignment to avoid all villages, settlements, campsites, and culturally significant areas.

For non-government land affected by the road, land acquisition plans will be elaborated and compensation will be paid according to normal Ethiopian procedures.

5.2 Environmental Impacts during Operation

The development objectives of this road are to access agricultural potential in the area, to provide important Regional administrative links, and to open the area to mineral exploration and subsequent resource extraction. Operational phase impact assessment, therefore, is based on the assessment of the impact of implementing these types of development goals in the context of the current road project.

5.2.1 Impacts on Soils and Soil Erosion

Road operation is expected to bring higher levels of traffic (not a significant or rapid increase, however), the possible development of mining and agricultural activities, and the in-migration of people to the area, most of who will settle in close proximity to the road. The two most significant effects will be intensified pressure on exploitation areas from new settlers, and the destructive affects induced by the uncontrolled construction of access roads to agricultural and mining activities. This will result in the following potential impacts to soils and increased risk of soil erosion:

- the erosion of access roads to newly developed agricultural or mining sites
- loss of soil through poor agricultural practices of increased in-migrant population
- loss of vegetative cover and top soil through erosion induced by changes in hydrology and slope instability
- possible soil contamination by mine tailings
- pollution risk to soil from transport of hazardous substances

In addition, erosion from blocked ditches and damaged water control structures will occur if the road is not properly maintained.

Effects from proposed mining activities are not likely in large measure because current analysis of the mineral resource base does not support the large scale development of these activities as is currently anticipated by economic planners. To eliminate this as a possibility would require additional study beyond the scope of the project EIA. Therefore, while the effects of mining have been considered, it has been determined that the possibility remains remote based on current information.

Pollution from the transport and spill of hazardous substances is also rather remote given improvements in road safety that will result from the project. Traffic levels on the new road are predicted to remain low and grow slowly. As road accidents are high in

Ethiopia not only because of poor road conditions, but also as a result of poor vehicle conditions and driving habits, this potential impact is assessed to be a decidedly negative one with a low level of probability for this particular road.

The loss of soil through poor agricultural practices of increased in-migrant population, however, is highly likely and considered to be one of the significant negative impacts of road-induced development. The magnitude and character of the increase in population has not been modelled and given the existing sparse settlement pattern, the problem may not emerge until quite some time after road operation, at which point a new set of conditions will prevail governing the nature of this impact.

The greatest impact to soils and erosion, however, are the effects from the development of secondary roads that will provide access to agriculture or mining activities. Planners in the Region and at central level are relying on private concerns to build their own roads into development sites. This is especially true for mining exploration that is needed to accurately assess the potential of gold resources. These roads will fall outside the national and rural road programs and will be entirely uncontrolled.

The impact of the earthworks for secondary access roads and the indirect effects of opening previously inaccessible areas to exploitation, are the most serious impacts of the proposed project. These negative impacts are currently assessed as quite likely, extremely serious, and given current capabilities, are not likely to be mitigated.

5.2.2 Impacts to Ground and Surface Water

Direct impacts resulting from the operation of the road on water resources is expected to be positive, at least at first, and for the long term, if the road is properly maintained. This is primarily because proposed improvements are expected to significantly reduce current erosion from the road, and to increase road safety, thereby reducing the probability of road accidents and the release of petroleum or other hazardous substances into surface or ground waters.

It is possible that surface water flows will be modified through road alteration of local hydrology at drainage basin crossings and this can lead to erosion problems in the off-road environment. Engineering design, however, will attempt to anticipate and avoid this situation, and if it occurs, it should be corrected during road maintenance activities. The problems of modified surface flows may also be a residual effect of borrow site restoration (or even lack of) and will need to be monitored.

It should be noted that maintenance will be critical to achieving the environmental benefits of the project. If not properly maintained, degradation of the road and drainage structures overtime will result in increased sedimentation load of surface water sources.

The principal indirect impacts are long term negative effects to ground and surface water that could be induced by the development of agriculture and mining activities. These include:

- downstream effects such as eutrophication from irrigation based, large scale agricultural inputs (this includes effects reaching the Rosieres Reservoir across the border in Sudan

- also increase sedimentation load of surface water sources
- increased use of agro-chemicals by small landholders, because easier to obtain them, leading to downstream pollution of local water resources
- contamination from mine tailings or spills of hazardous substances from mining activities especially along uncontrolled access roads

While these types of effects are often slow to develop, they are considered to be very serious. It is for this reason that they are raised. However, the probability of the pollution of water resources from intensified commercial (or even local) agricultural activity in the Region is difficult to assess since the capital inputs to achieve high levels of activity are not easily available in the current economy. It is possible, given the development objective and agricultural potential of the Darbus River Valley, however, but this is probably a rather long way off in the future.

More likely impacts of immediate concern are the pressures that will be put on water resources by incoming settlers who will locate in the communities and conduct economic activities in the immediate zone of influence. As existing settlements and economic activities grow, there is greater demand for water and increased probability of pollution from increased production of waste-water.

5.2.3 Noise and Air Pollution

During operation, there will continue to be impacts from dust emissions, noise emissions, and exhaust emissions. Since the future levels of traffic on the road are not expected to grow considerably over the short term, no real change in the impacts of these emissions from current levels is anticipated. The road is not expected to be sealed so dust in the dry season will continue to be a problem; but improvements in road roughness and efficiency, may result in some small improvement in exhaust emissions.

Induced development and planned expansion of services by the government, particularly schools and clinics, will create more sensitive receptors in the area. Zoned planning will needed to avoid conflicts between the road and these activities with respect to noise, dust and exhaust.

A negative impact from noise is expected to be low, and air pollution is expected to be minimal and localized. The potential negative effects of both noise and exhaust emissions can be mitigated most likely through advanced land use planning as the potential for the enforcement of improved vehicle performance (to reduce exhaust emissions) and slower speeds or the sealing of the road surface through key settlement areas (to reduce dust) is extremely unlikely. Reduction of vehicular emissions and dust along rural roads are seen as incremental and a consequence of economic development of Ethiopia as a whole.

5.2.4 Impacts on Fauna and Flora

The development of agriculture, the influx of new settlers, and the development of mining activities will all lead to a loss of habitat and increased pressure on fauna and flora in the area. Loss of wetlands and very special species of large trees, such as baobab found in the Region north of Sherkole, will be an extremely serious negative impact against which aggressive steps should be taken. However, given low levels of

capability in regard to land use planning and monitoring, these resources are at serious risk.

Clearly, increased cooperation both within the government between Regional and central level administration, and most importantly increased cooperation with the local community is badly needed to protect these important natural resources. Research institutions can play a very important role in supporting these efforts, as can donor agencies in terms of supporting basic research in the area.

Impacts to the remaining flora and fauna in the area, hence the productive resource base, are assessed to be the most serious environmental problems in creating improved access in Benshangul – Gumuz and opening the Region to further development. The loss of these resources is assessed as very likely and mitigation uncertain.

5.2.5 Changes in Land Use and Induced Development

Currently there is a notable amount of migration into the Region - about 5% of the Region is comprised of inter-Regional "recent" migrants (moving to the Region between 1994 and 1999). The growth rate of migrants within the total population is estimated at 5.4%. It would be expected that if commercial agriculture and mining were to be developed within the project area in the near future, this would encourage further migration.

With respect to resource extraction, there is a significant amount of marble mining, but it is unclear whether the project area would attract any expansion of this activity, even if the project road is constructed.

Gold has always been mined in the area on a small scale, and might be increased to commercial levels if exploration yields positive results. Government sources have no estimates of reserves or their economic viability. There is some possibility that gold mining on the artisanal level may intensify if the border with Sudan is opened, as is planned. This would simply reinforce an old trading link that seems to be operative even now.

In light of this, we can expect to see the following changes of land use in the road's ZOI:

- change from forest land to large scale cultivation or mining, consequently local people will not be able to sustainably exploit forest reserves
- traditional grazing areas lost to agriculture or mining
- access to traditional water resources may be restricted or denied
- change from traditional slash and burn to large scale (mechanized) cultivation

The effects are assessed as serious and have the highest probability, if examples from elsewhere in Ethiopia are applicable models in this case, and it is felt that they are. There is no mitigation possible for land use conversion of this scale or magnitude short of limiting development in the Region. The road, of course, is obviously intended to stimulate development. However, even if increased access is provided, some limits could be placed on the scale and location of land use conversion and related negative consequences by limiting or prohibiting the development of local water resources.

This would require high levels of cooperation between a number of agencies and the present level of institutional capability limits the effectiveness of these linkages.

5.2.6 Road Safety

Improvements in road condition and alignment are expected to increase road safety. This is a clear benefit of the proposed road project.

5.2.7 Visual Impacts

Positive visual impacts will come from improvements in road environment, a reduction in roadside erosion and the refurbishment of the drainage system and shoulders. If plantings are used to stabilize cut slopes, more will be done to improve the aesthetic qualities of the road.

The road will also provide increased access to scenic vistas in the area and perhaps even domestic tourist sites. By reducing erosion, road improvements in and of themselves will contribute to the preservation of vegetation, which is aesthetically appealing along the roadside, especially in the hot dry season.

Negative impacts are possible from poor / insensitive selection of materials and colours for bridges or other visually prominent components of the road. In addition, poor or improper maintenance can create negative visual impacts by contributing to poor roadside conditions.

Indiscriminate solid waste disposal is expected to be an increasing problem as more people move into the area and as traffic increases. This is especially true near settlements and markets where it is customary to dispose of waste to the ground. Left uncorrected, roadside trash is decidedly ugly.

Finally, the restoration of borrow pits are an opportunity to enhance the visual qualities of the landscape and if left in an un-restored state, are usually assessed as visually negative to most road users.

5.2.8 Sites of Cultural or Historical Importance

A recent study has indicated that Ethiopians appreciate and visit their cultural heritage sites, way outnumbering foreign tourists. While the reasons for this are multiple, there is a propensity to preserve sites if increased access leads to increased appreciation and visitation. The possibility for this is a positive benefit of the road.

5.2.9 Social Impacts

Public Health
No reduction in exposure to dust emissions is anticipated during operation of the road. If traffic levels increase there will be increased exposure to dust, noise and exhaust. As the environment is relatively free from noise and air pollution, the increase in exposure is not expected to reach health-threatening levels. Health problems related to dust, however, are likely to increase with increased exposure.

The spread of HIV/AIDS is a pandemic problem along roads and increased access will very likely exacerbate existing mechanisms, which spread the disease. On the other hand, increased access to the Region is intended to enable an increase in access to health services, which presumably might include programs to control the AIDS epidemic.

The health status of the Berta and Gumuz are expected to improve slightly. At present, the average life expectancy in the Region is 48 years, and over 10% of infants born die, and nearly one in five children under the age of five years dies. These health indicators are some of the worst in Ethiopia, which itself is regarded as having one of the lowest health standards in the world. An increase in provision to health services intended by the road is likely to reach the more traditional groups little by little as a result of the construction of the road. The improvement will however not be dramatic, and therefore the impacts of the road on their health are indirect at best.

Employment

Employment is expected to be created because of the development of agricultural or mining activities. This is predicted to attract migrant labour. Data is insufficient to assess the labour requirements of commercial scale agriculture or mining at this point. By and large access of local people to jobs in these sectors is likely to be limited to low-skill positions since most of them are not yet experienced in these types of operations.

In addition, there may some opportunity to perform road maintenance if a labour-based approach is taken.

This impact of the road is assessed as positive, but not significant.

Poverty Alleviation

Traditional peoples living in the Benshangul – Gumuz are described as the poorest in the Region as based on classic socio-economic indicators. The alleviation of the poverty of these peoples as a consequence of development induced by the road is only likely to the degree that they become part of the wage economy. Local income levels may be raised through:

- income from labour-based road maintenance
- employment on agricultural farms and mines, but benefits may be limited to migrant workers
- local sale of more produce to other wage earners who no longer grow food
- improved level of nutrition because of improved food supply
- improved health, thus increased productivity
- improved education levels

Improved access to markets is a purported benefit, but this is likely to be confined to commercial growers since local poor people rarely use motorized transport to sell their produce. Their access to market is not likely to be significantly increased, therefore, improvements to income from sales on more easily accessed distant markets should not be a contributing factor to alleviating their poverty.

Although the rehabilitation / construction of the road is not likely to displace any people, the resultant agricultural activities would do so. In general, displacement leads to a loss of traditional lifestyle and further impoverishment.

Indigenous people are likely to be slower to respond than migrant communities, to the opportunities offered by improved access, lower transport costs and better transport services that are likely to result from the project area. Nevertheless, they are likely to benefit to some extent, both directly and indirectly, to improved access to markets, health centres and administrative centres.

Changes in Cultural Tradition

Interaction with migrant population and pressures from new intensified land uses is expected to induce changes in Berta / Gumuz traditional lifestyles. The conversion of forest land to large scale cultivation or mining will result in the loss of forest reserves and a depletion of the natural resource base. Consequently local people will not be able to sustainably exploit forest reserves that remain. Traditional grazing areas are likely to be lost to agriculture or mining activities, and access to traditional water resources may be restricted or denied.

A full understanding of the mechanisms of culture change in the Region would require much additional study. However, applicable experience from elsewhere in which traditional ways of life were lost under quite similar circumstances, indicates that this is a very real concern in this context, and the negative impacts, either leading to or resulting from the loss of traditional ways of life are, in general, difficult to impossible to mitigate.

Access

To education facilities:

By opening up the area, the road will enable BOE to construct schools and expand their activities within Sherkole Woreda (currently virtually devoid of such services). This will improve services provided by BOE with respect to provision of teachers, teaching material, monitoring of teaching standards. However, the road is not expected to have any effect on school enrolment because children do not travel by public motorized means.

Improved income levels may result in increased enrolment numbers and increased enrolment implies higher literacy rates. School attendance amongst Berta / Gumuz children means they cannot participate in household chores expected of them and this may inhibit increased enrolment among this group.

To administrative centers:

The road is expected to facilitate (local administration) especially if the institutional capacities of responsible agencies are increased. In addition, the road will cut down on the cost of the journey to Guba from Assosa in terms of time and travelling costs (including Regional staff time and allowances, vehicle breakdowns). People will save time and money to get to Regional or zonal or woreda centers.

To markets:

Improved access may stimulate crop production at household level, resulting in surpluses that can be sold for income. Easier access to agro-chemicals, resulting in

higher yields, is also a possible positive consequence, but may also have negative impacts such as stripping the soil and pollution.

To water resources:
Increased access to water resources is largely negative in that it might allow higher population densities, stimulating a worsening of environmental problems. In addition, on a more local scale, it may allow people (women) to travel further to get water, resulting in over-exploitation of resource.

To health services:
By opening up the area, the road will enable BOH to construct health stations/ posts and to expand their activities within Sherkole Woreda (currently virtually devoid of health services).

Access to areas hitherto not serviced will allow posting of health personnel, delivery of drugs, etc. Local people will be able to access health centres more easily and possibly cheaply (eg pregnant women will not have to be admitted a month before delivery as happens now). Ultimately, the health of the population with access to improved services should improve (decreased infant mortality, morbidity rates decreased, etc), implying increased productivity. Finally, family planning programs will be able to target more women, which may stabilize the population growth rate.

The area between Sherkole and the Abay River is virtually inaccessible. Thus it is unlikely that the services mentioned above would be extended to cover that area, without the road project.

5.3 Environmental Impacts of the "No Improvement" Scenario

With no road, intra-Regional migration by people looking for virgin land to clear for cultivation into the inaccessible land north of Sherkole and south of the Abay River will be less likely to occur.

As access to markets is difficult, it would appear that without the project road, there would be little incentive to improve crop yields. The people in the ZOI would continue to grow food mainly for subsistence, and surpluses would be sold in nearby markets or exchanged for other necessities.

Chapter 6
Mitigation of Impacts

November 2001

6. MITIGATION OF IMPACTS

The most important mitigating action to be taken is to raise the awareness of all stakeholders in the road project regarding the rich and unique biodiversity of the Region and the means that can be used to protect it. It is, therefore, proposed that a series of presentations be conducted describing the findings of the EIA and bringing the results of the biological survey to all parties involved including ERA, central and local authorities, local villages and settlements, the contractor and staff and the engineering team. Specific mitigation for each type of impact assessed is presented in detail in the sections that follow below.

6.1 Impacts on Soils

All negative impacts to soil associated with the project can be avoided first through careful planning and, second, through the diligent application of proposed mitigation. Mitigation measures focus on the following issues:

- Installation and operation of contractor's site facilities
- Preservation of topsoil and re-use
- Reinstating of borrow areas and quarries
- Reinstating of detours, temporary access roads, abandoned road sections
- Landscaping, grassing, preparation, fertilization, seeds, establishment, maintenance
- Tree planting (seedlings)
- Erosion protection, (construction of retaining walls, cascades, relief culverts)

Each of these are discussed below.

6.1.1 Installation and operation of contractor's site facilities

Compacted soils due to the site installation should be reinstated by:

- loosening of compacted soils
- spreading of top soil (0.20m)
- application of appropriate grass seedings and/or replanting of trees
- watering and maintenance

This mitigation measure assumes that campsite does not become a permanent village, as is often the case here in Ethiopia. More is said on this problem in the section below on land use change.

6.1.2 Preservation of topsoil and re-use

During road construction, topsoil should be preserved for re-use:

- topsoil stripping shall be carried out with due care to limit contamination by mixing with other soils or overburden
- topsoil shall be stored/stockpiled close to the road works with a maximum height of 2 m and shall be protected against erosion by means of appropriate seeding
- topsoil stockpiles should be watered and maintained

6.1.3 Reinstating of borrow areas and quarries

Extraction of materials should be done in a planned manner to minimize erosion and maintain topsoil. In addition, borrow sites should be refilled, preferably by using excess cut material and restored to natural contour (not original).

There has been the suggestion that borrow pits can be subsequently used for storing rain water for livestock watering. However, studies have shown that at elevations of less than 2000m, standing water creates problems with insect disease vectors. This would require strict controls on breeding sites and is therefore not advisable in the area for this road alignment, all of which is below 2000m in elevation.

6.1.4 Reinstating of traffic deviations (detours), temporary access roads, and abandoned road sections

The contractor should be required to reinstate temporary access roads, detours as well as abandoned sections of the existing road. This may be done by:

- removing gravel (reusing for new construction)
- loosening of compacted soils
- spreading of top soil (0.20m)
- application of appropriate grass seedings
- watering and maintenance of restoration area

6.1.5 Landscaping, grassing, preparation, fertilization, seeds, establishment, maintenance

As described above the reestablishment of exposed soils or use areas such as borrow pits, campsites and haul roads will require a systematic program of landscaping, grassing, preparation, fertilization, seeds, establishment, and maintenance. At a minimum, all open soils should be covered by topsoil and grass seeds should be applied, watered and maintained immediately after the completion of short sections of the works.

Tree planting (seedlings)
Tree planting should be used as much as is possible and appropriate along the alignment.

6.1.6 Erosion protection

One of the most critical issues concerning soil erosion is the drainage system. The existing drainage system has been severely deteriorated due to lack of sufficient maintenance and, perhaps, due to the very large quantity of water for which the systems were originally not designed. The extreme increase of the run-off is caused by the deforestation, overgrazing etc., general problems found in many parts of Ethiopia, the solution for which would be beyond the scope of the present project.

Comprehensive reconstruction and improvement of the drainage system including extensive erosion and scour protection is one of the key ways to avoid negative

impacts. To prevent soil erosion the drainage system needs to be rehabilitated, improved and/or upgraded nearly over the whole length of the road. Drainage structures should be provided for every natural drainage channel and flood path and should at a minimum pass the appropriate return period flood with minimum concentrations of flows as evidenced by scouring, for example. It is recommended to construct:

- lined ditches and drains
- drain erosion checks and cascades to reduce the velocity of water in ditches and at culvert outlets
- frequent cross drains in hilly areas
- stilling basins to disperse the energy of water
- an appropriate number of relief culverts for road side ditches to reduce the discharge of the individual culverts and the erosion

Earthworks should preferably be carried out during the dry season to avoid soil erosion e.g. in cut or fill sections. Open soils shall be covered by topsoil and grass seeds shall be applied, watered and maintained immediately after the completion of short sections of the works. All slopes in cut and fill sections have to be protected against erosion by running water or animals by appropriate means:

- proper compaction of embankments and slopes
- provision of proper drainage system
- planting of thorn scrubs (see below)
- grassing
- construction of retaining walls (only on steep slopes)
- fencing in agricultural areas, if necessary

Animals also often cause slope erosion. The vegetation cover is destroyed by overgrazing and the soils structure is effected by hooves. It is therefore recommended to cover the slopes with grass seedings and thorn scrubs. In areas with soils which are very susceptible to erosion the construction of retaining walls seems to be the most appropriate solution for the avoidance of additional slope erosion in cut sections.

6.2 Impacts on Water Resources

Given the large number of streams to be crossed, there are two principal issues in regard to water resources: the first is to avoid any depletion or contamination of sources used by the local communities; and the second is sedimentation control. All springs, wells and small streams in the project area should be mapped and the use of these resources well planned with the participation of local settlements. Protection of ground and surface water focuses primarily on the avoidance of pollution and the control of erosion.

6.2.1 Pollution Control

To avoid any pollution of ground and surface waters, the establishment of campsites should be set up with a minimum distance of about 1000 m from villages or from wells and water pumping stations. Additionally the contractor should provide proper treatment of sewage and waste of his site facilities, the Engineer's facilities and of the

site in general. Special attention should be paid to the proper design and installation of vehicle maintenance and refuelling areas that should be required at all campsites.

The storage and handling of hazardous substances such as detergents, lubricants, oil, fuels, paints and solvents, which can be a considerable source of pollution of groundwater or soils, has to be handled with care and safety provisions need to be established. A special requirement is the improvement of the safety of tankers / fuel trucks. The current regulations should be reviewed and, where necessary, amended and improved. A major item would be an increased safety standard to avoid the loss, the spillage of the fuel after an accident (e.g. multi-cell tanks, reinforced and well sealed man hole covers as well as other installations like taps etc.).

The technical condition / fitness of the tankers / fuel trucks needs to be checked and certified frequently as well as monitored and reinforced. Another item would be an improved training for the drivers, who should have a special license or permit for driving a tanker or fuel truck.

The contractor should be required to develop an emergency response plan for preparedness in handling various emergencies including spills. Staff should be trained in methods of avoiding accidents, emergency containment, and the procedures to be followed for reporting and clean up.

6.2.2 Control of Sedimentation

With the measures discussed in the previous section, erosion can be controlled and reduced which will result in a considerable reduction of the siltation of water courses. In addition, extraction of materials such as sand and gravel from large rivers should avoid alteration of the hydrologic profile, which can later result in serious erosion and flooding problems. Minor rivers should not be used as material sources. All extraction should be done at times of low flow levels. Proper measures should be taken during foundation excavation to avoid increasing turbidity of the stream.

6.3 Impacts on Air Quality and Noise

Contractors should be required to perform regular maintenance on vehicles and keep them in good working order to reduce exhaust emissions as much as possible. Vehicles should not be left idling when standing whenever possible.

Noise is expected to be most critical for construction workers who receive constant exposure. This should be monitored and can be corrected by requiring staff who receives high levels of noise exposure to wear ear protection. If required, equipment can be fitted with mufflers to reduce noise but this is unlikely to be implemented in this setting. Both factors are improved if speeds are controlled especially near sensitive receptors and in all villages.

Dust is a very critical problem and should be controlled as much as possible by low speeds, watering at an appropriate frequency and covering haul trucks.

The use of plantings at sensitive receptors is highly recommended.

6.4 Impacts on Fauna and Flora

These comments apply to all construction related activities including, road cutting and widening, borrow pits and quarrying, access roads, campsites, and traffic deviations. In siting any project related activity including campsites, borrow pits as well as the alignment itself, all environmentally sensitive areas should be avoided. These include areas such as wetlands (also very undesirable from an engineering point of view) and areas with rare species of flora and fauna.

To avoid impacts arising from the installation of the contractor's site facilities, areas with dense vegetation cover shall be avoided and in particular the cutting down of trees shall be avoided. Single trees in the immediate vicinity of the site facilities shall be protected by suitable measures (fences etc.) to avoid any damage. All removed vegetation has to be compensated by appropriate planting at suitable locations.

The new width of the ROW is proposed to be 30m. This widening together with planned alignment improvements and the establishment of new alignment will result in the loss of vegetation. In order to reduce the loss of valuable vegetation it is recommended to reduce the ROW width and to widen the road to one side only, wherever possible in order to reduce the loss of valuable vegetation. To compensate the loss of vegetation, trees and bushes should be planted along the road. This work should be carried out in close cooperation with local forest departments and tree nurseries. It can be done by local communities and is an important way of involving them in the improvement of their local environment. In towns and villages, the planting of blossoming trees like Jacaranda and Flamboyant is highly recommended.

The cutting of large trees is to be entirely avoided. Any woodland areas that are disturbed, however, should be compensated for by the reforestation of wasteland with native fast growing species. Tender documents and the bill of quantities should include this item. Specific consideration needs to be given to some of the big trees in riverine vegetation such as *Breonardia salicina and Hyphene thebaica.*

Also, the alignment must avoid the large baobab trees on Alternative IV, and these trees must be protected with fencing (Annex B: Photo 12). Hand digging methods must be employed in the vicinity of these trees to avoid root damage.

On the northern bank of the Abay River Alternative B, which goes through much of the woodlands and along the Abay River, should be avoided, as its construction will have a significant impact on existing biodiversity. Therefore, Alternative Route A, which coincides with the already partially constructed road by UNHCR, should be followed

Valuable habitat such as typical wetland vegetation and waterfowls, within a 10km range of construction should be protected to avoid any negative impact during and after the implementation of the project.

The use of local natural resources for energy, food or construction purposes should be controlled and done only in a planned way. Hunting, fishing, and collecting of firewood by project staff should be restricted. If such resources are available, the right to harvest and sell should be with the local community.

6.5 Visual Impacts

These are mitigated by requiring the contractor to adhere to the good housekeeping practices as contained in general contract clauses, and as agreed to on site, especially those regarding stock handling, waste and spoil disposal.

Borrow pits must be restored to natural contour and re-vegetated. The maintenance of these areas is critical and should be monitored. The preservation of vegetation is critical where at all possible.

6.6 Potential Impacts on Sites of Cultural or Historical Significance (includes archaeological resources)

Consultation with local elders in the affected communities should be conducted to identify and map key sites. These must be taken into consideration when planning any realignment of the existing or cutting of new road, traffic deviations and quarry sites.

Procedures should be established in cooperation with the Regional office of the Ministry of Information and Culture in the event of the discovery of archaeological or historical sites. These may include provision for the stoppage of all works in the affected area, and site visit by relevant authorities. If salvage excavation is required, costs should be borne by ERA.

6.7 Impacts on the Local Communities and Road Users

Methods of providing information and offering consultation and inviting participation of effected communities will be critical to ensure the beneficial effects intended for the project are achieved, and to avoid and mitigate any negative impacts. Consultations should be carefully planned by ERA in conjunction with the Supervising Engineer and the Environmental Advisor, and Woreda leaders.

It is proposed that to be efficient and to effectively deal with locally relevant issues that the communities be grouped by road section in which there are likely to be common issues such as construction scheduling, or resource access, for example. These may be as follows:

- From Assosa to Komosha
- From Komosha to Sherkole
- From Sherkole to the Blue Nile
- It is proposed that during road construction, regular consultation be held with the communities along the road at an interval of not less than three months.
- From Guba to the Blue Nile

An initial meeting should be held to appraise local people of the construction schedule and activities, and to solicit information about the area in regard to resources and sensitive locations. Later meetings can discuss solutions and their implementation, offer additional investigation and analysis, and provide a forum for resolving any conflicts that may arise. It is proposed that during road construction, regular and frequent consultation be held with the communities along the road as needed. In any case, this should be at an interval of not less than three months.

6.7.1 Public Health

The prevention of the spread of AIDS is a critical mitigation activity. This should include a program for increasing the awareness of the work force regarding the transmission of AIDS and ensuring the availability of condoms. The Camp Administrator should ensure that health education on venereal disease is compulsory for construction workers, and should be arranged to be provided by local health care providers, who can further monitor interaction with the local community.

Campsites are expected to have their own health facilities for staff. However, as these do not treat every type of illness or injury, additional demand can be placed on local healthcare systems. This situation needs to be monitored to be sure that local services are not over burdened with an increase demand. If this is found to be the case, collaboration between ERA, the Regional health department, and the Camp Administrator will be needed to find appropriate and timely solutions.

The difficulty of providing medicines and drugs for treatment in the area indicates a need for advanced planning regarding the needs of the incoming population in order to ensure adequate supply. Again, this should be coordinated with the local health bureau and the ministry, if needed to be sure that sufficient supplies are in place before they are needed.

The contractor should be required to have in place an emergency response plan for coping with health risks presented by the accidental spill or mishandling of hazardous construction materials.

6.7.2 Loss of Property

The number of houses, properties, businesses and roadside activities likely to be affected by the project has not yet been determined at this early stage of project development. More detailed assessment will need to be made during the detailed design phase in order to develop specific mitigation that may be possible.

A general guiding principal is that people directly affected by the project road should not be left worse off after construction is completed. Therefore, when land and property is taken, the owner or occupier should receive some form of compensation. Land is not property and cannot be compensated by cash. There is no individual land ownership. For non-government land affected by the road, relocation plans should be elaborated and compensation provided according to Ethiopia procedures.

Within a given village or settlement, it will be critical to replace vegetation lost either by construction or by exploitation by the work force. This includes shrub plantings and trees. If large areas of woodland are lost, these should be compensated for by reforestation at another site selected by the community. Economically valuable trees or crops should be compensated with cash payment, again in accordance with Ethiopian law.

6.7.3 Induced Development

Past patterns of development indicate that construction campsites become permanent villages in Ethiopia. These sites attract people who do not have farmland and who earn a living by providing goods and services to the work force. Most of these people stay after the project is over. Although they are usually not permitted to set-up house-

sites near the camp, small markets and drinking houses spring up. Since this is not possible to prevent, it is important that this induced development is planned.

This has a very important implications for this project. The establishment of campsites should be equated with the establishment of new villages and should be treated as such. Siting a camp will have long lasting impacts and should be done in collaboration with Regional planning offices. ERA should consult and agree with local authorities regarding the location of the camps.

It is essential that a determination be made about the availability of resources such as drinking water and fuel-wood. The provision of adequate infrastructure, such as adequate methods for waste treatment and disposal, roads, and drainage is very important. Future levels of demand must also be considered and should be planned for.

All environmentally sensitive land, especially wetlands, is to be strictly avoided. Trees should be planted and managed to provide a viable source of building materials and firewood for the new settlement.

Building must not be permitted in the ROW. Houses which are built should be registered and have permission from the kebeles in order to avoid illegal permanent settlements.

The location of new boreholes should benefit local users.

6.7.4 Economy

Temporary inflation of prices benefits local business people, but place a burden on the poorer sections of the community who are dependent on the same purchases. The effects on the poor need to be closely monitored and addressed on a community / clan / family basis.

The registration of new houses resulting from induced development (above) may have the effect of controlling rents, keeping these at a more normal level.

The Camp Administrator should ensure that "shopping weekends" are divided among workers so that everyone does not appear in town at once.

6.7.5 Safety

The contractor should be required to produce a traffic deviation and safety plan. Adequate signs and guard railing should be constructed where needed at deviations. Flagmen should be posted in areas with heavy traffic.

Pedestrian access should be provided at all times, and there should be a separation of motorized from non-motorized traffic. Non-motorized traffic should have the priority over motorized traffic.

Reduced speed and warning signs should be posted. Speed limits with limits adopted to the local conditions should be implemented.

Construction vehicles should have regular inspections of safety equipment.

Chapter 7
Environmental Management
Plan and Monitoring

October 2001

7. ENVIRONMENTAL MANAGEMENT PLAN AND MONITORING

Three principles guided the development of the environmental management plan for this project:

- Ensure good public participation through early and frequent contact
- The use of natural resources for energy, food, and construction purposes should be done in a controlled way. The right to harvest is with the local community.
- People directly affected by the road project should not be left worse off once it is completed and operational.

7.1 Environmental Management Plan (EMP)

ERA's EMB has the overall task of ensuring that the EMP is implemented. Many of these measures would ordinarily be included in the Tender Documents. Those that would be included in the standard construction costs, or that should be additionally costed in the BoQ, are italicised in the table below.

Environmental Impact	Measure to be taken	Responsible Organization
Soil compaction	Identify all activities for which there will be soil compaction and where this is likely to occur	Contractor and Engineer
	Locate these activities to avoid damage to farmland	Contractor, Engineer, Communities
	Monitor and identify all areas in which soil compaction has occurred	Engineer, Contractor
	Reinstate compacted soils: *Loosening* *Spreading topsoil* *Seeding* *Watering*	Contractor
Loss of topsoil	Identify all areas in which topsoil will be removed	Contractor
	Develop a plan to reuse topsoil	Contractor
	Locate topsoil storage sites for efficient maintenance and reuse	Contractor
	Preserve topsoil for re-use: Strip with care *Segregate piles* *Protect against erosion* *Water and maintain*	Contractor
Erosion	Limit stripping of vegetation by reducing area to be widened	Design Team
	Conduct earthworks in dry season	Contractor
	Compact embankments and slopes	Contractor
	Cover open soils with topsoil and grass seeds	Contractor
	Where animals and hoof traffic are a problem, plant in thorn scrub	Contractor
Water depletion	Map all springs, wells and small streams	Engineer and Contractor

Environmental Impact	Measure to be taken	Responsible Organization
	Identify water requirements of projects and potential sources	Engineer and Contractor
	Conduct consultation with community to plan water use	Engineer, Community Dev. Specialist
	Supply camp sites with boreholes, if needed	Contractor
	Monitor water availability and quality during construction	Engineer, Communities
Water pollution	Identify all project related sources of water pollution	Contractor and Engineer
	Locate camp sites 1km from local drinking water sources	Contractor and Engineer
	Provide camp sites with simple waste water connection and treatment (pit latrines) and pollution control structures / procedures for hazardous material storage and handling	Contractor
	Control vehicle washing and maintenance	Contractor
	Monitor fuel handling	Contractor
	Control waste disposal	Contractor
	Require and confirm technical fitness of contractors vehicles and equipment	Engineer
	Emergency Response Plan Accidental fuel release Worker accident	Contractor
	Train workers in: Fuel handling Waste disposal First aid Spill containment	Contractor Env. Advisor Engineer
Sedimentation	Identify all extraction sites on a map	Contractor and Engineer
	Prepare a plan and schedule for material extraction	Contractor and Engineer
	Consult with local community near sites	Engineer and Community Dev. Specialist
	[redacted]	Contractor
	[redacted]	Contractor
	[redacted]	Contractor
	Do not alter the hydrologic profile	Contractor
	Prepare an area for the pump truck, stabilize the bank where the truck is parked for water extraction or install a small pump	Contractor
	Take proper measures during foundation excavation for bridges	Contractor
Air pollution	Perform regular maintenance on vehicles	Contractor
	Do not idle while standing	Workers
	Control speeds and acceleration	Workers

Environmental Impact	Measure to be taken	Responsible Organization
	Train drivers in Expected maintenance Improved habits	Contractor and Env. Adviser
Noise pollution	Identify potential sources of noise exposure for workers	Contractor
	Monitor noise levels for and hearing damage in workers	Contractor
	Provide ear protection for key functions	Contractor
	Control speeds and acceleration	Workers
	Train drivers in Expected maintenance Improved habits	Contractors
Loss of vegetation	Identify activities in which vegetation will be removed or damaged	Contractor and Engineer
	Identify important vegetative resources and consult with community on preservation	Contractor and Engineer
	Plan the siting and construction of camp sites carefully	Contractor and Engineer
	Avoid all wetland areas	Contractor and Engineer
	Do not remove any large trees	Contractor and Engineer
	Protect single trees in the immediate vicinity of the site (fences)	Contractor and Engineer
	Locate camp site away from areas of dense vegetative cover	Contractor and Engineer
	All removed vegetation should be compensated (cash or replacement)	ERA
	Reduce the ROW width and widen to one side where possible	Design Team
	Plant trees and bushes for noise and dust protection	Contractor
	Plant trees to replace and provide fuel wood for camp site	Contractor
	Compensate for disturbance to woodland areas by replacement	Contractor
	Plant flowering trees such as Jacaranda and Flamboyant in villages	Contractor
	Involve villagers in re-vegetation schemes	Contractor
	Valuable habitat within 10 km of the road should be protected	EPA / ERA
Loss of fauna	Hunting and fishing by project staff should be restricted.	Contractor
Visual ugliness	Implement good engineering housekeeping practices at all construction activity sites	Contractor and Engineer
	Control stock handling, waste and spoil disposal	Contractor and Engineer
	Consult with the community regarding construction waste disposal	Contractor and Engineer

Environmental Impact	Measure to be taken	Responsible Organization
	Reinstate borrow-pits *To natural contour (not original)* *Re-vegetate*	Contractor
Loss of cultural / historical sites	Conduct consultation with local elders to identify and map known sites	Engineer and Com Dev. Specialist
	Avoid these sites	Contractor
	Protect sites that are in the immediate project vicinity	Contractor
	Collaborate with Ministry of Culture to establish procedures in the event of the discovery of a site	Contractor
	Train staff	Contractor
Degradation of public health	Prepare a social impact monitoring plan	Com Dev. Specialist
	Develop a program to prevent the spread of AIDS Increase awareness of workers and local women	Community Dev. Specialist and Contractor
	Make condoms available at a subsidized price	Contractor Camp Administrator
	Avoid overburdening the local health system	Contractor Camp Administrator
	Plan to increase the availability of treatments and drugs	Contractor Camp Administrator
	Provide and upgrade camp health facilities to limit use of local health care	Contractor Camp Administrator
	Anticipate problems	Contractor Camp Administrator
Loss of property	Prepare a social impact monitoring plan	Community Dev. Specialist
	Identify the number of businesses, homes, properties, and other road side activities that are likely to be effected by road construction	Com Dev. Specialist and ERA
	Prepare a relocation plan for each affected party and assist in resettlement	ERA
	Compensate for losses in accordance with Ethiopian practice	ERA
	Replace lost vegetation in villages, flowering trees such as Jacaranda and Flamboyant are recommended	ERA and Contractor
Uncontrolled growth of illegal permanent settlements	Prepare a social impact monitoring plan	Com Dev. Specialist
	Plan the sitting of camp sites carefully	Contractor
	The location of camp sites must be approved by the Engineer	Engineer
	Do not permit the building of houses in the ROW	Local Authorities
	Require that houses that are built in response to the camps, be registered	Local Authorities
	Empower local communities through adequate consultation and participation	Engineer and Com Dev. Specialist
Inflation and economic hardship	Prepare a social impact monitoring plan	Com Dev. Specialist
	Locate the largest construction camps near the largest settlements, Assosa and Guba (where livelihoods are	Contractor and Engineer

Environmental Impact	Measure to be taken	Responsible Organization
	broader in scope) but with a sufficient distance to restrict interaction with the local community	
	Monitor prices and the effect on the poor of the community	Com Dev. Specialist and Local Authorities
	Register new houses resulting from induced development to control rent levels	Local Authorities
	The camp administrator should not allow everyone in town at once on a shopping weekend	Camp Administrator
Increase in traffic accidents	Prepare a traffic deviation and safety plan	Contractor
	Provide properly planned and developed deviations with signs and protections as needed	Contractor
	Post flagmen in heavy traffic areas	Contractor
	Always maintain pedestrian access	Contractor
	Provide adequate separation between motorized and non-motorized traffic	Contractor
	Reduce speeds and post signs for construction workers	Contractor
	Inspect construction vehicles regularly	Contractor
	Train drivers	Contractor

7.2 Institutional Requirements of the EMP

The following stakeholders are directly involved in the implementation of the EMP:

- ERA
- EPA
- Supervision Team
- Camp Administrator
- Contractor
- ERA EMB
- Environmental Advisor
- Community Development Specialist
- Local Authorities
- Public

Compliance with the avoidance and mitigation measures contained in the EMP shall be supervised by ERA EMB and the Engineer, and, during the construction phase, an Environmental Adviser appointed to the project. The Engineer shall ensure that all mitigation measures in the contract and agreed at the site are done in a proper and timely manner.

The Environmental Adviser will oversee the implementation of the EMP by providing relevant advice, visiting the site, monitoring issues and working with the Engineering team, construction staff, and the community to develop relevant solutions to problems. A minimum of 4 months for the Environmental Advisor is recommended.

After construction, the maintenance section of ERA will follow-up and report to the EMB about the condition and function of mitigation measures as implemented on the ROW and in the vicinity of the road.

Project level committees (not the ERA Compensation Committee) should be set up by ERA for consultations along the alignment that include the following persons:

- Women as local users of the road
- Local elders
- People affected by the project at the village level
- Officials from BOPED and other relevant Regional and local offices
- Officials from relevant Ministries in central government
- A representative from the EPA
- Research institutions (representatives from the National Herbarium who have been working in the Region are very important)
- Relevant NGOs
- The Supervising Engineer
- The Environmental Inspector

Regular consultations with these committees should be held throughout the duration of the project. Clear and timely information should be provided to this group and certain individuals from the committee should be assigned to receive complaints and questions from the public.

It is strongly recommended that a community development/consultation specialist be included as part of the implementation team to ensure that the necessary consultation is carried out in an efficient and effective manner and to prepare the social impact monitoring plan. This will ensure that public participation in the process is systematic, relevant and beneficial. By having a team member with specialist skills, the concerns of the more vulnerable members of the community will be incorporated. A minimum of 4 months is recommended.

7.3 Monitoring Program

The following issues should be monitored, some continuously, others at intervals:

- Erosion (continuously)
- Level and quality of ground and surface water (continuously)
- Changes in vegetation, growth of planted trees, grass, and other plants (continuously)
- Cultural and historical monuments and sites (periodically as needed)
- Resettlement and migration (within 6 months of project inception, thereafter annually)
- Impoverishment (during construction and annually)
- Social or structural changes in communities (during construction, one year after construction, and thereafter about every three years for 12 years)
- Dust and noise pollution levels (continuously)
- Accidents and spills (as needed)

There are four types of monitoring:

- Regulatory compliance monitoring
- Contract compliance monitoring
- Environmental impact monitoring
- Social impact monitoring

The responsibility for regulatory compliance monitoring should fall to ERA with assistance from local (Regional / Zonal) authorities. Contract compliance monitoring should fall to the Engineer. Environmental Monitoring should fall to ERA EMB with assistance from the EPA during construction. Social impact monitoring should fall to the Community Development specialist under supervision of ERA EMB and the Engineer (duration of constriction only) with collaboration from local authorities. ERA EMB is responsible for all post-project evaluations and monitoring.

After construction, the maintenance section of ERA will follow-up and report to the EMB about the condition and function of mitigation measures as implemented on the ROW and in the vicinity of the road.

A certain degree of social monitoring should be conducted during project construction so that corrective action can be taken when it is most needed, and so that lessons learned on one section of the road can be applied later to another. In conducting social impact monitoring, both qualitative and quantitative indicators should be used.

At a minimum, post project evaluation should take place one year after project completion and should focus on both technical as well as social indicators. Again, this falls to ERA EMB.

7.4 Estimated Cost of Implementing the EMP

It is extremely difficult to cost individual items or activities required for mitigating the potentially negative environmental effects of the project as described in the EMP. As these will be incorporated to a large degree in the Tender Documents, the contractor will submit a total price for a group of related actions such as "erosion control" and not a price for a specific activity to control erosion such as the "provision of small pumps to avoid putting trucks on stream banks and prevent sedimentation."

Therefore, the cost estimate presented herein is based on the Consultants experience elsewhere in a similar context. This is anticipated to be 2-3 % of total project costs.

Chapter 8
Conclusions and
Recommendations

November 2001

8. CONCLUSIONS AND RECOMMENDATIONS

Key conclusions and recommendations are summarized as follows.

The proposed project is basically consistent with existing development plans for the Region.

Likely development is based on the establishment of improved or intensified agriculture large-scale, commercial farming and migration of people into the area. From an environmental standpoint this raises questions about the affects of possible loss of subsistence based agriculture supporting indigenous groups, land clearing and use conversion, as well as increased urbanization / induced development and pressures on resource availability.

Until a more strategic environmental assessment of the Abay River Basin Master Plan is performed, environmental sustainability must be built incrementally by including environmental considerations in each project.

For the proposed road project to be sustainable, it must be implemented in such a way as to conserve the existing biodiversity of the area and with full consultation of local indigenous groups.

This will require an environmentally proactive approach to project implementation. However, direct observation of current contractor practices, the remoteness of the location, the lack of adequate independent supervision of works, the institutional weaknesses of the EPA, ERA EMB, and the Regional BOPED and a lack of interagency cooperation on the issue of monitoring and enforcement, mitigation is unlikely to be implemented.

Evidence of this is no more obvious than in contractor methods that were observed being used to clear the alignment for the road from Komosha to Gizen (See Annex B: Photo 2b). When questioned, contractor workers, local and central level authorities were unaware of these problems, and had no plan, or means, to act in this case to correct methods.

Public consultations revealed a high acceptance of the project, largely based on the expectations that there will be opportunities for employment of local people and increased income. In practice, employment opportunities will be rather limited and of short duration. In the final analysis, these benefits are outweighed by the potential for inflation, conflict between in-migrants, and competition for resources during the construction phase.

The implementation of post project monitoring of social impacts is key. This has been provided provided for be the collection off base-line socio-economic data for this project. However, this activity must be planned and budgeted by the EMB.

Local communities are the owners of all local resources and have the first right to use and harvest. To achieve this, local communities must be empowered by adequate and effective consultation. Public participation in road projects is a new activity in Ethiopia. The challenge is to implement a public consultation process that is both efficient and effective for all parties. This will require specialist input and the careful planning and coordination of related activities and follow-up. It is proposed that contact with local communities have expert facilitation. In this way, the voices of the most vulnerable are

likely to be heard. This requires the inclusion of a community development specialist on the engineering team in Assosa.

Awareness of the important biodiversity of the area must be raised on all levels.

The area in the direct zone of influence of the road has yet unrealised tourist potential in the form of birding tours. The presence of rare orchids and other endemic plant species is also of great interest internationally. It has been estimated that some 70% of all bird species occurring in Ethiopia can be found in the project vicinity. To achieve this potential, local biodiversity must be maintained and intensified wherever possible. All remaining wetland areas must be preserved. Soil erosion must be controlled. Vegetation removal must be strictly limited and every opportunity for increasing vegetative cover and habitat should be taken.

Awareness of the importance and effectiveness of good engineering practices must be raised on all levels, this includes workers.

Sustainable development is not an inhibiting factor for road project implementation. The implementation of the EMP does not pose a burden on the engineering team. In large measure it is simply the reiteration of good engineering practice. Much of this is contained in the customary contract specifications. The problem seems to stem from inadequate means to enforce implementation of contract environmental specifications, and a lack of technical expertise in terms of incorporating the EMP into site level activities. If this is to be overcome, a multidisciplinary team approach to managing the construction phase is required and the contractor must be held accountable.

Implementation of mitigation will require the systematic planning of proposed measures.

Several of the proposed mitigation measures require the systematic management of information and action. This requires the preparation of plans. These include, but are not limited to:

- Camp site design and siting (approach as a new village, confirm provision of resources and infrastructure, avoid or compensate vegetation loss – plant fuel wood species)
- The protection of trees and other vegetation (must be located on a map, obtain input and agreement from community, fenced and verified, train workers to not crush remaining vegetation or go off site for the wrong reason – to dispose waste, hunt, collect fire-wood, etc.)
- Public consultations on resources management (give public information on extraction or disturbance areas, obtain input and agreement, monitor conflicts, take corrective action)
- Sensitive area protection 10 km range (identify location, educate workers and communities, seek official protective status at central level, monitor)
- Social impact monitoring (both current and post – project evaluation, ERA EMB needs to budget cost and incorporate this activity into their work program, a sustained effort is required)

Emphasis must be placed on linking the plan to concrete actions. It is essential that the preparation of the plan not be the end goal, but rather the conversion of knowledge gained from analysis and planning into actual construction activities.

It is essential that a clean-up program be implemented in the area after the construction phase is complete.

The contractor must be required to have a specific and practical plan for clean-up and waste disposal. The restoration of borrows sites, access roads, traffic deviations, etc. must be confirmed and final payment must be made dependent on the adequacy of the provision of environmental restoration and clean up.

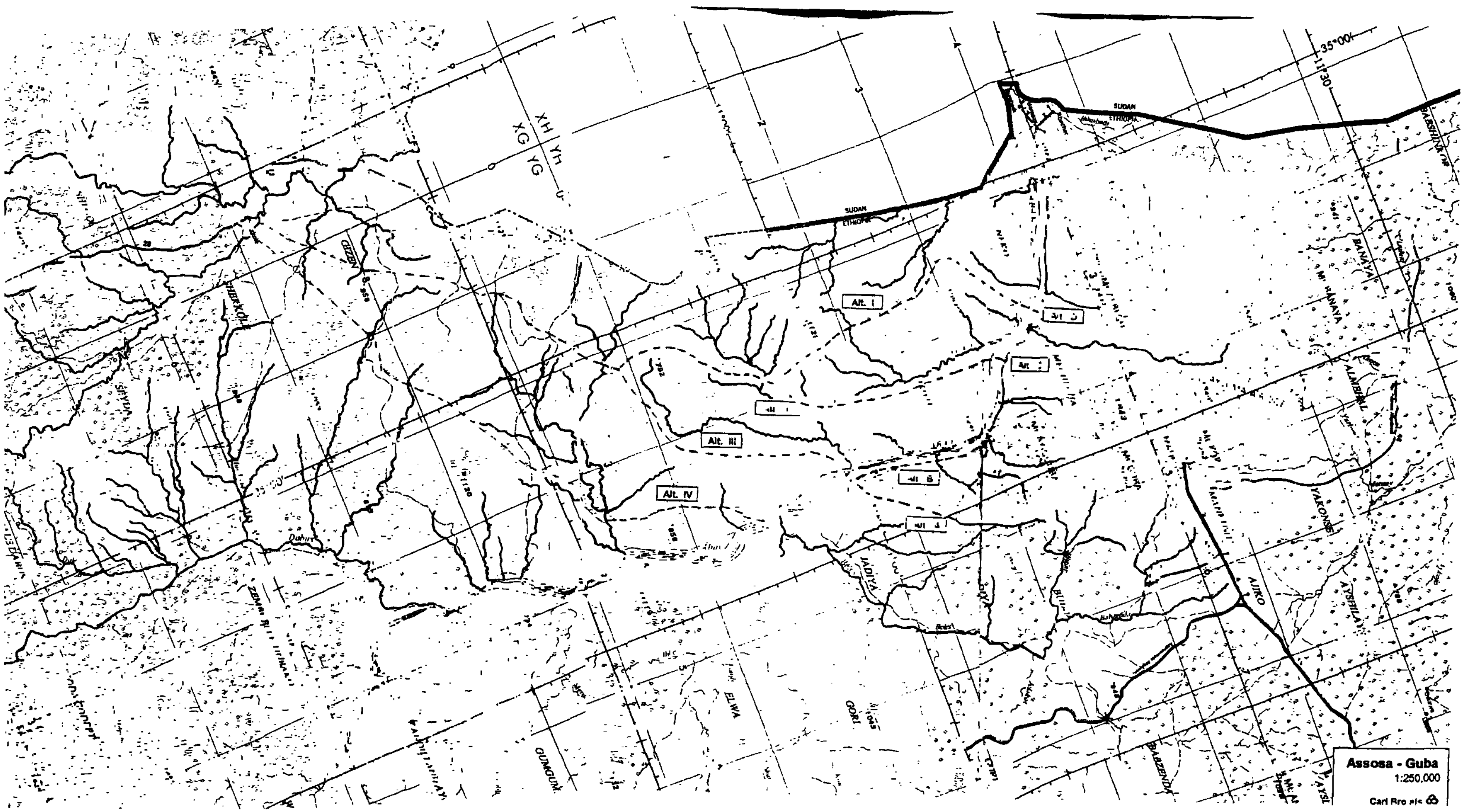
Assumptions of this up-streamed EIA must be verified and corrected during detailed design.

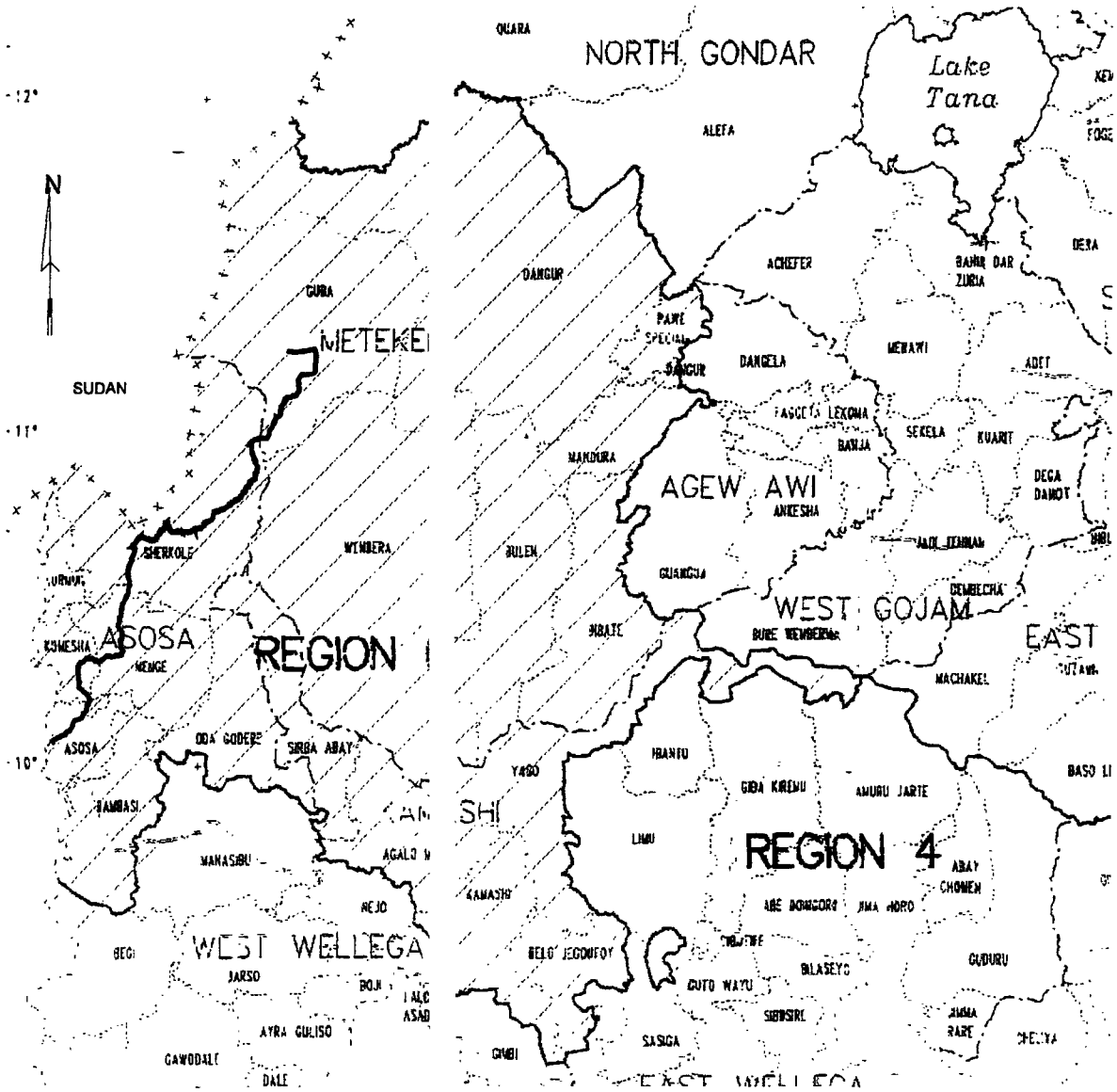
As the current analysis was made early in the project cycle, it has emphasized input into the analysis of engineering alternatives and the route selection process. Assumptions on which this EIA is based and its conclusions will need to be updated during detailed design.

It is strongly recommended that the next step in the environmental management process for this project it to prepare and implement an awareness raising presentation for stakeholders.

Annex A
Maps

November 2001


Assosa - Guba
1:250,000
Carl Bro
SUDAN
ETHIOPIA
Alt. I
Alt. II
Alt. III
Alt. IV
Alt. V
Alt. VI
XH
YH
XG
YG
35°00'
11°30'
GIZEN
SHERKOLE
SEYDA
ELWA
GORI
JADIYA
AJIKO
YAKONSE
AYSHILA
BANAYA
ALMIBIRAL
BARZENDA
GUMGUM



LEGEND

- International boundary
- Region boundary
- Zone boundary
- Woreda boundary
- Project Road
- Major roads

MAP #2

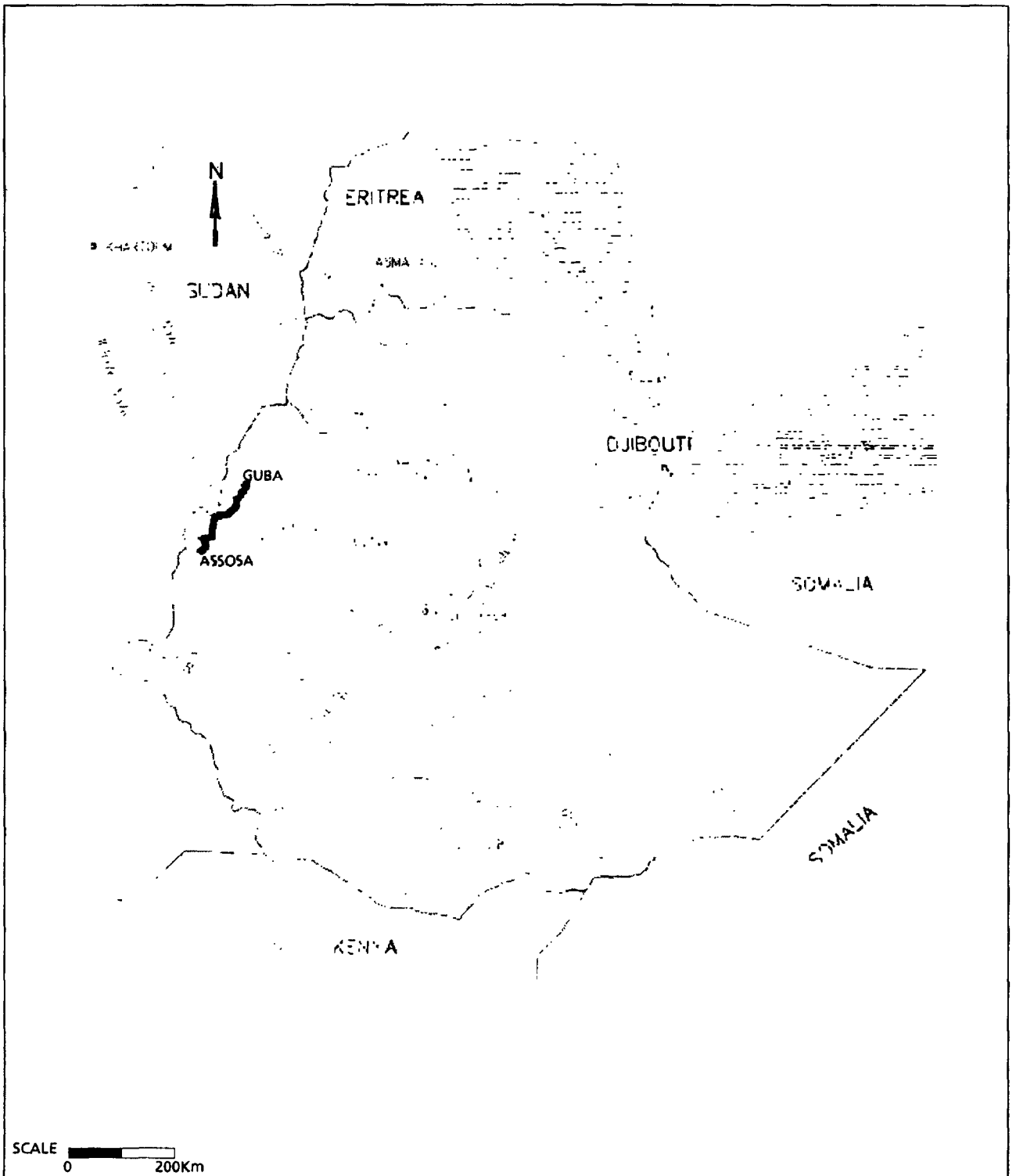
ADMINISTRATIVE DIVISIONS

SOURCE MINISTRY OF WATER RESOURCES
ABAY RIVER BASIN MASTER PLAN

ETHIOPIAN ROADS AUTHORITY
ASSOSA - GUBA ROAD PROJECT

Carl Bro as
Consulting Engineers and Planners

DANA & Associates P.L.C.
Engineering Consultants

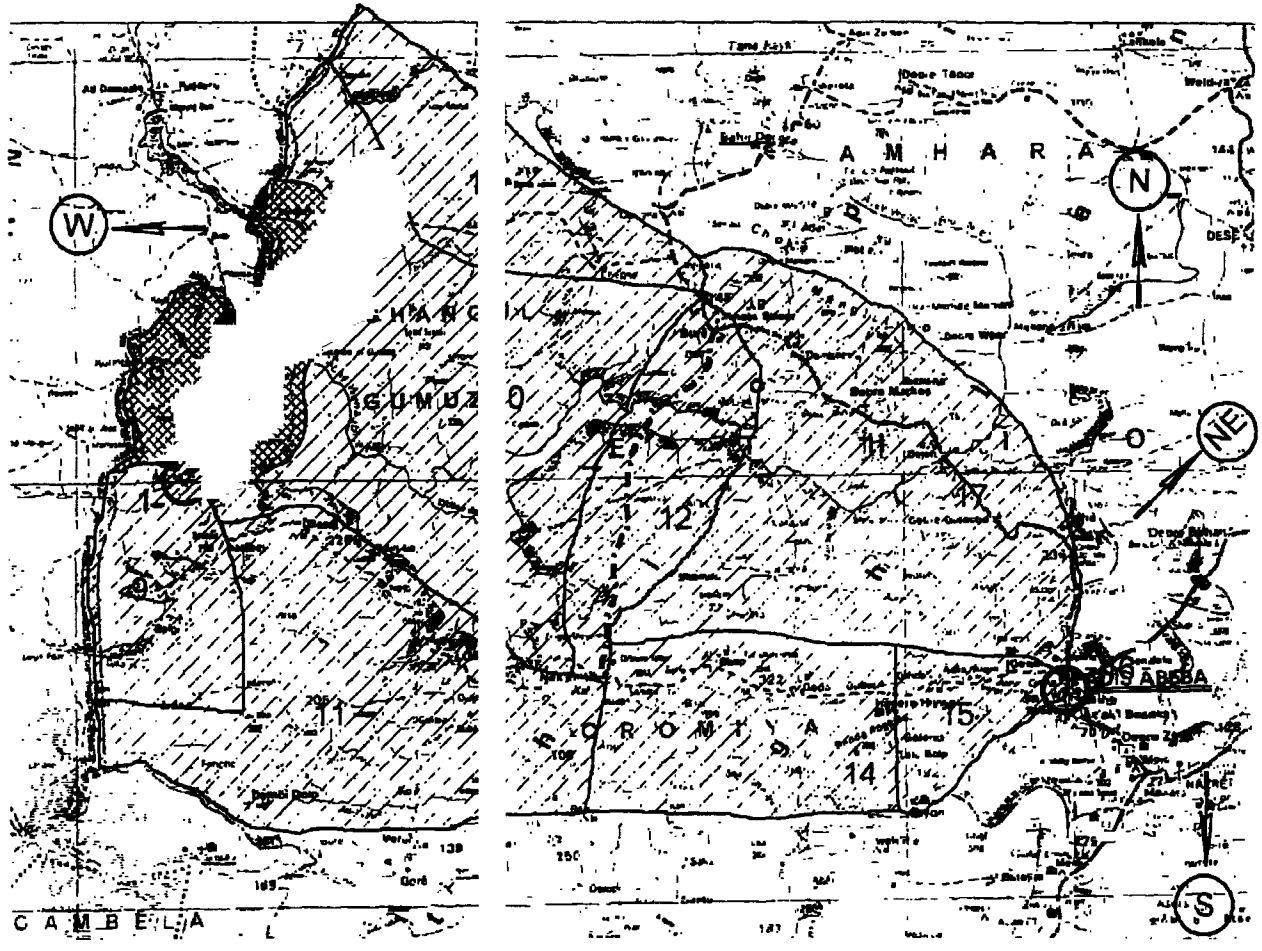


LEGEND

ABAY RIVER BASIN LOCATION

PROJECT ROAD

Carl Bro as Consulting Engineers and Planners DANA & Associates P.L.C. Engineering Consultants	ETHIOPIAN ROADS AUTHORITY ASSOSA - GUBA ROAD PROJECT SOURCE MINISTRY OF WATER RESOURCES ABAY RIVER BASIN MASTER PLAN	TITLE : MAP #3 ABAY RIVER BASIN LOCATION MAP



LEGEND

- Indirect Influence Zone
- Direct Influence Zone
- Regional Influence Zone
- Main Trunk Roads Corridors
- Project Road
- Nekempte - Bure
- 17 Traffic Zones
- Broader Traffic Zones
- Traffic Zone Boundary

SCALE 0 100Km

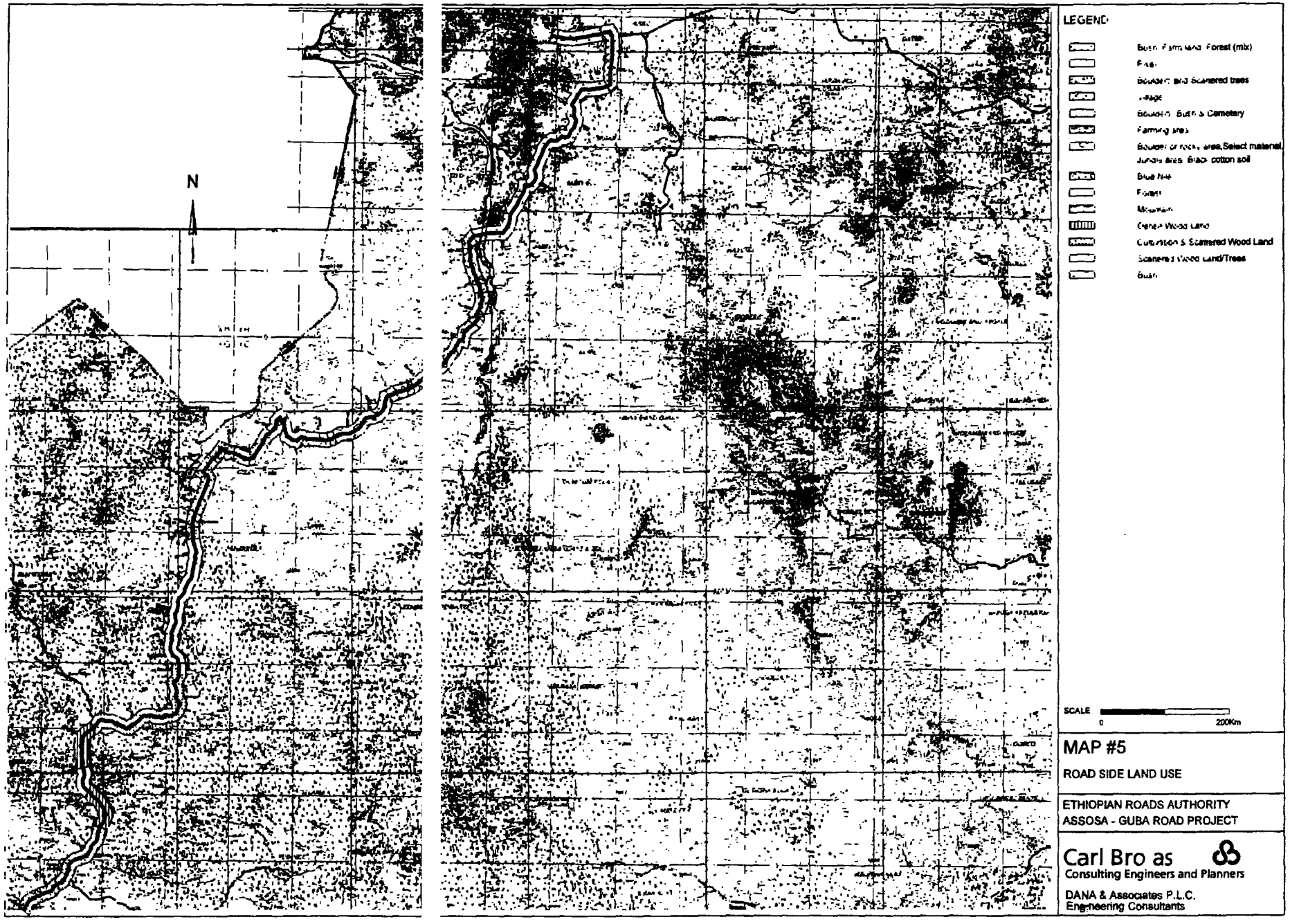
MAP #4

ZONE OF INFLUENCE

ETHIOPIAN ROADS AUTHORITY
ASSOSA - GUBA ROAD PROJECT

Carl Bro as
Consulting Engineers and Planners

DANA & Associates P.L.C.
Engineering Consultants



MAP #5

ROAD SIDE LAND USE

ETHIOPIAN ROADS AUTHORITY
ASSOSA - GUBA ROAD PROJECT

Carl Bro as
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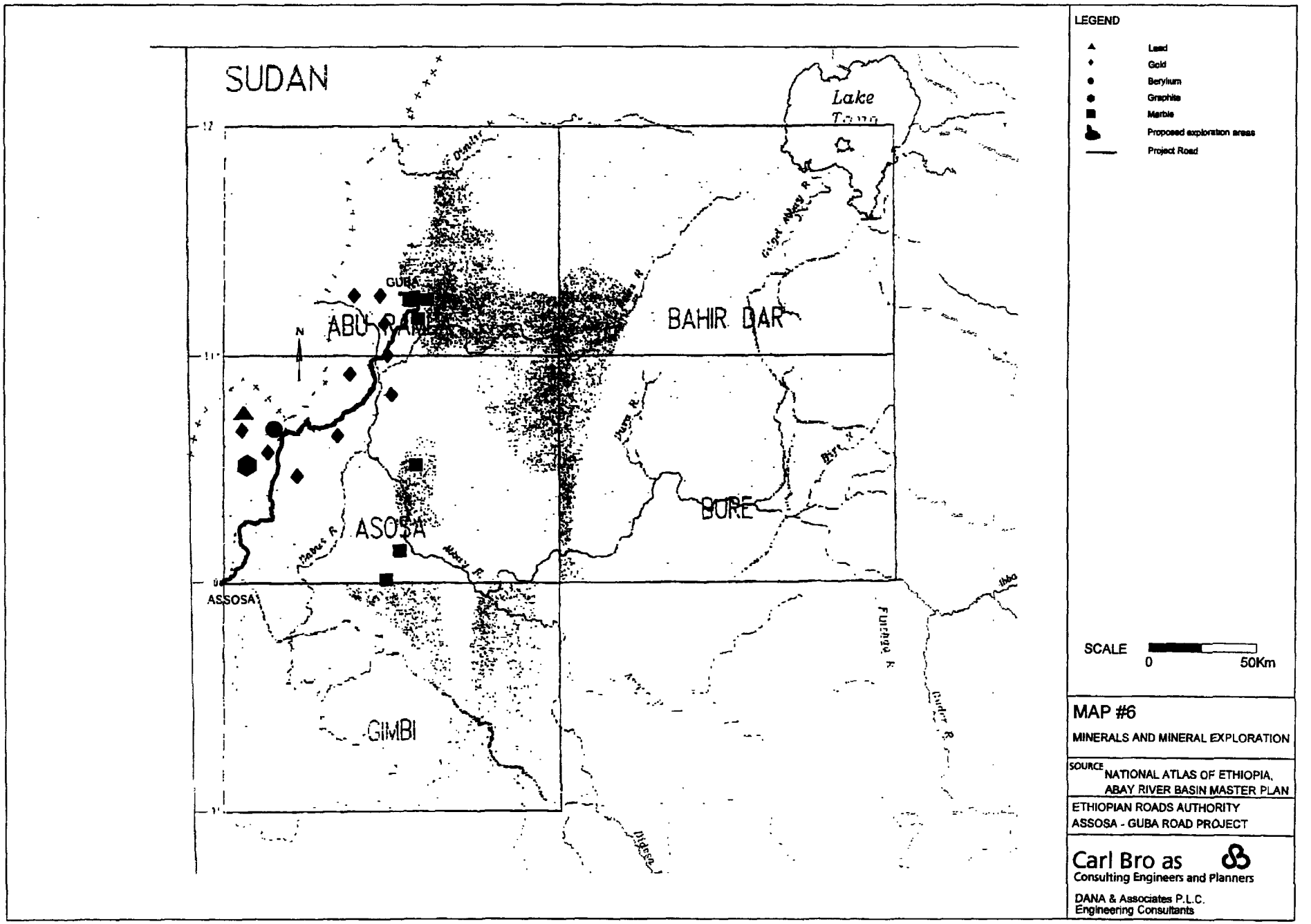
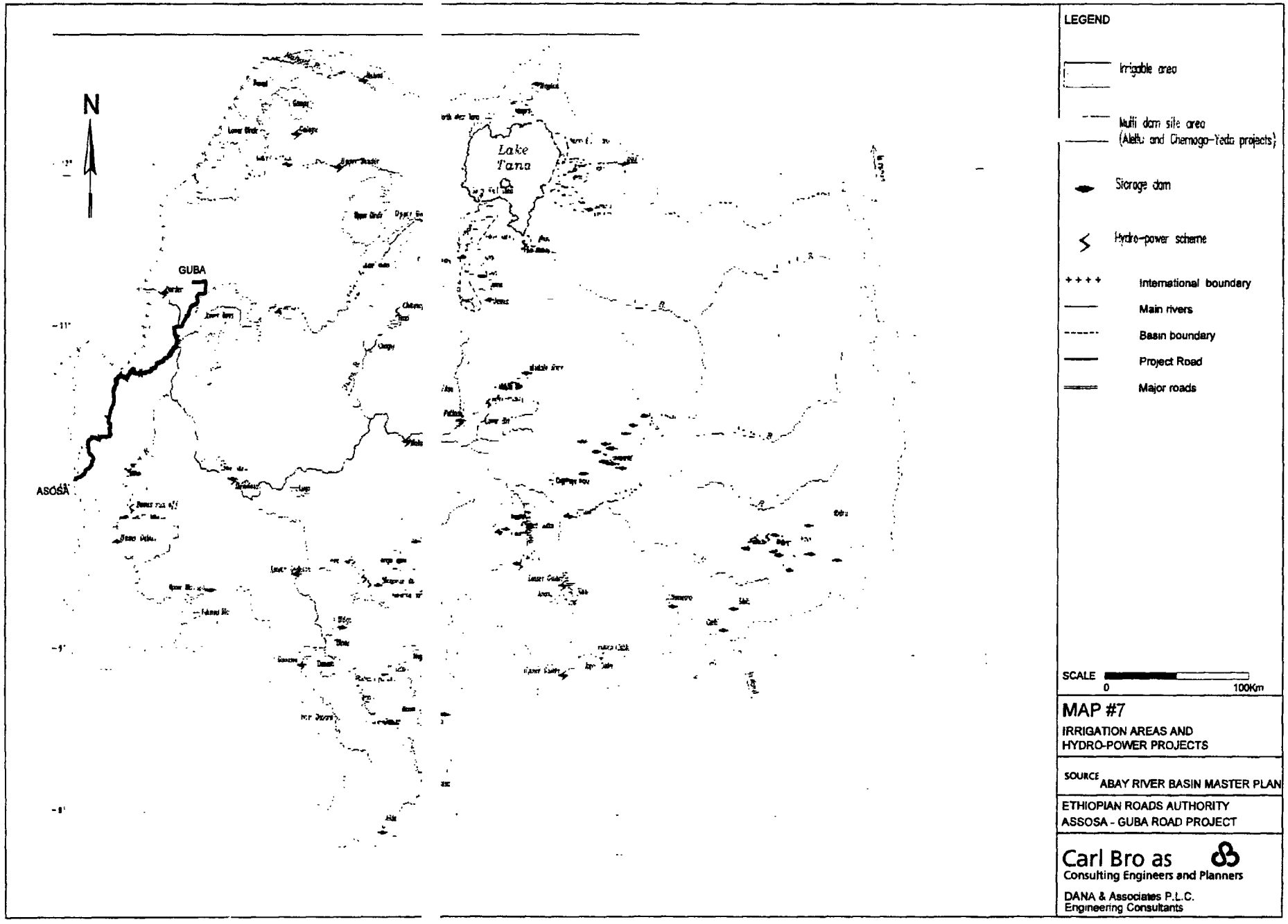
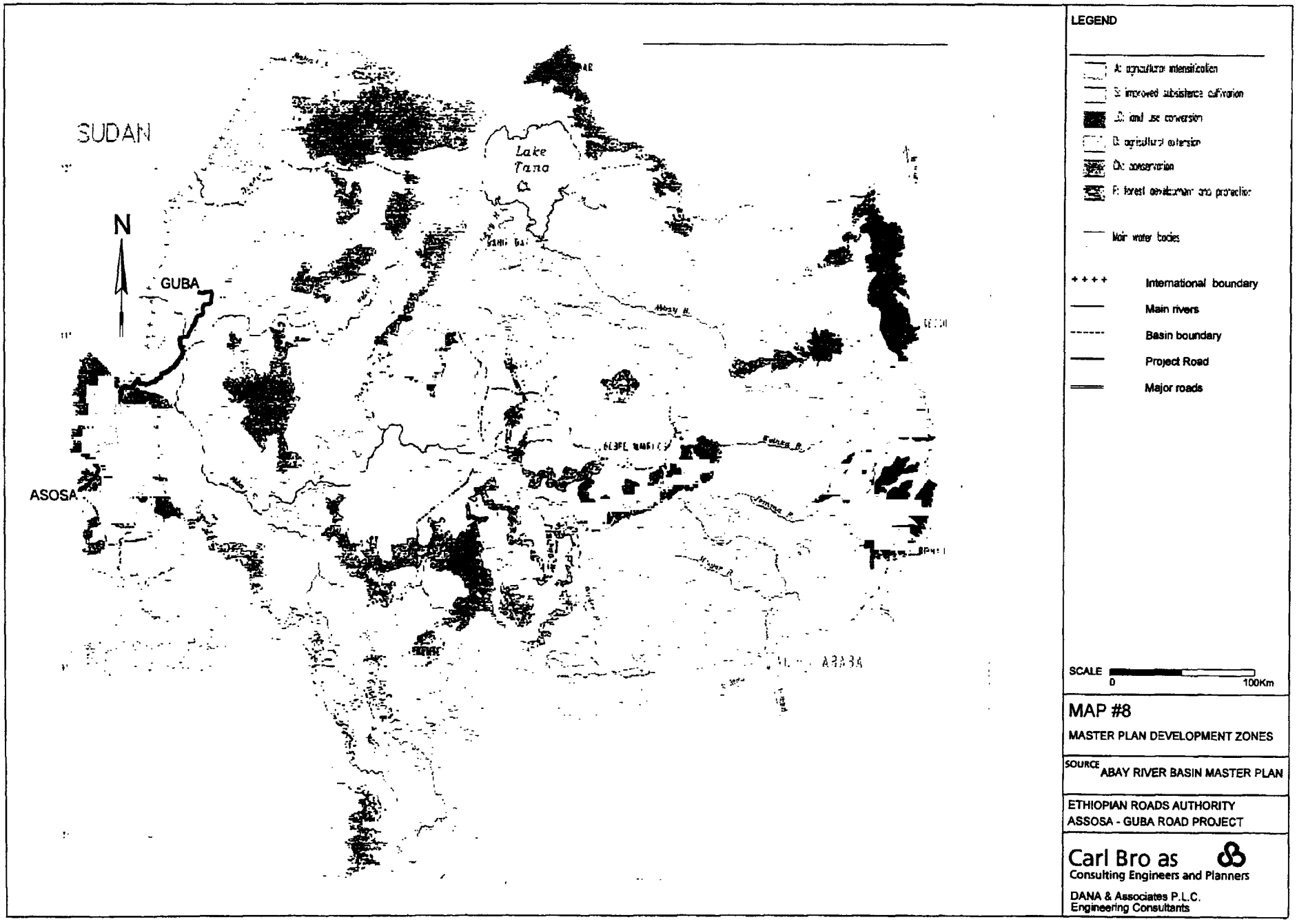
DANA & Associates P.L.C.
Engineering Consultants


SUDAN
Lake
GUBA
ABU RAMA
BAHIR DAR
N
ASOSA
BURE
ASSOSA
GIMBI
LEGEND
Lead
Gold
Beryllium
Graphite
Marble
Proposed exploration areas
Project Road
SCALE
0
50Km
MAP #6
MINERALS AND MINERAL EXPLORATION
SOURCE
NATIONAL ATLAS OF ETHIOPIA,
ABAY RIVER BASIN MASTER PLAN
ETHIOPIAN ROADS AUTHORITY
ASSOSA - GUBA ROAD PROJECT
Carl Bro as
Consulting Engineers and Planners
DANA & Associates P.L.C.
Engineering Consultants


N
GUBA
ASOSA
Lake Tana
LEGEND
Irrigable area
Multi dam site area (Alelti and Chemoga-Yeda projects)
Storage dam
Hydro-power scheme
International boundary
Main rivers
Basin boundary
Project Road
Major roads
SCALE
0
100Km
MAP #7
IRRIGATION AREAS AND HYDRO-POWER PROJECTS
SOURCE ABAY RIVER BASIN MASTER PLAN
ETHIOPIAN ROADS AUTHORITY
ASSOSA - GUBA ROAD PROJECT
Carl Bro as
Consulting Engineers and Planners
DANA & Associates P.L.C.
Engineering Consultants


SUDAN
Lake Tana
N
GUBA
ASOSA
LEGEND
A: agriculture intensification
S: improved subsistence cultivation
D: land use conversion
E: agricultural extension
C: conservation
F: forest development and protection
Main water bodies
International boundary
Main rivers
Basin boundary
Project Road
Major roads
SCALE
0
100Km
MAP #8
MASTER PLAN DEVELOPMENT ZONES
SOURCE ABAY RIVER BASIN MASTER PLAN
ETHIOPIAN ROADS AUTHORITY
ASSOSA - GUBA ROAD PROJECT
Carl Bro as
Consulting Engineers and Planners
DANA & Associates P.L.C.
Engineering Consultants

Annex B
Photographs

November 2001

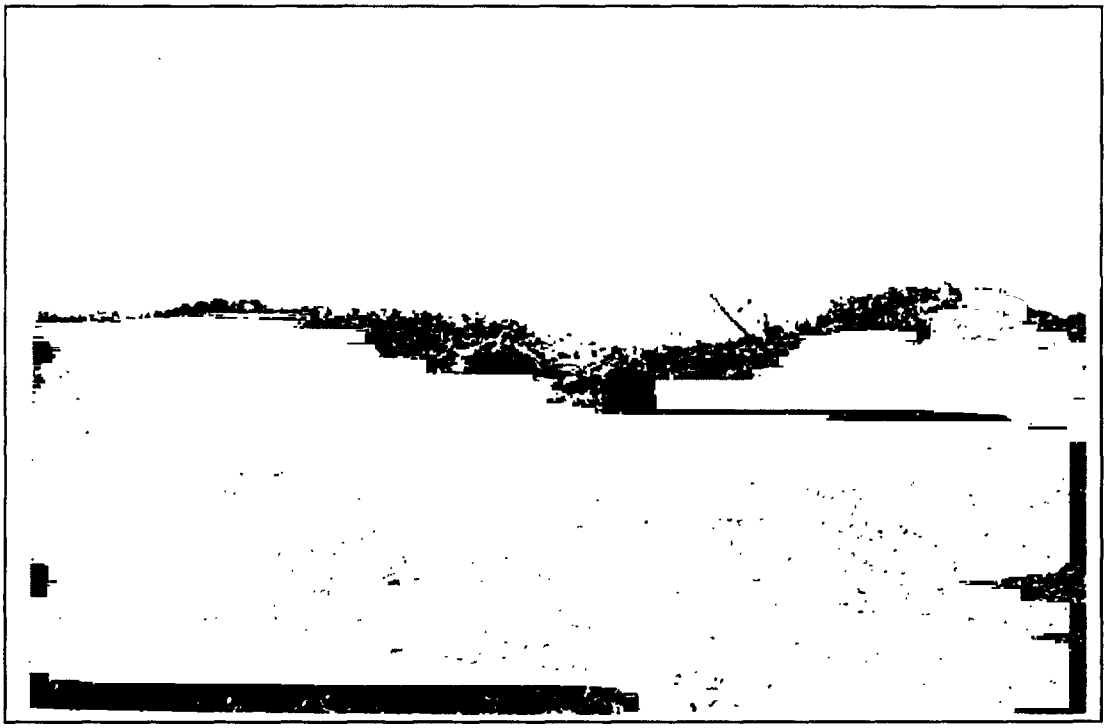


Photo 2A: Woodland Vegetation and clearing of the vegetation close to Sherkole

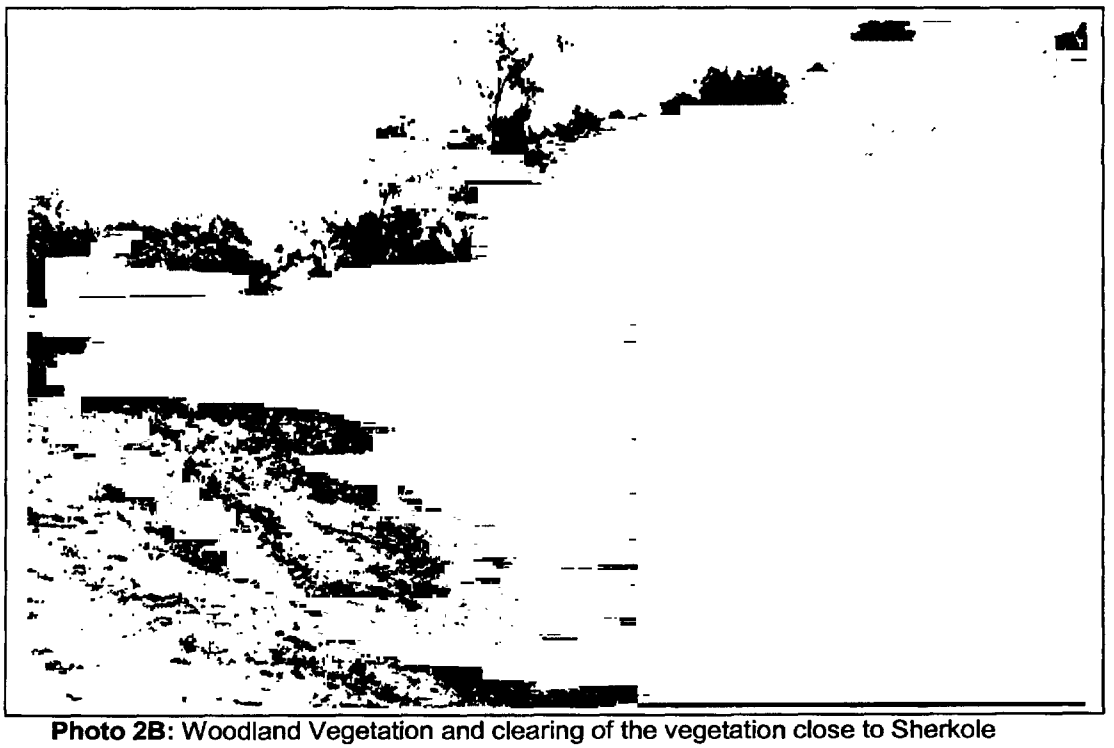


Photo 2B: Woodland Vegetation and clearing of the vegetation close to Sherkole

Photo 3: *Crinum subcernum*. An unique specie, known so far only from the Region in Ethiopia, otherwise known from southern Tanzania and Zimbabwe.

Photo 4A: Wetlands sites with various species of sedges and *Eulophia* species.

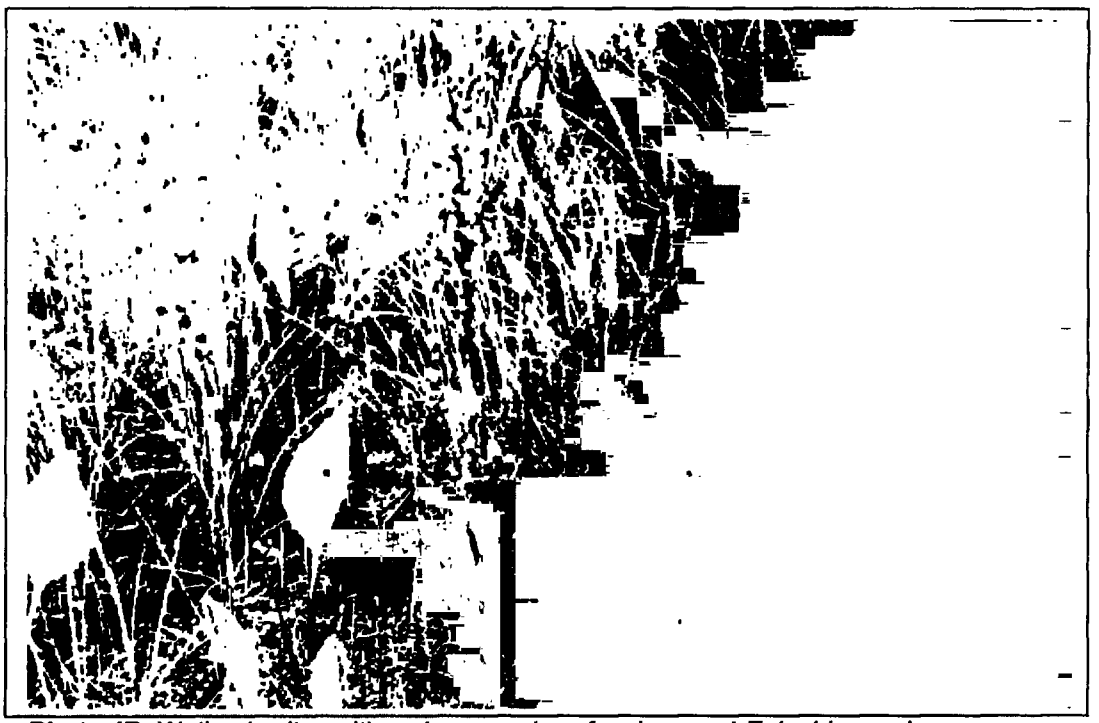


Photo 4B: Wetlands sites with various species of sedges and *Eulophia* species.

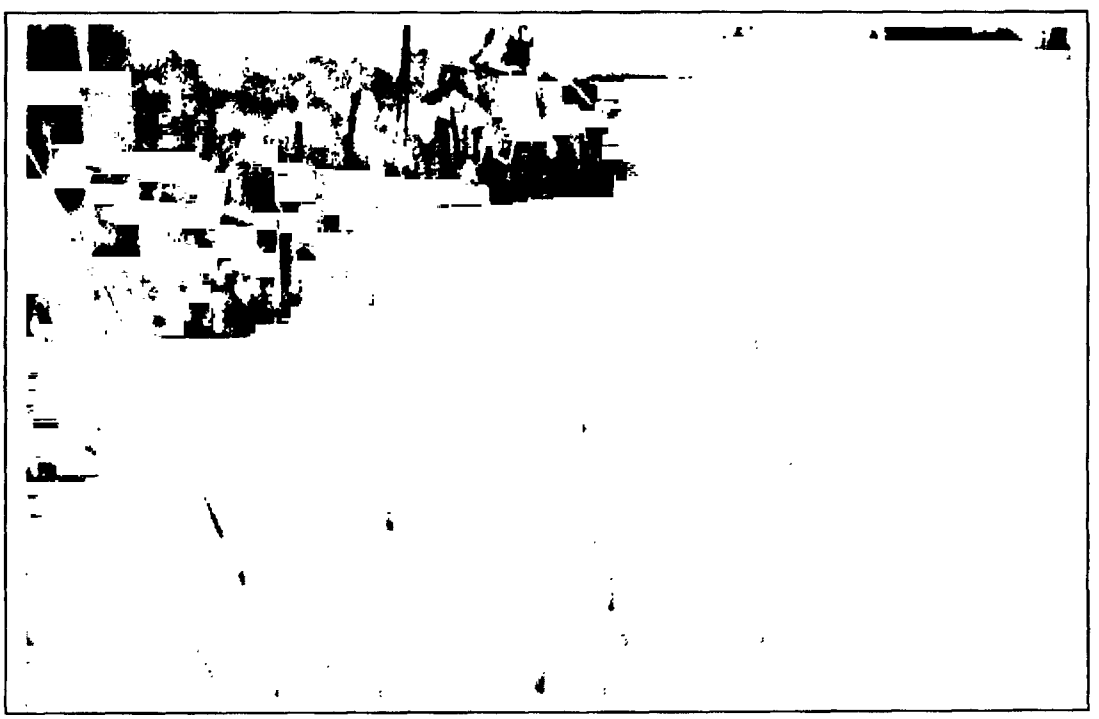


Photo 5: *Eulophia guineensis*, a beautiful orchid common in the area.

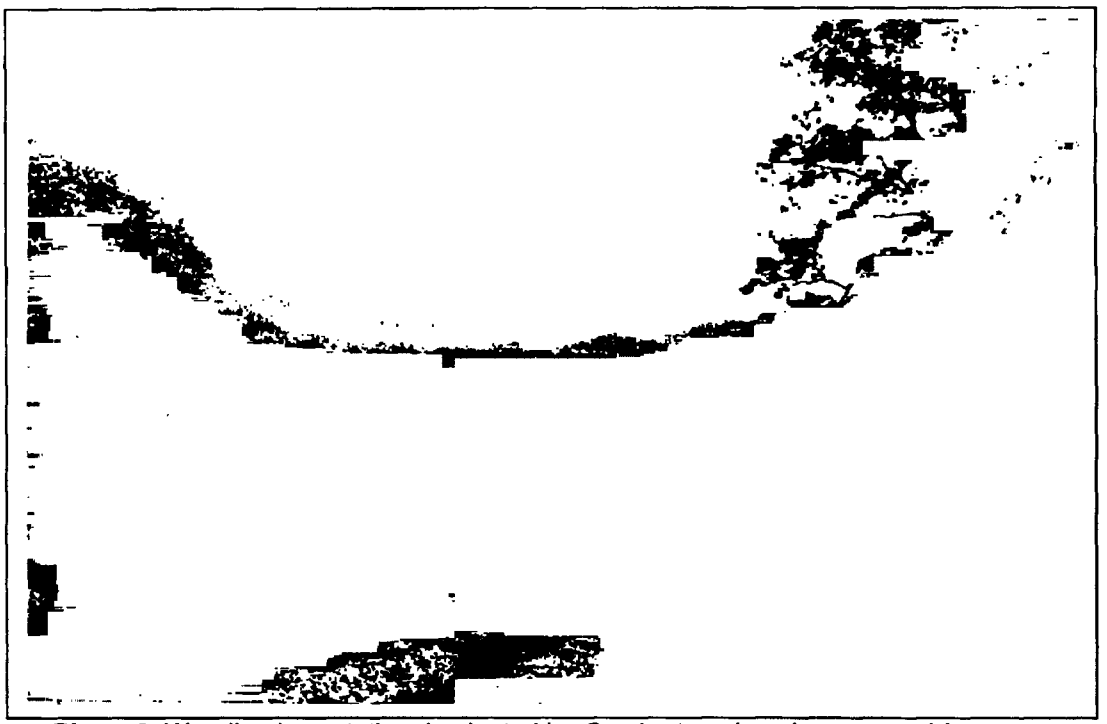


Photo 6: Woodland vegetation dominated by *Combretum*, *Lonchocarpu* and *Lannea* species at c. 30 km from the junction on the new road towards Abay, c. 11°04.65'N, 35°16'E.

Photo 7: *Gladiolus daleni subsp. daleni*, a beautiful wild monocut found in the woodland, this one seen at c. 7 km from the junction on the new road towards Abay, c. 11°12.31'N, 35°22.33'E.

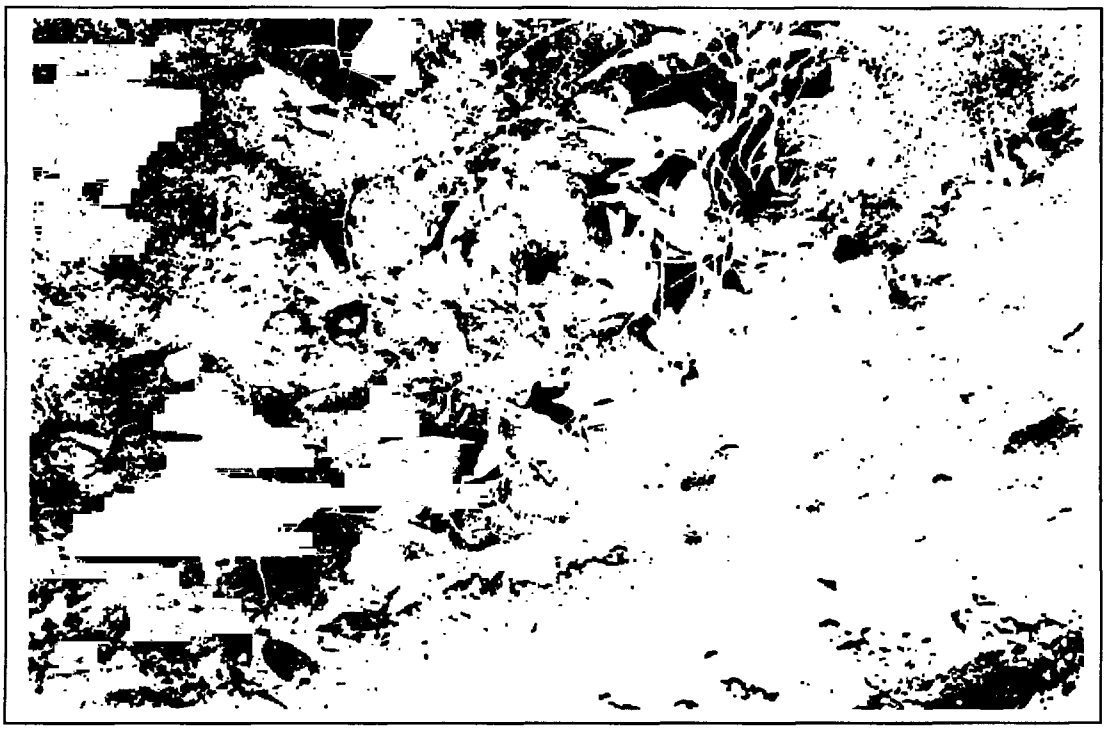


Photo 8: *Merremia gallabatensis*, an attractive prostrate perennial herb, endemic to Ethiopia and known so far only in Metekel and Metema in the woodland vegetation.

Photo 9: Riverine vegetation dominated by *Hyaphane thebaica* atYabulu River, c. 7 km from the junction on the new road towards Abay, c. 11°12.31'N, 35°22.33'E.

Photo 10A: Entrance to the new road (woodland on the western side and cultivation on the eastern side.

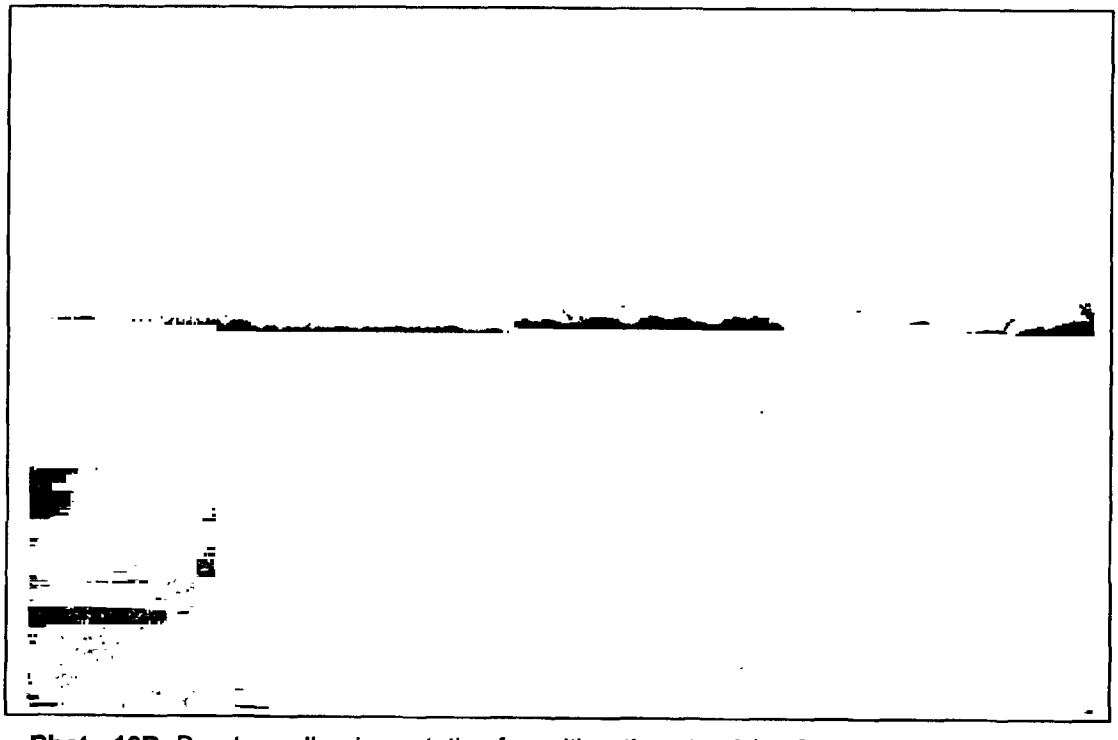


Photo 10B: Burnt woodland vegetation for cultivavtion at c. 2 km from the junction on the sides of the new road, c. 11°15'N, 35°22.51'E.

Photo 11A: Yarenja Refugee Camp.

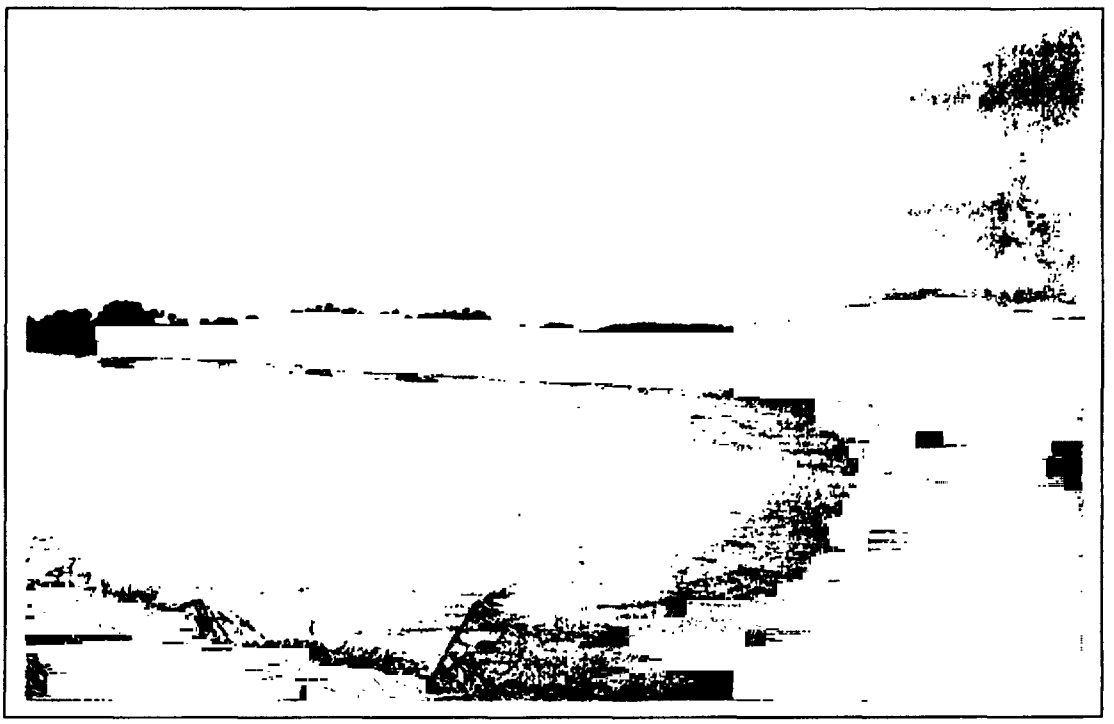


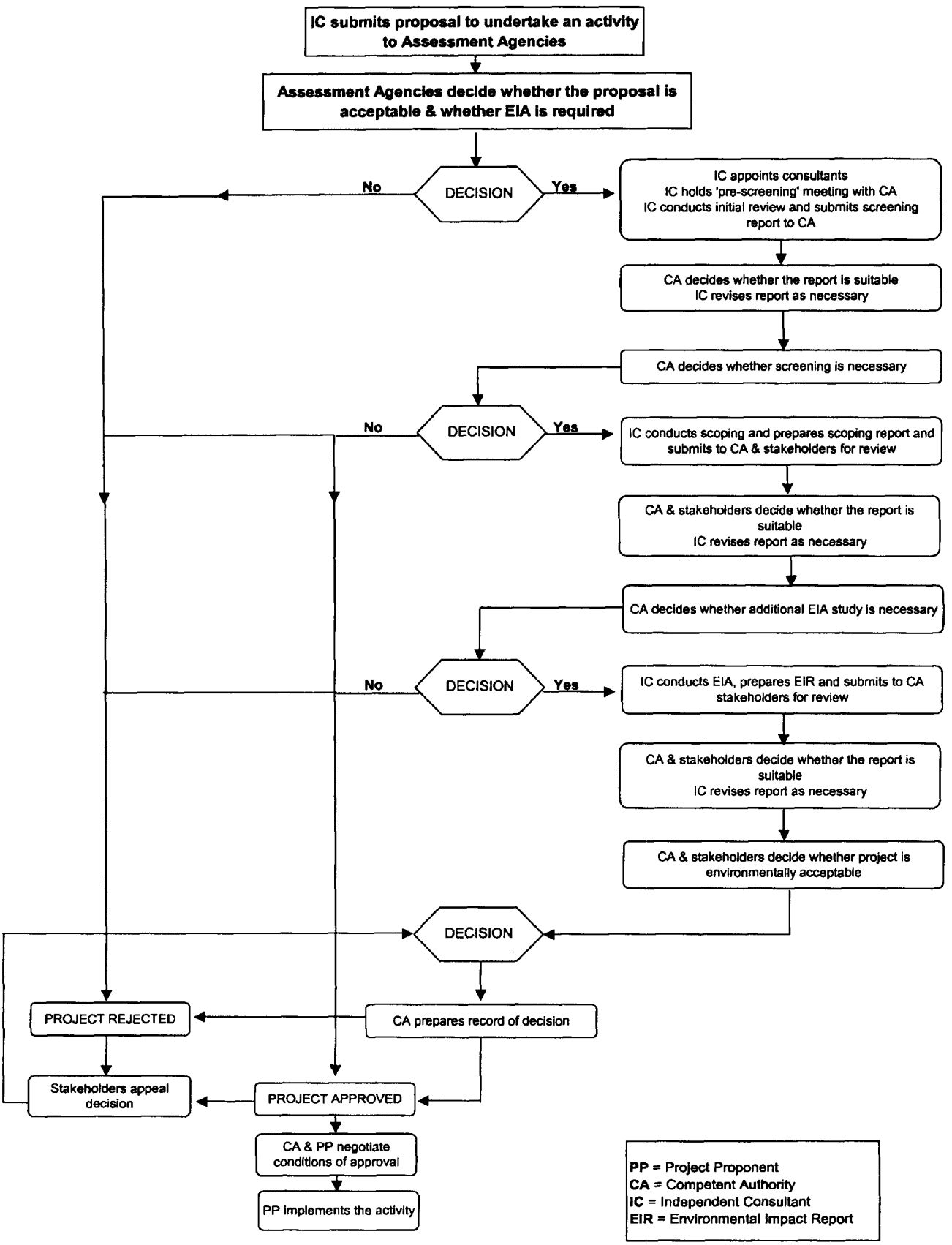
Photo 11B: close to Abay River, which will be the terminal point of the new road on Metekel side, vegetation in the vicinity already cleared, c. 11°00'N, 35°12.33E.

Photo 12: Site 3, vegetation dominated by Adansonia digitata trees, a specie not commonly found in Ethiopia, except in the Tekeze valley between Tigray and Gonder, and Sidamo, apart fromBenishangul. According to information on the flora of Ethopia vol. 2, part 2 (1995), this is the baobab of tropical Africa and the white pulp is used to make a refreshing drink with water, the leaves are edible and the bark is used as rope.

Annex C
EPA EIA Review Process

November 2001

Annex C: Simplified EIA Procedural Flow in Ethiopia



Source: EPA EIA Guidelines Document, July 2000

Annex D
Household Survey
Questionnaire

November 2001

Enumerator: Please use the codes below as indicated in question

Code A	Code B	Code C	Code D
0 Never	1 Walking	0 Nothing/Not used	1 Cannot afford
1 Several times/day	2 Donkey/mule/horse	1 Water	2 It is not available
2 Once/day	3 Animal+cart	2 Firewood	3 Don't need it
3 Several times/week	4 Bicycle	3 Crops	4 Other / specify
4 Once/week	5 Motorcycle	4 Products from market	
5 Several times/month	6 L'rover/jeep/pick-up	5 Passengers	
6 Once/month	7 Bus	6 Other/specify	
7 Several times/year	8 Truck	7 All	
8 Once/year	9 Other/Specify		
9 Rarely/or first time			

Enumerator: Please use the codes below as indicated in question

Code A	Code B	Code C	Code D
0 Never	1 Walking	0 Nothing/Not used	1 Cannot afford
1 Several times/day	2 Donkey/mule/horse	1 Water	2 It is not available
2 Once/day	3 Animal+cart	2 Firewood	3 Don't need it
3 Several times/week	4 Bicycle	3 Crops	4 Other / specify
4 Once/week	5 Motorcycle	4 Products from market	
5 Several times/month	6 L'rover/jeep/pick-up	5 Passengers	
6 Once/month	7 Bus	6 Other/specify	
7 Several times/year	8 Truck	7 All	
8 Once/year	9 Other/Specify		
9 Rarely/or first time			

Enumerator: Please use the codes below as indicated in question

Code A	Code B	Code C	Code D
0 Never	1 Walking	0 Nothing/Not used	1 Cannot afford
1 Several times/day	2 Donkey/mule/horse	1 Water	2 It is not available
2 Once/day	3 Animal+cart	2 Firewood	3 Don't need it
3 Several times/week	4 Bicycle	3 Crops	4 Other / specify
4 Once/week	5 Motorcycle	4 Products from market	
5 Several times/month	6 L'rover/jeep/pick-up	5 Passengers	
6 Once/month	7 Bus	6 Other/specify	
7 Several times/year	8 Truck	7 All	
8 Once/year	9 Other/Specify		
9 Rarely/or first time			

Enumerator: Please use the codes below as indicated in question

Code A	Code B	Code C	Code D
0 Never	1 Walking	0 Nothing/Not used	1 Cannot afford
1 Several times/day	2 Donkey/mule/horse	1 Water	2 It is not available
2 Once/day	3 Animal+cart	2 Firewood	3 Don't need it
3 Several times/week	4 Bicycle	3 Crops	4 Other / specify
4 Once/week	5 Motorcycle	4 Products from market	
5 Several times/month	6 L'rover/jeep/pick-up	5 Passengers	
6 Once/month	7 Bus	6 Other/specify	
7 Several times/year	8 Truck	7 All	
8 Once/year	9 Other/Specify		
9 Rarely/or first time			

A: የግል ሕይወት ታሪክ - PERSONAL DATA

የቃለ መጠይቅ አቅራቢው ስም፣ _____
Name of Enumerator:
ቃለ መጠይቁ የተካሄደበት ሥፍራ፣ _____
Name of Place where Interview is held:
ቃለ መጠይቁ የተካሄደበት ቀን፣ _____
Date of Interview:

A1	የት ነው የሚኖሩት? - Where do you live?:	
A1/1	ቀበሌ/ገበሬ ማኅበር - Kebele/Farmers Association:	
A1/2	ወረዳ፣ - Woreda:	

A2	እዚህ አካባቢ ምን ያህል ዓመት ኖሩ? How long have you lived here (years)?						
		1	2	3	4	5	6
A3	ቀደም ሲል የት ይኖሩ ነበር? Where did you live before?	በወረዳው woreda	በክልሉ Region	ከክልሉ ውጭ Out - Region	ጎረቤት አገር Neighbour C.	ሌላ አገር Another C.	ሁሌም እዚሁ Always here

		1	2	3	4	5	6	7
A4	የሥራ ዓይነት፣ (ምልክት ያድርጉ)	ገበሬ	ሱቅ ሻጭ	የቤት እመቤት	የቀን ሠራተኛ	አስተማሪ	የመንግሥት ሠራተኛ	ልብስ ሰፊ
	Occupation (tick)	Farmer	Shopkeeper	Housewife	Labourer	Teacher		Tailor
		ነጋዴ	ሜካኒክ	አናጢ	ወፍጮ ቤት	ሻይ ቤት	ሌላ	
		Trader	Mechanic	Carpenter	Miller	Coffe House	Other	

A5	እድሜ፣ Age (years)	

A6	የመልስ ሰጭው ጾታ፣ Sex of Respondent	ወንድ፣ Male		ሴት፣ Female	

		1	2	3	4	5	6	7
A7	የትምህርት ደረጃ፣ Education Level	ምንም None	መሠረተ ትም. Literacy	1ኛ ደረጃ Primary S.	2ኛ ደረጃ Sec. Sch.	ተግባረ እድ Tehc. Traing.	ዩንቨርስቲ University	ሌላ Other

		1	2	3	4	5	6	7
A8	ጎሣ Ethnic Group	በርታ Berta	ጉምዝ Gumuz	አማራ Amhara	ኦሮሞ Oromo	ሺናሻ Shinasa	አገው Agew	ሌላ Other

B እርሻ ፣ AGRICULTURE

B1	ጠቅላላው የቤተሰብ እርሻ ስፋት ምን ያህል ነው? What is the total area cultivated by your household?	ሄክታር hectares								አካባቢ Area
B2	እርሻው በስንት የተለያዩ ቦታዎች ላይ ይገኛል? ብ33 Into how many separate plots of land is this divided ?	በቁጥር no.								
B3	የእርሻው ርቀት ከቤትዎ በእግር ስንት ሰዓት ያስኬዳል? How many hrs does it take to the plots from your house?	ሰዓት hours	በቅርብ Nearest		አማካይ Average		ሩቅ Furthest			
B4	ወደ እርሻዎ በምን ይጓዛሉ? How do you travel to these plots? **(Use Code B)**	የጉዞ ዓይነት mode								
B5	የግብርና ምርትዎን በምን ያጓጉዛሉ? How do you move crops to the house? **(Use Code B)**	ዓይነት mode								
B6	ይህን መሬት ለምን ያህል ዓመት አረሱት For how many years have you cultivated this land?	ዓመት years								
B7	አዳዲስ የእርሻ ቦታዎችን በምን ያህል ጊዜ ያለማሉ? How frequently do you develop new areas of cultivation?	ዓመት years		በየዓመቱ ወይስ መቼም every Year or never						

B ሰብል፣ Crops

			1	2	3	4	5	6
B8	በአለፈው ዓመት የእርሻ ውጤትዎ ምን ነበር? What crops did you grow last season?	ዓይነት type						
B9	ካለሙት ውስጥ በግምት ምን ያህል እጁ ሰብል ተዘርቶ ነበር? Approximately what % of total cultivated area by crop ?	ከመቶ %						
B10	በአለፈው ዓመት ምን ያህል ኩንታል አመረቱ? How many quintals did you harvest last season?	በኩንታል qtls						
B11	በተባይ ወይንም በሌላ የደረሰው ጥፋት ምን ያህል ነበር? How much did you lose to pests or other losses?	በኩንታል qtls						
B12	ለቤት ውስጥ ፍጆታ ምን ያህል አስቀመጡ? How much did you keep for home consumption?	በኩንታል qtls						
B13	ለዘር ምን ያህል አስቀመጡ? How much did you keep for seed?	በኩንታል qtls						
B14	ምን ያህል ምርት ይሸጣሉ? How much did you sell?	በኩንታል qtls						
	ድምር (Sub-total)	ኩንታል/qtl						
B15	በኩንታል ምን ያህል ይሸጣል? What price did you get/qtl	ብር Birr						

B16	ለዘር የሚሆን ምርት ከየት ያገኛሉ? /ምልክት ያድርጉ/ Where did you get the seed from? (tick as appropriate)	ከወዳጅ Friend	ካለፈው ምርት Last crop	ከተወካይ Agent	ከገበያ Market	ከሱቅ Shop	ከሌላ other	ግብአቶች Inputs
B17	የተሻሻለ ዘር ተጠቅመዋል? Did you use any improved seeds?	አዎ YES	አይደለም NO					
B18	ምን ያህል ማዳበሪያ ተጠቅመዋል? How much fertiliser did you use?	በኪ.ግራም kg						
B19	እርሻዎን በምን ዓይነት የእርሻ ዘዴ ያርሳሉ? How do you plough/till your field	ትራክተር tractor	በሬ ox plough	እጅ by hand				
B20	ከቤተሰብዎ ስንት ሰዎች ዘወትር በእርሻ ሥራ ይሰማራሉ? How many people in your household work regularly in the fields?	ወንድ Men	ሴት Women					የሰው ጉልበት Labour
B21	በዋናው የእርሻ ወቅት እርስዎ/ቤተሰብዎ በቀን ስንት ሰዓት ትሠራላችሁ? How many hrs/day do your family work in the main season?							
B22	በአለፈው ዓመት ለእርሻ ሥራ ከውጭ የቀጠሩት ሰው ነበር? Did you hire any labour outside your family to work on the f	አለ YES	የለም NO					
B23	ቀጥረው ከሆነ ለስንት ቀን ቀጠሩ? If so, for how many days?	ቀን no.days						
B24	ቀጥረው ከሆነ በቀን ምን ያህል ከፈሉ? If so, how much did you pay per day?	ብር Birr						
B25	ከእርሻ ልማት ባለሙያዎች እርዳታ ያገኛሉ? Do you have any help from the Development Agent?	አዎ YES	አላገኘሁም NO					ምክር Advice
B26	ለእርሻ ሥራ ባለፈው ዓመት ምን ያህል ገንዘብ ተበደሩ? How much money did you borrow last year to pay for farm inputs or other items?	ብር Birr						ብድር Credit

B ከብት Livestock

B27	ምን ያህል ከብት አለዎት? How Many livestock do you have?	በቁጥር No.	ከብት Cattle	በግ Sheep	ፍየል Goats	ዶሮ Chickens	አህያ Donkeys	ሌላ Other
B28	በአለፈው ዓመት ከከብት ውጤት ምን ያህል አገኙ? How much did you earn from the L.stock of last year?	ብር Birr	ከወተት Milk	ከእንቁላል Eggs	ከሥጋ Meat	ከዶሮ Chicken	ሌላ ካለ Other	ሌላ ካለ Other

B29	በእርሻ ሥራ ላይ ያጋጠሙ ችግሮች ምን ምን ናቸው? **What are the main difficulties you face on your farm?**	በደረጃ Rank 1-3	ሌላ አስተያየት ካለ ይገለጽ **Other comments**
B29/1	ምርት አልባ /ያለቀ/ አፈር ወይንም ድንጋያማ መሬት፣ Poor soils/stony ground		
B29/2	ድርቅ ወይም አነስተኛ የዝናም መጠን፣ Too dry or too little rain		
B29/3	በቂ የጉልበት ሠራተኛ አለመገኘት፣ Not enough labour		
B29/4	በቂ የእርሻ ቦታ አለመኖር፣ Not enough land		
B29/5	በተባይና በተለያየ በሽታ የሰብል መጥፋት፣ Losses from pests and diseases		
B29/6	የእርሻ በሬ አለመኖር፣ No ox plough		
B29/7	የገንዘብ ብድር አለመኖርና ካለም የወለዱ መጠን መብዛት፣ No credit or credit too expensive		
B29/8	ማዳበሪያን በቀላሉ አለማግኘት፣ No fertiliser available		
B29/9	የምርት ግብዓት ዋጋ ከፍተኛ መሆን፣ Inputs too expensive		
B29/10	ምርትን ለማሻሻል የሚረዳ ምክር አለማግኘት፣ No advice on how to improve cultivation		
B29/11	የሚመረተውን ምርት ለመሸጥ አለመቻል፣ No market for crops		
B29/12	ምርትን ወደ ገበያ ለመውሰድ የሚያስችል መጓጓዣ አለመኖር፣ No transport to market		
B29/13	ወደ ገበያ ለማጓጓዝ የትራንስፖርት ክፍያ ውድ መሆን፣ Transport to market too expensive		
B29/14	የምርት ዋጋ በገበያ አነስተኛ መሆን፣ Low prices in market		
B29/15	ተጨማሪ አስተያየት ካለ ግለጹ Other (specify):		
B30	የተሻለ መንገድ መሠራት/መኖር ለእርሻ ሥራ ምን ያህል ለውጥ ያመጣል ብለው ይገምታሉ? **How would an improved road change your farming activity?**		

C: የቤተሰብ እንቅስቃሴና የገቢ ዓይነት፣ HOUSEHOLD ACTIVITIES AND INCOME

C1	የገቢ ምንጭ፣ Source of Income	ቤተሰብዎ በየትኛው የሥራ ዘርፍ ይሳተፋል What other activities is your HH involved in		ከነዚህ ውስጥ የትኛውን በመሸጥ ገቢ ያገኛሉ? Do you sell any of them?		ማን ይሠራል? Who is involved
		አዎ (YES)	አይደለም (NO)	አዎ (YES)	አይደለም (NO)	M / F / C
C1/1	ከትጥር ከሚገኝ ደመወዝ፣ Wage Employment					
C1/2	የግንዶ እንጨት ከመሰብሰብ፣ Collecting firewood					
C1/3	ከሰል ከማክሰል፣ Making charcoal					
C1/4	ቤት ከመሥራት፣ Collection thatch/grass					
C1/5	አውሬ ከማደን፣ Catching wild animals					
C1/6	ማር ከመሰብሰብ፣ Collecting honey					
C1/7	እጣን ከመሰብሰብ፣ Collecting incense					
C1/8	ወርቅ ከማንጓለል፣ Panning for gold					
C1/9	አሣ ከማጥመድ፣ Fishing					

C2	የቤተሰብዎ የመገበያያ ዘዴ ምንድን ነው? In what method does your household exchange?	በለውጥ Barter	በገንዘብ Money

C3	ከዚህ በታች የተዘረዘሩት ይኖርዎታል? Do you own any of the following items:	አዎ (YES)	አይደለም(NO)
C3/1	የሚኖሩበት ቤት ጣሪያው ቆርቆሮ ነውን? Iron roof		
C3/2	በቤቱ ውስጥ ራዲዮ አለዎት? Radio		
C3/3	በቤቱ ውስጥ የነጭ ጋዝ ምድጃ አለዎት? Kerosene Stove		
C3/4	በቤቱ ውስጥ የሰዓት መቆጠሪያ አለዎት? Watch		

D: የቤት ወጭ፣ HOUSEHOLD EXPENDITURE

D1	በሚከተሉት ላይ ምን ያህል ገንዘብ ያወጣሉ? How much did you spend on the following?		ወጭ በብር Expense/in Birr
D1/1	ለምግብና ለሌላ ፍጆታ፣ Food and other consumbles	በወር per month	
D1/2	ለትምህርት ቤት የደንብ ልብስና ለመጽሐፍ፣ School expenses, uniforms, books	ያለፈው ዓመት last year	
D1/3	ለመጓጓዣ፣ Travel and transport	በወር per month	
D1/4	ለእርሻ ሥራ ማስፋፊያና ለከብቶች ጤንነት፣ Agricultural inputs incl. animal care	ያለፈው ዓመት last year	
D1/5	ለሕክምና ወጭ፣ (መድኃኒትና ሆስፒታል) Medical expenses (hospital, drugs)	ያለፈው ዓመት last year	
D1/6	ለውሃ Water	በወር per month	
D1/7	ለነዳጅ፣ (ነጭ ጋዝ፣ እንጨትና ከሰል) Fuel (kerosene, firewood, charcoal)	በወር per month	
D1/8	ሌሉች ወጭዎች፣ Other expenses	ያለፈው ዓመት last year	

D2	ከዚህ በታች ለተዘረዘሩት ወጭዎች ወላኙ ማነው? Who decides on the expensel of the following?	ወንድ Male	ሴት Female
D2/1	የምግብና ሌላ ፍጆታ፣ Food and other consumbles		
D2/2	ለትምህርት ቤት የደንብ ልብስና መጻሕፍት፣ School expenses, uniforms, books		
D2/3	ለመጓጓዣ፣ Travel and transport		
D2/4	ለእርሻ ሥራ ግስፋፊያና ለከብቶች ጤንነት፣ Agricultural inputs incl. animal care		
D2/5	ለሕክምና ወጭ (መድኃኒትና ሆስፒታል፣) Medical expenses (hospital, drugs)		
D2/6	ለውሃ፣ Water		
D2/7	ለነዳጅ (ነጭ ጋዝ፣ እንጨትና ከሰል፣) Fuel (kerosene, firewood, charcoal)		
D2/8	ሌሉች ወጭዎች፣ Other expenses		

E: ጤና ነክ ጉዳዮች፣ HEALTH ISSUES

E1	በቤተሰብ ውስጥ የተከሰቱ ዋና የሕመም ዓይነቶች ምንድናቸው? (1፣ 2፣ 3 ብለው በደረጃ ሦስት መልሶችን ብቻ ስጡ) **What are the main illnesses suffered by your family ?** **Please rank according to response**	ደረጃ 1 - 3 Rank 1-3
E1/1	ወባ፣ Malaria	
E1/2	የተቅማጥ በሽታ፣ Diarrhoea	
E1/3	የተለያየ የሆድ ህመም፣ Stomach problems	
E1/4	የዓይን ህመም፣ Eye infections	
E1/5	የመተንፈስ ችግር፣ Respiratory problems	
E1/6	ኤች አይ ቪ ኤድስ፣ HIV / AIDS	
E1/7	በእርግዝና እና በወሊድ ጊዜ ያጋጠመ ችግር፣ Problems during pregnancy/child birth	
E1/8	የሥጋ ደዌ፣ Leprosy	
E1/9	ሌላ ካለ ይግለጹ Other	

E2	በአካባቢው ዋና የጤና ችግር ምንድን ነው? በደረጃ መልስ ስጡ **What are the main problems with health services** **in your area? Please rank according to response**	ደረጃ 1 - 3 Rank 1 - 3
E2/1	በቀበሌ/በገበሬ ማኅበር የጤና አገልግለት የለም፣ No health facilities in the kibele/FA	
E2/2	በህመም ጊዜ ለመሄድ የጤና ጣቢያው ሩቅ ነው፣ Too far to get to when sick	
E2/3	የሕክምና ወጭ ውድ ነው፣ Too expensive	
E2/4	መድኃኒት ማግኘት አስቸጋሪ ነው፣ No medicines	
E2/5	የሠለጠነ የሕክምና ባለሙያ የለም፣ No qualified medical staff	
E2/6	ሌላ ካለ ይግለጹ Other (specify)	

F: ትምህርት፣ EDUCATION

F1	ምን ያህል ልጆች ወደ ትምህርት ቤት ይሄዳሉ? ቁጥራቸውን ግለጹ **How many children in your household go to school? Give No.**		
	ወንድ ልጆች	Boys	
	ሴት ልጆች	Girls	

F2	ልጆች ወደ ት/ቤት የማይሄዱ ከሆነ ምክንያቱን ግለጹ (መልሱን 1፣ 2፣ 3፣ በማለት መልሱ) **If answer to F1 boys or girls = 0, why do they not go to Schools? Please rank according to response**	ደረጃ 1 - 3 Rank 1 - 3
F2/1	ወንድም ሆነ ሴት ልጅ በቤት ውስጥ የለም፣ No boy or no girl child in household	
F2/2	ትምህርት ቤቱ ሩቅ ነው፣ Schools too far from home	
F2/3	ሴቶች ልጆች በቤት ውስጥ ሥራ አላቸው፣ Girls have chores to do at home	
F2/4	ሴቶች ልጆች መማር አያስፈልጋቸውም፣ No need for girls to be educated	
F2/5	ለትምህርት የሚያስፈልገው የገንዘብ ወጭ ውድ ነው፣ Too expensive	
F2/6	በባህል ምክንያት ወደ ትምህርት ቤት አይሄዱም፣ Tradition	
F2/7	ሴቶችና ወንዶች በአንድ ክፍል ውስጥ ስለሚማሩ፣+ብ180 Classes are mixed (boys and girls together)	
F2/8	የተለያየ ዘርና ሃይማኖት ያላቸው ልጆች ስለሚገናኙ፣ Children interact with other ethnic/religious groups	
F2/9	ሌላ ምክንያት ካለ ግለጹ Other (specify)	

F3	የትምህርት አገልግሉትን በሚመለከት ምን ዓይነት ችግር አለ? (ዋናውን ችግር) በደረጃ ይግለጹ What are the main problems with education services in your area? Please rank according to response	ደረጃ 1 - 3 Rank 1 - 3
F3/1	የትምህርት አገልግሉት በቀበሌ/ገበሬ ማኅበር የለም፣ No education facilities in the kibele/FA	
F3/2	ትምህርት ቤቱ ሩቅ ነው፣ Too far	
F3/3	የትምህርት ክፍያው ውድ ነው፣ Too expensive	
F3/4	የደንብ ልብስ እና መጻሕፍት የሉም፣ No uniforms, books	
F3/5	መምህር የለም፣ No teachers	
F3/6	በትምህርት ክፍሉ በዘርና በሃይማኖት የተለያዩ ተማሪዎች በአንድ ላይ ስለሚማሩ፣ Classes are ethnically/religiously too mixed	
F3/7	ሌላ ተጨማሪ ምክንያት ካለ ግለጽ Other (Specify)	

G: መጓጓዣ እና ግብይት፣ TRANSPORT AND MARKETING

G1	የጉዞ ዝርዝር፣ Trip data	ቤተሰብም ወይም እርስዎ ምን ያህል ጊዜ ይጓዛሉ? How often do you or your family go to: (Code A)	ምን ዓይነት የመጓጓዣ ዘዴ ይጠቀማሉ? What type of transport do you use? (Code B)	ጉዞው ምን ያህል ሰዓት ይወስዳል? How much time does the trip take (hr.)	ወጭው ምን ያህል ነው? (በብር) How much does it cost? (Birr)	ለጉዞው ዋናውን መንገድ ትጠቀማላችሁ? Do you use the main road for this trip?	ለዚህ ጉዞ ዋናው ኃላፊ ማነው? Who has the main responsib for this trip?
						አዎ / አይደለም	ወንድ ሴት ልጅ
						YES / NO	M F C
G1/1	ገበያ Market						
G1/2	ውኃ ለመቅዳት Water collection						
G1/3	የመስክ ጉዞ Field						
G1/4	ለማገዶ እንጨት Firewood collection						
G1/5	ለተቀጠሩበት ሥራ Wage employment						
G1/6	ለትምህርት School						
G1/7	ለጤና Health facility						
G1/8	ማኅበራዊ ጉዞ፣ (ዘመድ፣ ቤተሰብ፣ ለእምነት) Social visits e.g. family,friend, worship)						

G2	በሞተር የማይንቀሳቀስ መጓጓዣ Intermediate Transport	አህያ/በቅሉ Donkey/mule	የአህያ ጋሪ Donkey cart	ብስክሌት Bicycle	ፈረስ Horse	የሚገፋ ጋሪ Wheelbarrow	ሌላ ካለ ግለጽ Other/specify
G2/1	በቤትዎ ምን ያህል አለዎት? How many of these does your household own?						
G2/2	ኃላፊነቱ የማን ነው? Who has the main responsibility for it?	ወ(M) /ሴት(F)	ወ(M) /ሴት(F)	ወ(M)ሴት(F)	ወ(M)/ሴት(F)	ወ(M) /ሴት(F)	ወ(M) /ሴት(F)
G2/3	ምን ያህል ገንዘብ ያወጣል? How much did it cost (birr)?						
G2/4	እነዚህን ለማኖር በዓመት ስንት ገንዘብ ያወጣሉ? How much does it cost to maintain ? (birr/year)						
G2/5	ምን ያህል ጊዜ ይጠቀሙበታል? (ኮድ ኤ) How often is it used? (Code A)						
G2/6	ምን ያህል ጊዜ ያከራዩታል?/ይከራዩታል? (ኮድ ኤ) How often do you rent it out or hire it?(Code A)						
G2/7	በምን ያህል ዋጋ ያከራዩታል?/ይከራዩታል? For how much ? (specify birr per hour)						
G2/8	ከቤተሰብዎ ማን ማን ይገለገልበታል? Who in the family uses it?	ወ /ሴት/ ልጅ M / F/ C	M / F/ C	M / F/ C	M / F/ C	M / F/ C	M / F/ C
G2/9	ለጭነት የሚገለገሉብት ከሆነ ምን ዓይነት ጭነት? If used for cargo, what kind of cargo? (Code C)						
G2/10	ለግል ጉዞ ይጠቀሙበታል? Is it used for personal travel?	አዎ አይደለም YES / NO	YES / NO	YES / NO	YES / NO	YES / NO	YES / NO
G2/11	ካልተጠቀሙበት ምክንያቱን ግለጹ (ኮድ ዲ) What is the main reason for not using one? (Code D)						

G3	የትራንስፖርት አገልግሎት Transport services	ፒክ አፕ Pick-up	አውቶቡስ Bus	የጭነት መኪና Truck
G3/1	እቃ ለማጓጓዣ ምን ያህል ጊዜ ተሽከርካሪ ይጠቀማሉ? (ኮድ ኤ) How often do you use motorised transport services to carry goods? **(Code A)**			
G3/2	ማጓጓዣውን ለምን ዓይነት እቃ ይጠቀሙበታል? (ኮድ ሲ) What type of cargo do you use the transport for ? **(Code C)**			
G3/3	ምን ያህል ርቅት ይጓዛሉ? (በኪ. ሜትር) How far do you travel? (in Km)			
G3/4	ምን ያህል ይከፍላሉ? (በኪሉ ግራም/በሻንጣ) How much do you pay? (specify/kg or bag)			
G3/5	ለግል ጉዳይዎ/ጉዞዎ ይጠቀሙበታል? ('አዎ" ወይም 'አይደለም' ብለው ይመልሱ) Do you use it for personal travel? (Please answer Yes or No)			
G3/6	ምን ያህል ርቅትይጓዛሉ? (በኪ. ሜትር) How far do you travel? (in Km)			
G3/7	ምን ያህል ይከፍላሉ? (በሰው ወይም በርቀት) How much do you pay? (specify/pers/distance)			
G3/8	ለምን ይህን አገልግሎት አይጠቀሙም? Why don't you use these services? **(Code D)**			

G4	የተሻሻለ የመጓጓዣ አገልግሎት ቢኖር መጓጓዣውን ለመጠቀም ምን ያህል ዝግጁ ነዎት? ከአሶሳ፣ ሸርኮሌ፣ መንጌ፣ ኮመሻ፣ ጊዘን (አንዱን መነሻ ያድርጉ) ከ _____ ወደ _____ **If there were better transport services how much would you be prepared to pay to go from Assosa, Sherkole, Menge, Komosha, Giesen (pick one destination)** **From ---------- to ----------**					
G3/1	ብር / በጉዞ Birr /trip	ከ 1 - 4 ብር 1 to 4 birr	ከ 5 - 9 ብር 5 to 9 birr	ከ10 - 14 ብ 10 -14 birr	ከ15 - 20 ብ 15 - 20 birr	ከ20 ብር በላይ > 20 birr

G5	የትራንስፖርትን አገልግሎት ለማሻሻል በእርስዎ በኩል ቅድሚያ ሊሰጠው ይገባል የሚሉት የትኛውን ነው? **What would be your priority for improving transport services in your home area**	ለእግረኛ መሄጃ Footpaths	ጥርጊያ መንገድ Tracks	ዋና መንገድ Main Road	ድልድይ Bridges	ሌላ ካለ ይገለጽ Other

H: የኅብረተሰቡ ተሳትፎ፣ COMMUNITY PARTICIPATION

		አዎ YES	አይደለም NO
H1	ቀደም ሲል በመንገድ ሥራ ላይ ተሳትፈዋል? Have you worked on a road project before		
H2	በዚህ ሥራ ለመሳተፍ እድሉን ቢያገኙ ይሳተፋሉ? If given the chance, would you work on a road project?		
H3	ሴቶች በመንገድ ሥራ ቢሳተፉ ኅብረተሰቡ ፈቃደኛ ነው? Should women be allowed to work on road projects ?		

H4	ሴቶች በመንገድ ሥራ የማይሳተፉ ከሆነ ምክንያቱን ከ1-3 በደረጃ መልስ ስጡ If no, why not? Please rank according to response	ደረጃ 1 - 3 Rank 1-3
H4/1	የመንገድ ሥራ የሴቶች ሥራ አይደለም፣ Not women's job	
H4/2	ሴቶች በቤት ውስጥ ብዙ ሥራ አላቸው፣ (ለመንገድ ሥራ ጊዜ የላቸውም) Women have too much of other work at home (no time)	
H4/3	ሴቶች በመንገድ ሥራ ላይ ተሳትፎ ለማድረግ ጥንካሬ ያንሳቸዋል፣ Women are not strong enough	
H4/4	ሴቶች ገንዘብ ማግኘት የለባቸውም፣ Women should not earn money	
H4/5	ባህል ስለሆነ ነው፣ Tradition	
H4/6	ሌላ ምክንያት ካለ ግለጹ Other	

H5	ሴቶች በመንገድ ሥራ መሳተፍ ካለባቸው በምን ደረጃ (1-3 በደረጃ መልስ ስጡ) If yes, in what capacity: Please rank according to response	ደረጃ 1 - 3 Rank 1-3
H5/1	በጉልበት ወይም በቀን ሠራተኝነት፣ Labourer	
H5/2	በኃላፊነት፣ Supervisor	
H5/3	ምግብና ውኃ በመስጠት፣ Providing food and water	
H5/4	በጥበቃ ሠራተኝነት፣ Watchperson	
H5/5	በእቃ ግምጃ ቤት ሠራተኝነት፣ Stores	
H5/6	ሌላ ምክንያት ካለ ግለጹ Other	

I. የመንገድ መሻሻል ውጤት፣ IMPACTS OF THE ROAD

I1	የመንገዱ መሻሻል ምን ጥቅም ይሰጣል ብለው ይገምታሉ?(በቅደም ተከተል ይመልሱ) What do you think would be the main benefits from improving the road ? Please rank in order of response	ደረጃ 1 - 3 Rank 1-3
I1/1	ወደ ገበያ መሄጃ፣ Access to markets	
I1/2	ወደ ጤና አገልግሉት መሄጃ፣ Acess to health facilities	
I1/3	ወደ ትምህርት ቤት መሄጃ፣ Access to schools	
I1/4	ወደ አስተዳደር ቢሮ መሄጃ፣ Access to administrative centres	
I1/5	ወደ የልማት አገልግሉት ሰጭ ባለሙያዎች ጋር መሄጃ፣ ወይም እነርሱ እንዲመጡ፣ Access to/by development agents	
I1/6	ሥራ የማግኘት እድልን ያሰፋል፣ Employment opportunities	
I1/7	የተሻሻለና በአነስተኛ ክፍያ የትራንስፖርት አገልግሉት ማግኘት፣ Better/cheaper transport services	
I1/8	ምንም የተሻለ ጥቅም አያስገኝም፣ No benefits	
I1/9	ሌላ ምክንያት ካለ ግለጽ Other (specify)	
I1/10	ተጨማሪ ማብራሪያ ካለም ግለጽ Other (specify)	

I2	የመንገዱ መሻሻል ምን ችግር ያመጣል ብለው ይገምታሉ? What do you think would be the problems that will result from improving the road Please rank in order of response	ደረጃ 1 - 3 Rank 1-3
I2/1	አቧዋራ፣ Dust	
I2/2	ጩኸት፣ Noise	
I2/3	የበሽታ መስፋፋት ለምሳሌ የኤች አይ ቪ ኤድስ፣ Spread of diseases, eg HIV/AIDS	
I2/4	የድንገተኛ አደጋ መጨመር፣ Increase in number of accidents	
I2/5	በአካባቢው የሕዝብ ቁጥር መጨመር /ለምሳሌ ከሌላ ቦታ ወደዚህ ሥፈራ መሰደድ/፣ More people migrating here	
I2/6	በመሬት ሀብት ላይ ተጽእኖ ሊያሳድር መቻል፣ Pressure on land resources	
I2/7	በውኃ ሀብት ላይ ተጽእኖ በማሳደር የውኃ እጥረት ሊያጋጥም መቻል፣ Pressure on water resources	
I2/8	በመንገዱ ሥራ ወቅት ሰብል ሊወድም ይችላል፣ Crops are destroyed during construction	
I2/9	ምንም ችግር አይኖርም፣ No problems	
I2/10	ሌላ ምክንያት ካለ ግለጹ Other (specify)	

Annex E
Public Consultation

November 2001

Summary of Outcome of Public Consultations

Public consultations were held at Assosa, Komosha, Menge, Sherkole and Guba (Mankush) during June 2001. Members of the Consultant's team conducted the consultation process according to guiding principles and a consultation outline prepared beforehand (see Annex E).

The woreda officers were asked to convene a meeting, to include both men and women, in order to discuss issues pertaining to the project road.

The objectives of the public consultation were as follows:

1. To inform the public / to present details regarding the proposed road, its design and anticipated function (the reason it is being built), steps to implement the road and timeframe;
2. To ask local residents about their transport needs (both short term and long term)
3. To ask local residents about problems with the existing road and improvements they feel are needed
4. To explore whether or not the proposed road is consistent with their needs and goals
5. To ask local residents about problems with current or past road construction and any issues or conflicts that need to be resolved

Participants were specifically asked their views on the following issues:

- the road condition
- beneficiary and affected groups
- impacts of the road (due to the existing road and expected from the proposed rehabilitation)
- priorities for transport
- environmental issues
- community participation
- women's issues.

This section summarises the findings of the public consultations. Detailed minutes on each of the consultations are provided below, together with the lists of attendees.

<u>The Road Condition</u>

In the past the road condition has been very poor. The section of the road between Menge and Sherkole is closed every year in the wet season from July to November. The section from Assosa to Komosha is passable during the rains, but the condition of the road is very bad. Recently however, some maintenance works of the road has been done from Assosa to Komosha (and is currently ongoing from Komosha to Gizen). The northern end of the road from Mankush to the Abay River has not been maintained since EC 1975 and has deteriorated considerably. The road is usually closed between May and November.

<u>Beneficiary and Affected Groups</u>

The main beneficiaries were cited as being the farmers, residents of the main centres (particularly people conducting business).

The people who would be affected would be those who would have to be displaced if the alignment of the road were changed.

No indigenous peoples or ethnic groups would be adversely affected by the project road.

Impacts of the Road

At all the consultation meetings, participants said that road construction had not caused any problems in the past. Nor had there been any problems due to the existing road, apart from its condition.

The project road would have a number of positive impacts. If the road were to be improved and transport services would also improve. Farm produce could then be sold at larger markets for higher prices. Traders could bring goods to their shops at reasonable prices. The road may also offer employment opportunities.

In Sherkole, Komosha and Menge, it was felt that the road would bring about an improvement in health and education services. It would encourage health and education staff to take up postings in these areas.

In Assosa, access to Amhara Region was cited as a major advantage that would result from the road, as many people there have relatives in Wello.

The road may attract new settlers into the area. In all cases, the participants expressed acceptance of investors and business people coming into the area, but did not want settlers taking up their land.

Concerns about the construction of the road included the destruction of big trees while clearing the right of way, and destruction of mosques, churches and graveyards. However, the latter would not occur if the road were to follow its existing alignment.

Priorities for Transport

In Assosa, the road from Addis to Assosa was cited as being a priority for improvement, followed by the road and bridge connecting Assosa Zone to Metekel Zone.

At all the other venues, the project road was considered the most important transport priority, over other main roads, rural roads, footpaths and bridges.

Environmental Issues

In Sherkole, it was noted that there was a severe drought in 1974 EC which reduced agricultural productivity and food prices escalated. In Menge, Komosha and Assosa, food shortages due to drought have never been experienced. However, in Guba, every 2-3 years they are invaded by armyworms and/or desert locusts, which destroy the crops and consequently cause a shortage of food.

Water is a major problem in all the five consultation areas. Water is obtained from the rivers, In Assosa, Komosha, Menge and Mankush potable water is obtained from boreholes or handpumps. However, river water is also used because of water shortages. In Sherkole rivers provide the only source of water.

Community Participation

Community participation was considered an important factor in road construction at all the consultation meetings. In Menge and Guba, the communities had previously been involved in road construction. The communities would be willing to contribute through labour and by guarding the bridges and road.

Women's Issues

In Assosa and Komosha women had access to transport facilities, including donkeys. In Menge, Sherkole and Guba, women were not allowed to use donkeys for transport because of cultural beliefs.

In all the consultation areas women said they were allowed and willing to work on road construction projects. They could contribute by providing labour, providing supplies (eg. wood, water, bringing things closer to the construction site) and preparing food.

Minutes of the Community Consultation I: Assosa Woreda

Woreda Assosa Date: June 7/2001
Key contact persons: Ato Awraris Terefe, Vice
Location of Meeting: Assosa Woreda, Amba 5 Village
Road location (Km from 0.0):
How participants were notified: The participants were informed through Ato Awraris Terefe, Vice Woreda Administrator.
Number of Attendee's:
Name of person taking meeting minutes: Ato Fitsum, Carl Bro as, Consultant, Agricultural Economist
Follow-up required: The issues regarding mosques, graveyards and about the poor who could not afford to have another place if displaced due to the construction of the road need follow up.

Objectives of the consultation:

i) To inform the local residents the details of the proposed road in terms of the design and function, the steps in implementing the proposed road and time frame,
ii) To understand the transport needs of the local residents (both in short and long term),
iii) To consult the community about the problems of the existing road and the necessary improvement they propose,
iv) To explore the consistency of the proposed road with their needs, and
v) To understand the past and present road construction issues and conflicts in the area.

Details of the Consultation:
Amba 5 is situated about 15-20 kms away from Assosa. It is located near the main road passing from Assosa to Sherkole, about 3-5 kms on the right hand side of the road. The village is a resettlement area for people who came from Wello during the *Derg* era.

Based on the guiding principles for public consultation, the consultants introduced themselves and explained the stated objectives of the consultation to the participants. Accordingly, the following points were raised and discussed.

1. The Road Condition
According to the response of the people present, the road had been very bad up until recently. It is only in the last few months that the road has been maintained and become functional. The residents expressed their interest and full support over the plan to rehabilitate and/or construct the road that connects the BGNRS and the Amhara Region. According to them the construction of the road will have the following benefits to the people living in the village.

a) They originally came from Wello (Amhara Region). At the moment it takes them five to six days to reach the part of Wello where their family live. If the road, and especially the bridge over the Abay River are built, it would only take them 2-3 days to reach their families.
b) The road will be an alternative route to reach Addis Ababa for business purposes.
c) It will reduce the cost of spare parts for vehicles that are frequently damaged due to bad road conditions.
d) They would try some alternative businesses/activities other than agriculture.
e) Goods from within and outside the country would be found at a cheaper in price.
f) It will create employment for their families.

Thus, they hope that if the Government is willing and able to do it would be a leap forward in their life.

2. Beneficiaries and Affected People

According to them if the road is to continue on the existing alignment, there would not be a major problem, and only very few individuals can be affected. However, they warned that there would be serious problems if the road is to be rerouted and if there are attempts to take up the already small sized farms. They demanded some clarification as to whether the road would pass through their farmland. The participants suggested that there would not be a big problem with clearing the bushes, but care must be taken not to destroy the indigenous big trees within the forests, especially near the Sherkole area. This area is very hot and dry especially in the summer, and if the big trees will be destroyed the area will easily be converted into desert, like the neighboring areas in the Sudan.

3. Impacts of the Road

According to the participants the existing road has not created any difficulty so far. They hope that if the road is improved it will improve their life, as stated above. With regard to the road attracting new settlers, they could not forecast at this stage what the Government is planning. But business people would obviously be around to do business and the interaction would be higher than it is now. They hope this will create more jobs, and income, and also more understanding rather than conflicts. With regard to special places to be conserved, at the moment the road has not created any problem, and if it continues along the same path, there would not be any problems. But if realignments are proposed, care should be taken to avoid of the churches, schools, clinics, and farmland, and be prepared to pay compensation.

4. Priorities for Transport

Regarding priorities there were two points raised. Firstly it was expressed that water was their first priority. But after some discussions and clarifications, the participants agreed that the road from Addis Ababa to Assosa must be maintained and improved first, and finally they said that there was a need for the road and bridge that connects Assosa with Metekel, in particular the bridge must be built. At present there is no [infrastructure] link with the BGNRS and the Amhara Region.

5. Environmental Issues

There was no major shortage of food in the village, and there not one person has been known to die due to lack of food since they came to this settlement area. However, they say that recently land shortage has become an aggravating problem which might lead to a food shortage very soon. There has not been a major drought recently. The shortage of water is becoming serious due to lack of/poor maintenance of the already constructed boreholes and hand pumps. Thus the residents are now drawing water from streams and rivers.

6. Community Participation

The participants expressed that community participation is an important factor in any rural development program. They made it clear that they have been involved in many road and related works around their villages. They say they can participate as laborers during construction, and can safeguard bridges and other properties after construction, maintain the road, etc.

7. Women's Participation

The participants of the meeting seriously felt that women can and should be involved in any work that is relevant to them. Women could participate as laborers, supply providers, etc. There was no any objection from the men that women should be involved; in fact husbands would support their wives' involvement in any income generation activity for the family. According to the participants, there is no discrimination in the use of any transportation facilities between men and women. Both can use their pack animals based on agreement and scheduled programs - in fact priority for transport is given to women than men if they are sick, or if it is needed to carry cargo to markets and mills. Almost all such issues are done by agreement.

Community Consultation II: Sherkole Woreda

Woreda Sherkole Date: 8une 2001
Key contact persons: Ato Hassan Mussa Secretary, Woreda Council Ato Dawit, Carl Bro, Consultant, Transport Economist Ato Fitsum, Carl Bro, Consultant, Agricultural Economist Selected Community Members (see attached list)
Location of Meeting: Sherkole Town,
Road location (Km 87 from Assosa):
How participants were notified: The participants were informed through Ato Hassan Mussa Secretary, Woreda Council
Number of Attendee's:
Name of person taking meeting minutes: Ato Fitsum, Carl Bro as, Consultant, Agricultural Economist
Follow-up required: The issues regarding mosque, graveyard and about the poor who could not afford to have another place if displaced due to the construction of the road need follow up.

Objectives of the Consultation:

i) To inform the local residents about the details of the proposed road in terms of the design and function, the steps in implementing the proposed road and time frame,
ii) To discuss the transport needs of the local residents (both in short and long term),
iii) To consult the community about the problems of the existing road and the necessary improvement they propose
iv) To explore the consistency of the proposed road with their needs, and
v) To ask the past and the current road construction issues and conflicts in the area.

Details of the Consultation

Sherkole woreda is the fourth woreda through which the road from Assosa to Guba passes. It is found on the northwest part of the BGNRS bordering the Sudan. It is most remote and hottest place in the Region, and most of the woreda is marginally productive for both crop and livestock production due to the sandy nature of the soils and Tsetse fly infestation, respectively. The community consultation is done in the town. Both men and women were called from the PAs through which the road passes. The following are some of the points discussed during the consultation.

1. The Road Condition
According to the residents' response, the section from Assosa to Sherkole is the worse part of the proposed road. It is continuously deteriorating from time to time and this year its condition has been the worst. Every year the road is closed during the rainy season (from July 1 to Mid November). The residents give due consideration for the construction of the road. They have said that if the road is constructed they will come out of the poverty and isolated condition widely observed in the woreda. It will help them to move from one part of the region to the other within and outside the Region.

2. Beneficiaries and Affected Groups
The respondents indicated that the beneficiaries of the road would be both the local residents and outsiders, mainly those who want to carry out business within and outside the region. In addition the road will help to have good access to health and education facilities, and help retain government staff that frequently flee from the area due to its isolation. The crop and livestock production is low in the woreda; consequently there would only be few individuals who would be affected by the road, if it were to passes through their houses. There is no any specific group (indigenous or settlers) who would be specifically affected.

3. Impacts of the Road

With regard to the impacts of the road, the response was that it would depend on how the road is built and what it passes through. Dust might be the biggest problem especially during the dry season. However, they have made it clear that the advantages would outweigh the disadvantages. They have also made it clear that they are not interested in having new settlers coming into their area, but they did need investors and businessmen who would work in their locality.

With regard to safeguarding sites of special interest, they stated that areas such as graveyards, mosques, schools, health centres, and big trees should not be destroyed while constructing the road.

4. Priorities for Transport

Members of the community expressed their priority needs as building the project road, where the bridge is be their highest priority as they do not have access to Metekel Zone.

5. Environmental Issues

There was a drought condition in 1974, which reduced the food crop production and escalated the price of food crops (Sorghum birr 450/qt). Food crops were purchased from Sudan. Many people were dependent on roots and some people died due to starvation.

Other [more recent] problems are lack of potable water and flourmills. These are located very far and are inaccessible. Currently people are using river water for drinking.

6. Community Participation

Participants of the consultation have expressed their willingness and readiness to participate during all stages of the road project, starting clearing the forest and showing the right routes, to safeguarding bridges and maintaining them after they are constructed.

7. Women's Issues

Women in the woreda are the most negatively affected by lack of transport facilities. They travel long distances on foot in search of water and flourmills and to sell and buy food items,. Moreover, there is a problem associated with the use of non-motorised vehicles such as donkey. Donkeys are used mainly by men, while women travel on foot carrying their goods on their head. In order to overcome this problem, the women said they were willing and ready to cover the cost of transport if there was access. They expressed their readiness to provide assistance either in the form of labour, providing supplies and through other functions.

Community Consultation III: Komosha Woreda

Woreda Komosha: Date: 10th June 2001
Key contact persons: Ato Mustfa Yoseph, Secretary of Komosha Woreda
Location of Meeting: Komosha Town, Komosha Clinic
Road location (Km from 0.0): 38.5 km from Assosa town round about
How participants were notified: The participants were informed through Ato Mustafa Yoseph, Woreda Secretary on 7th June 2001.
Number of Attendee's: 15
Name of person taking meeting minutes: Dawit Gebremedhin from Carl Bro as
Follow-up required: The issues regarding mosque, graveyard and about the poor who could not afford to have another place if displaced due to the construction of the road need follow up.

1. General

Komosha is a new Woreda and information about its area is not available from the Council nor from the Economic Development & Social Services Offices. The Woreda has 14 peasant associations and one service cooperative. It has a population of 12,480 and 2,158 households as per the 2001 census of the Woreda.

The major development priority identified by the Woreda is agricultural development. The people used to raise cattle thirty years ago, but due to tsetse fly infestation, they do not keep cattle any more. Hand tools (the hoe) is the main means of cultivation in the area. The problems encountered to carry out the development include the absence of oxen, tractor and credit facilities. It is suggested that the improvement of the road will facilitate the availability of these inputs.

2. Road Condition

The road from Assosa to Komosha is under maintenance and from Komosha to Gizen is under construction. Thus, the road will be better than it was in the past. The road is important for development. Farmers would be able to sell their products and get what they want from traders if the road is in good condition, and if there is nothing bad about the road. The road has never been closed during the rainy season but it is difficult to drive along it. Even though the traffic decreases during the rainy season, some vehicles still operate.

3. Beneficiary and Affected Groups

The main beneficiaries of the road are the farmers. Sick people could be taken to hospital if there is a road and transport service. There may be few individuals who would be affected and displaced by the construction or widening of the road. But the majority will benefit. If the road follows the present alignment, no one will be affected. But one has to evaluate the overall advantages of the road. It was stated that the displacement of the few is insignificant when one compares the situation with the overall advantage of the road. Those displaced by the road, and who could not afford to resettle in another place, need to get due attention from the Government. This issue needs follow up. The road will not affect any ethnic group or indigenous people.

4. Impacts of the Road (Existing and Proposed Rehabilitation)

The existing road does not create any problem for the people of the Woreda. In the past, the road construction did not create any problem either. The construction of the road will change the way of life of the people because they can sell agricultural produce (crops & fruit) at a higher price in Assosa (large market). In addition those who want to sell their products in Komosha could even get a better price due to the improvement of the road and the availability of transport service.

The road would attract investors to the agriculture sector. Thus agricultural development would be enhanced. The Woreda is willing to accept investors who want to invest according to their established legal framework. The new settlers expected are investors, who would help

themselves and the local native people. Other than this, new settlers (that are non-investors) from other part of the country would create a shortage of land.

Religious place like mosque and graveyards need to be conserved.

5. Priorities for Transport

The project road is the most important priority in terms of transport for the people at the moment. Currently they walk up to Abay River and cross it to get to Guba. During the dry season, people cross the Abay River with the help of skilled swimmers. In the wet season they cross it using canoes. They use trucks for transportation to Assosa by paying Birr ten.

6. Environmental Issues

The road has never been closed and the people have not faced shortage of food. Fifteen years back, the Woreda had enough water. These days the rivers are drying up in some places, but now new pumps and boreholes exist to meet the people's water requirements. So long as the road follows the existing road alignment, there will not be [loss of] forest, woodland, grassland, destruction of grazing areas and pressure on water resources.

7. Community Participation

Community participation is an important factor in road construction. The people had participated in community road construction by contributing money and labour during the previous regimes. At the moment the people participate in guarding the bridges and the road from saboteurs. The people are willing to help in the maintenance of the new road if ordered by the government.

8. Women's Issues

Women are allowed to use transport services like donkeys and trucks. Both (men and women) have equal access to the use of donkeys. They are free from male domination if they wish to participate in road construction. Women could participate by supplying water, bringing things closer to the construction site and preparing food.

Community Consultation IV: Menge Woreda

Woreda Menge: Date: 8th June, 2001
Key contact persons: Ato Usman Mohammed, Menge Woreda Chairman
Location of meeting: Menge Town, Menge Hotel
Road location (Km from 0.0): 57.1 km from Assosa Town
How participants were notified: The meeting has been arranged through Ato Usman Mohammed, the Woreda chairman.
Number of Attendee's: 24
Name of person taking meeting minutes: Dawit Gebremedhin, Carl Bro as
Follow-up required The issue raised regarding mosque and graveyard need due attention.

1. General

The Woreda of Menge is 1,239.5 sq km consisting of twenty-two peasant associations and two service cooperatives. According to the recent (1999) population census conducted by Oxfam, it has a population of 36,499 people and 6950 households.

Agriculture is the major development activity identified by the Woreda. The problems encountered regarding agricultural development includes backwardness of the agriculture sector, low income of the people and absence of access by road during the wet season. The construction of the road is expected to improve these issues.

2. Road Condition

The road is now better than it was in the past. It gives them better access. The road is closed during the wet season, especially from July to October due to the absence of bridges across the Menge, Tumet, Sherkole and Shegol rivers.

3. Beneficiary and Affected Groups

The people of Menge in general will benefit most from the road. The farmers will be able to sell mango, sorghum and oilseeds to the larger market at a better price. Due to the absence of transport to market areas, there are times when mangos are left on the trees.

Some urban and rural dwellers would be displaced due to the construction of the road. But the majority of the people will benefit from the construction of the road. The road will not affect any ethnic groups or indigenous peoples.

4. Impacts of the Road (Existing and Proposed Rehabilitation)

The existing road does not create problems for the people. Road construction has not created problems in the past. If the road is improved, farm produce could get a higher price at the larger markets. In return they would be able to get other products easily at reasonable prices. This would change the way of life of the people. Education, health and other service experts would be willing to work in the Woreda and such services would therefore improve.

The road will have an impact on agricultural development in the Woreda by attracting investors and thus creating employment opportunities. Due to the investment in agriculture, the output will increase and merchants would bring commodities into Menge at reasonable prices.

The participants stated that they needed investors who would provide employment opportunities for the natives; but they did not want new settlers, who would share their land.

They are against of relocating mosques and graveyards which are along the project road.

5. Priorities for Transport

The project road is the most important in terms of transport services, higher in priority than any other feeder roads, main road, footpaths, bridges etc. The people of Menge do not travel to Metekel due to the problem of crossing the Dabus and Abay Rivers.

6. Environmental Issues

Neither a shortage of food nor a shortage of water has ever been observed in the past. The people use river water, or water from boreholes and hand pumps.

The new road will not affect forest, woodland or grassland; nor would it cause crop or livestock losses, loss of agricultural land, destruction of grazing areas, or and pressure on water services.

7. Community Participation

Community participation is an important factor in road construction and maintenance. They had participated in the construction and maintenance of Menge-Fardos road (43 km), Menge-Undulu road (27 km), Menge-Abiendu road (8 km), and Menge-Malio road (8 km) by providing free labour.

The community could help to maintain the road in the future as well.

8. Women Issues

There is no transport service in the Woreda. Due to culture beliefs and sources of finance, women do not use donkeys; however men do. But this is now changing.

Women are allowed to participate in the road construction by preparing and selling food, supplying wood, etc, to those involved in the road construction.

Minutes of the Community Consultation V: Guba Woreda

Woreda Guba Date: July 01/2001
Key contact persons: Ato Hassan, Woreda Secretary
Location of Meeting: Guba town
Road location (Km from 0.0):
How participants were notified: the participants were informed through Ato Awraris Terefe, Vice Woreda Administrator.
Number of Attendee's: 25
Name of person taking meeting minutes: Ato Fitsum, Carl Bro, Consultant, Agricultural Economist
Follow-up required: few mosques and graveyards might be affected, but there is no problem with farmland.

Objectives of the Consultation:

i) To inform the local residents the details of the proposed road in terms of the design and function, the steps in implementing the proposed road and time frame,
ii) To understand the transport needs of the local residents (both in short and long term),
iii) To consult the community about the problems of the existing road and the necessary improvement they propose,
iv) To explore the consistency of the proposed road with their needs, and
v) To understand the past and present road construction issues and conflicts in the area.

1. General

Guba Woreda has an area of 52,628 sq. km consisting of 16 peasant associations and two service cooperatives. As per the recent (1999) population census, the woreda has a population of 11,722 people of which 2,064 live in Mankush town.

Among other development priorities agriculture and water resource development are the major priorities of the people residing in the woreda. The problems encountered regarding agricultural development include backwardness of the agriculture sector, low income of the people and absence of road access during the wet season. The construction of the road is expected to improve problems of access to health, education and market centre.

2. Road Condition

Since 1975 EC, the road has not been maintained and is deteriorating. Trucks are stranded for a number of days exposing passengers to a number of problems. The road is closed between May and November unless some organizations (such as UNHCR) maintain it.

3. Beneficiary and Affected Groups

The participants believe both the government and the local people of the woreda would benefit most from the road. They would use it for their business and the government would benefit from the revenue obtained from the people. The participants expressed this as follows: Farmers will sell mango, sorghum and oilseeds to the larger market at a better price. At the moment Mankush town does not have a market, so people must travel long distances to carry out their transactions at other markets. Due to the absence of transport to market areas, there are times when some products are left unharvested (eg mangos are left on the trees).

The residents expressed that no harm will occur due to the construction of the new road. Rather every body will benefit from the road. They say there is no problem of land in their area, and land belongs to the government. A few people might be affected, but the benefits outweigh the negative impacts that might arise. The road will not affect any ethnic groups or indigenous peoples.

4. Impacts of the Road (Existing and Proposed Rehabilitation)

Neither the existing road nor the newly proposed road is expected to create any problems for the people. If the road is improved, markets will evolve, farm produce would get higher prices at the larger markets, border security would be easily controlled, the value of the land would increase, production and agriculture productivity would increase due to better access to inputs. In addition if the road is constructed there will be higher mobility of people, and knowledge transfer from the local to the external areas, and vice versa will be high. This would change the way of life of the people. Education, health and other service will be accessed easily, experts would be willing to stay and work in the woreda if such services are improved.

The road will have greater impact on the agricultural development of the Woreda by attracting investors and creating employment opportunities. Due to the investment in agriculture, the output will increase and merchants would be able to bring commodities to the area at a reasonable price.

The people need more investors who are willing and able to create employment opportunities for the natives. There is no preference as to the type of investors: they could be local or new comers from other areas.

The participants stated that there were no mosques and graveyards on the road, but if some are actually found along the alignment, they would not have a problem with relocating mosques and graveyards, as there is no problem of land.

5. Priorities for Transport

Some issues were raised in terms of priorities for transport, such as improving the Almahal-Mankush road, maintenance of the Chagni-Mankush road, and constructing the proposed Assosa Guba road. But they agreed that the Assosa-Guba was their priority. However, they insisted that the road should start from the center of the town, move through Yabulu to Yarerenge and Abay, rather than it starting 7 kms outside the town. The project road is most important in terms of transport services than any other feeder roads, main road, footpaths, bridges etc. They sometimes travel to Assosa using canoes to cross the Abay River.

6. Environmental Issues

Desert locusts and armyworm infestation has been a problem for a long time. This happens every 2-3 years and gives rise to a food shortage. These problems were more serious in the earlier days than at present. The elderly recalled that before the Italian invasion these problems were so serious that food was imported from Sudan to feed the local population. Regarding rainfall, there are some irregularities, but no drought has been observed. The people living outside Mankush use river water. Boreholes and hand pumps are used for water for potable water in Mankush.

It was informed that the new road will not affect forests, woodland or grassland. There would be no loss of crops, livestock losses or agricultural land, no destruction of grazing areas, and no pressure on water services.

7. Community Participation

Community participation is an important factor in road construction and maintenance. They had participated in the construction of the road from Wombera to Guba (AJECO). They are interested to participate within their capacity on the proposed Assosa – Guba road construction. They can participate by contributing labour, guarding the road and bridges, maintenance, etc.

8. Women Issues

There is no transport service in the Woreda. Due to cultural beliefs and sources of finance, women do not use donkeys. Men exclusively use donkeys.

Women are willing and allowed to participate in the road construction by preparing and selling food, supplying wood etc to those involved in the road construction.

Annex F
Terms of Reference for
the Biological Survey

November 2001

TERMS OF REFERENCE FOR THE BIOLOGICAL SURVEY

Rapid Appraisal Biotic Resources (Flora and Fauna) of the Asossa - Guba Road

By rapid appraisal it is meant that the consultant will use a combination of modern scientific and traditional knowledge to characterize the biological resources in the zone of influence of the alignment, to assess sensitivity, and to analyze potential effects (both negative and positive) of the construction and operation of the road, *in a short period of time.*

Date of Delivery: 31 July 2001

Objectives:

1. To perform a field survey of biological resources (flora and fauna) within the zone of influence on both sides of the center line of the proposed Asossa - Guba road concentrating on wetlands, woodlands, and riverine forest where present.

2. To identify sensitive areas, if any, and to assess the area's sensitivity to negative effects induced by construction and operation of the road.

3. To assess impacts and change that may be induced by the road, and to identify needed mitigation measures to avoid or lessen negative impacts.

Required Activities:

1. Study available documentation, including those listed below, to identify key resource areas
    - Topographic maps and field data regarding the alignment and its position, to be supplied by Carl Bro
    - Landsat images
    - Aerial photographs to be made available for review by Carl Bro
    - Preliminary Findings of the Environmental Assessment Report a copy to be supplied by Carl Bro
    - Description of the road project and associated activities including material source areas, as these are currently known to be supplied by Carl Bro
    - Information on areas of potential mining and agricultural development as these are currently known, to be supplied by Carl Bro
    - Published information on local wildlife obtained in Asossa
2. Perform field study within the zone of influence of the road focusing on locations of principal resources as identified from review of landsat imagery and aerial photographs
3. Inventory biotic resources (flora and fauna) and their geographic distribution within the zone of influence including species composition, ecosystem structure and function, and sensitivity. This includes:
    - Description of the vegetation type
    - Description of species composition and biodiversity
    - Listing of endangered, rare, or vulnerable species, if any
    - Estimation of the ecological significance of the vegetation type at the national level, and regional or global level if of interest
4. Assess the sensitivity of the ecosystem to the proposed changes in order to identify:
    - Variables which are likely to experience change
    - Previous experience of change, that is - other factors operating in the area that are resulting in change such as slash and burn agriculture, resource exploitation, soil erosion, invasion by non-native species and ecosystem simplification
5. Assess the impacts that may be induced by the road both during construction and during operation

6. Interview traditional users of the local natural environment who have first hand information (questions to be covered are attached)
7. Write a report on the above with regard to the attached outline of the Environmental Impact Assessment utilizing Word 6 or above and submitting 2 full hard copies and 2 sets of floppy diskettes (or compact disk); relevant sections in the EIA into which input should be provided are as follows:
    - 4.2.5 Flora (detailed section contents attached)
    - 4.2.6 Fauna (detailed section contents attached)
    - 4.4.3 Scientific Value
    - 4.5.3 Products Harvested from the Wild
    - 5.1 Project Impacts (only as this relates to fauna and flora)
    - 5.2 Environmental Change Expected in the Area without the Effects of the Road Project (only as this relates to fauna and flora)
    - 6.2 Mitigation and Monitoring Program (only as this relates to fauna and flora)
    - Various Appendices as required: Flora List, Fauna List
8. To the degree possible and where appropriate, all data should be presented graphically. Geographical distribution of resource areas should be mapped at 1:50,000 on available topographic maps, otherwise the 1:250,000 map and schematics can be used indicating relative location and scale of resources:
9. Make design recommendations, for example, as follows:
    - road development should be more than one kilometer away from sensitive areas
    - road development should be more than one kilometer away from wetlands
    - water crossings should be minimized
    - buffer zones of undisturbed vegetation should be left between roads and water courses

PRODUCTS TO BE DELIVERED (31 JULY 2001):

1. Report of results, utilizing Word 6 or above and submitting 2 full hard copies and 2 sets of floppy diskettes (or compact disk)
2. Maps presenting the data graphically at 1:50,000 on a topographic map, if this scale is available, otherwise 1:250,000 and schematics indicating relative location and scale can be used

Annex G
Flora List

November 2001

FLORA LIST	
1.	*Acacia hecatopylla*
2.	*Acacia polyacantha*
3.	*Acacia seyal*
4.	*Acalypha sp.*
5.	*Acanthus sennii*
6.	*Achyrantus aspera*
7.	*Adansonia digitata*
8.	*Aframomum alboviolaceum*
9.	*Albizia malacophylla*
10.	*Albuca c867*
11.	*Allophylus macrobtrys*
12.	*Aloe sp.*
13.	*Amorphophallus abyssinicus*
14.	*Ampelocissus schimperiana*
15.	*Annona senegalensis*
16.	*Anogeissus leiocarpa*
17.	*Asparagus flagellaris*
18.	*Asparagus racemosus*
19.	*Aspilia kotschyi*
20.	*Balanites aegyptiaca*
21.	*Bonatea steudneri*
22.	*Boswellia papyrifera*
23.	*Breonadia salicina*
24.	*Carissa edulis*
25.	*Ceropegia racemosa*
26.	*Cissus cornifolia*
27.	*Cissus populinea*
28.	*Clematis hirsuta*
29.	*Clerodendrum alatum*
30.	*Clerodendrum cordifolium*
31.	*Combretum aculeatum*
32.	*Combretum collinum*
33.	*Combretum molle*
34.	*Commelina africana*
35.	*Commelina bengalensis*
36.	*Commelina imberbis*
37.	*Commelina latifolia*
38.	*Commiphora pedunculata*
39.	*Corchorus olitorious*
40.	*Costus spectabilis*
41.	*Crinum ornatum*
42.	*Crossopteryx febrifuga*
43.	*Croton macrostachyus*
44.	*Cucumis sp.*
45.	*Cussonia (Araliaceae)*
46.	*Cyanotis sp.*
47.	*Cyperus spp.*
48.	*Cyperus rotundus*
49.	*Cyphostema sp.*
50.	*Dalbergia melanoxylon*
51.	*Dichrosthchys cinerea*
52.	*Dioscorea bulbifera*
53.	*Dioscorea dumetorum*

FLORA LIST	
54.	*Dioscorea praehensilsis*
55.	*Dioscorea schimperiana*
56.	*Disa aconitoides*
57.	*Dombeya torrida*
58.	*Dorstenia barnmiana*
59.	*Drimia altisima*
60.	*Echinops longifolius*
61.	*Ensete ventricosum*
62.	*Entada africana*
63.	*Eriosema sp.*
64.	*Erytrina abyssinica*
65.	*Eulophia guineensis*
66.	*Faretia apodanthera*
67.	*Faurea sp. (Proteaceae)*
68.	*Ficus sycomorus*
69.	*Ficus thonningii*
70.	*Floscopa glomerata*
71.	*Flueggea virosa*
72.	*Gardenia ternifolia*
73.	*Gladiolus roseolus*
74.	*Grewia mollis*
75.	*Guizotia sp.*
76.	*Hibiscus calophyllus*
77.	*Hoslundia opposita*
78.	*Hygrophila auriculata*
79.	*Hyphaene thebica*
80.	*Hypoxis villosa*
81.	*Hypparhenia sp.*
82.	*Indigofera garckeana*
83.	*Ipomoea aquatica*
84.	*Ipomoea eriocarpa*
85.	*Kniphofia sp.*
86.	*Lannea fruticosa*
87.	*Lannea welwitschii*
88.	*Ledeburia kirki*
89.	*Lonchocarpus laxiflorus*
90.	*Loudetia arundinacea*
91.	*Maesa lanceolata*
92.	*Maytenus senegalensis*
93.	*Merremia gallabatensis*
94.	*Merremia kentrocaulos*
95.	*Momordica foetida*
96.	*Neorautanenia mitis*
97.	*Ochna leucophloeos*
98.	*Oxalis anthelmintica*
99.	*Oxytenanthera abyssinica*
100.	*Ozoria insignis*
101.	*Panicum comorons*
102.	*Pavetta gardenifolia*
103.	*Pelargonium sp.*
104.	*Phoenix reclinata*
105.	*Phyllanthus sp.*
106.	*Physalis ixocarpa*

FLORA LIST	
107.	*Piliostigma thonningii*
108.	*Protea gaguedi*
109.	*Pterocarpus lucens*
110.	*Rhus vulgaris*
111.	*Rumex nepalensis*
112.	*Salacia sp.*
113.	*Sapium ellipticum*
114.	*Scadoxus puniceus*
115.	*Securidaca longpedanculata*
116.	*Senecio sp.*
117.	*Senecio gigas*
118.	*Senna obtusifolia*
119.	*Siphonochilus aethiopicus*
120.	*Sorghum bicolor*
121.	*Spermacoce spharostigma*
122.	*Sporobolus sp.*
123.	*Sterculia africana*
124.	*Sterospermum kunthianum*
125.	*Strychnos innocua*
126.	*Syzygium guineense*
127.	*Tacca leontopetaloides*
128.	*Tamarindus indica*
129.	*Terminalia laxiflora*
130.	*Terminalia macroptera*
131.	*Tylosema fassoglensis*
132.	*Vangueria apiculata*
133.	*Vigna membranacea*
134.	*Vitex doniana*
135.	*Ximenia americana*
136.	*Ziziphus abyssinica*
137.	*Ziziphus mauritania*
138.	*Zygotritonia praecox*

Annex H
Fauna List

November 2001

Partial bird species list for the Benishangul - Gumuz Region

Secretary Bird	*Sagittarius serpentarius*
Ostrich	*Struthio camelus*
Little Grebe	*Trachybaptus ruficollis*
Black-Necked Grebe	*Podiceps nigricollis*
Great Crested Grebe	*Podiceps cristatus*
Great Cormorant	*Phalacocorax carbo*
Long-Tailed Cormorant	*Phalacrocorax africanus*
Great White Pelican	*Pelecanus onocrotalus*
Pink-Backed Pelican	*Pelecanus rufescens*
African Darter	*Anhinga rufa*
Little Egret	*Egretta dimorpha*
Great White Egret	*Egretta alba*
Yellow-Billed Egret	*Egretta intermedia*
Black Heron	*Egretta ardesiaca*
Cattle Egret	*Bulbulcus ibis*
Green-Backed Heron	*Butorides striatus*
Common Bittern	*Botaurus stellaris*
Little Bittern	*Ixobrychus minutus*
Dwarf Bittern	*Ixobrychus sturmii*
Squacco Heron	*Ardeola ralloides*
Black-Crowned Night Heron	*Nycticorax nycticorax*
Goliath Heron	*Ardea goliath*
Grey Heron	*Ardea cincera*
Black-Headed Heron	*Ardea melanocephala*
Purple Heron	*Ardea pupurea*
White Stork	*Ciconia ciconia*
Black Stork	*Ciconia nigra*

Annex I
Persons Consulted

November 2001

Persons Consulted

Head of the Administrative Committee in Menge

Ato Israel Abeje	Department of Mines and Energy Department Head Benishangul-Gumuz region
Ato Menilik Wube	Department of Mines and Energy Mining Team Leader Benishangul-Gumuz region
Ato Daenachen Amberbir	BOPED-Benishangul Head of Planning Bureau of Planning and economic Development
Ato Yeshumneh Terefe	Bureau of Planning and economic Development for Benishangul-Gumuz National/Regional Government. Assosa Town. Dept. Head for Macro-planning and Focal Person for the regional Conservation Strategy
Ato Kinde Haile	Bureau of Agricultural, Assosa Head
Ato Atnafu Aqnatre	Head Natural Resources Department BOA Assosa
Mr. Christof Herman	German Development Service, Technical Assistant Assosa BOPED (1998-2001)
Ato Etsegonnet Atclilu	Ministry of Mines Addis Ababa
Dr. Milliyoni	Representative of the Head of the Bureau of Helath, Benishangul-Gumuz Region
Ato Medferiashwork Abebe	Women's Affairs Expert in the Bureau of Health Programme Coordinator, Healthnet International
Ato Huiot Haile	Expert, Women's Cooperatives and Associations Department, Asosa Regional Council
Ato Hailu Chane	Head of the Bureau of Education and Culture
Ato Mesfin Bekele	Acting Head of the Labour and social Development Department in the Bureau of Disaster Prevention, Labour and Social Affairs
Ato	Transport Department Bureau Assosa
Ato	Baneshegol Village
Ato	Head of Sherkole Town
Ato	Rural Roads Authority Assosa
Workshop Owner	Workshop Producing donkey charts
Owner	Bicycle for hire-business

Owner	Gold shop Assosa Ethiopian Rehabilitation & Development Fund (ESRDF) Komosha Woreda
Ato	ERA Assosa
Truckers	Amba II Village

Annex J
Documents Consulted

November 2001

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Annex K
Terms of Reference
for the EIA

November 2001

Terms of Reference for the EIA

ii) Environmental Impact Assessment (EIA)

The Consultant will carry out comprehensive Environmental Impact Assessments. Particular emphasis will be put on conservation interests (erosion/land slips, drainage channels, scour controls and water harvesting, loss of rare and endemic species, opening and subsequent site restoration of sources of material and plant and construction camp installations, etc.) and the dislocation of existing settlements. The consultant shall prepare environmental mitigation plans for the project road. Further details are presented below:-

1. Environmental Scoping

The initial stage of consultant's intervention shall be the scooping of the area of influence, activities and impacts that are to be studied in the EIA of the road. It shall comprise all the tasks that are required for an environmental assessment, as they are describe hereafter. The Consultant shall start the assignment by deciding upon the limits of the study area for the project roads and drawing the list of activities and impacts to be studied during the assessment.

2. Description of the Proposed Road Improvements

Description of the road construction work shall be based on the preliminary design proposals of the Feasibility study. It will take stock of the different components and break them down according to the type of works in order to ease the identification of their likely environmental impacts. A convenient way to do so is to break down each activity into the following phases; design, construction, maintenance and operation.

3. Study Area

The study area shall comprise the road corridors and all surroundings area that will be under significant influence, i.e., where the environmental impacts of the roads can be felt. The precise boundaries of the study area shall be determined during the initial scooping exercise of the EIA.

4. Description of the Environment

The consultant shall assemble, evaluate and present baseline data on the relevant environmental characteristics of the study area. It shall be a compilation of existing data and studies on the physical and socio-economic environment. These shall include information on any changes anticipated before the project commences. The following elements will be surveyed:

Physical environment: geology; topography; soils; climate and meteorology; surface and ground water hydrology and quality upstream and downstream.

Biological environment: flora; fauna; rare or endangered species; significant natural sites and sensitive habitats including parks and preserves, etc.; species of commercial importance (medicinal plants); and species with potential to become a nuisance, vectors or dangerous.

Socio-economic environment: Land use; land tenure; human settlements; present water supply and water uses; control over allocation of resource use rights; patterns of new settlements; transport patterns.

5. *Policy, Legal and Administrative Framework*

The Consultant shall draw attention to those regulations so far identified by the Ethiopian Environmental protection Authority, which will need to be applied in respect of the project road proposed for external donor financing consideration.

6. *Public Consultation*

The Consultant shall conduct public consultation in at least two towns/villages for upon ten towns affected for along road.

Interviews with individuals belonging to different social and/or economic categories shall be made.

Questionnaires shall also be distributed to local or international NGOs for their options on the construction works in relation to their adverse effects on the environment.

7. *Determination of the Potential Impacts of and Impacts on the Proposed Roads*

Potential impacts to be assessed shall include, but not to be limited to:

(a) Project location: possible resettlement of people; change of property values; loss of forest and agricultural land; loss of vegetative cover; deterioration or loss of ecologically sensitive areas; impact on flora and fauna; impact on historic and cultural sites; effects on water resources outside and inside command area; induced development; need for water harvesting.

(b) Project design: modification of disruption of natural drainage patterns; changes in groundwater elevation; design of road alignments and pavements as well as bridges and culverts; interference with movements of wildlife, livestock and local people; road crossings for people and animals; and water harvesting.

(c) Construction works: landslides, erosions, stream and lake sedimentation; water logging at borrow pits and quarries; construction spoils; air pollution; noise; fuel and oil spills; sanitary conditions and health risks associated with construction camps and workers coming into the area; social conflicts between imported workers and local people.

(d) Project operation: road spills and road runoff pollution; roadside waste; air pollution; noise; traffic safety issues.

The scooping part of the EIA shall determine the exact list of impacts that should be investigated.

8. *Analysis of Alternatives to the Proposed Roads and Road Alignments*

The Consultant shall consider alternatives analyzed during feasibility stage. The different impacts described should indicate which are irreversible or unavoidable and which can be mitigated. The analysis should address, to the extent possible, costs and benefits of each alternative, and incorporate the estimated costs of any associated mitigating measures. The alternative of keeping the current status without road improvements should be included for comparison.

9. *Development of Management Plan to Mitigate Negative Impacts*

The mitigation plan shall recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels. The Consultant shall estimate the impacts and costs of these measures, and of the institutional and training requirements to implement them. Compensation to affected parties for impacts which cannot be mitigated should be considered. The Consultant should prepare a short and concise management plan including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures.

10. Environmental Monitoring Plan

A detailed plan shall be prepared to monitor the implementation of mitigating measures and the impacts of the proposed road work during construction and after completion. The Consultant should define a few indicators of environmental performance that can be monitored on a regular basis.

11. Resettlement Requirements and Planning

The potential land acquisition, compensation and resettlement requirements in the road right-of-way of the proposed road alignments should be assessed. The requirements should be determined with in accordance with the World Bank's Operational Directive on Involuntary Resettlement (OD4.30). A resettlement plan will be prepared if the number of people to be affected exceeds 200 persons.

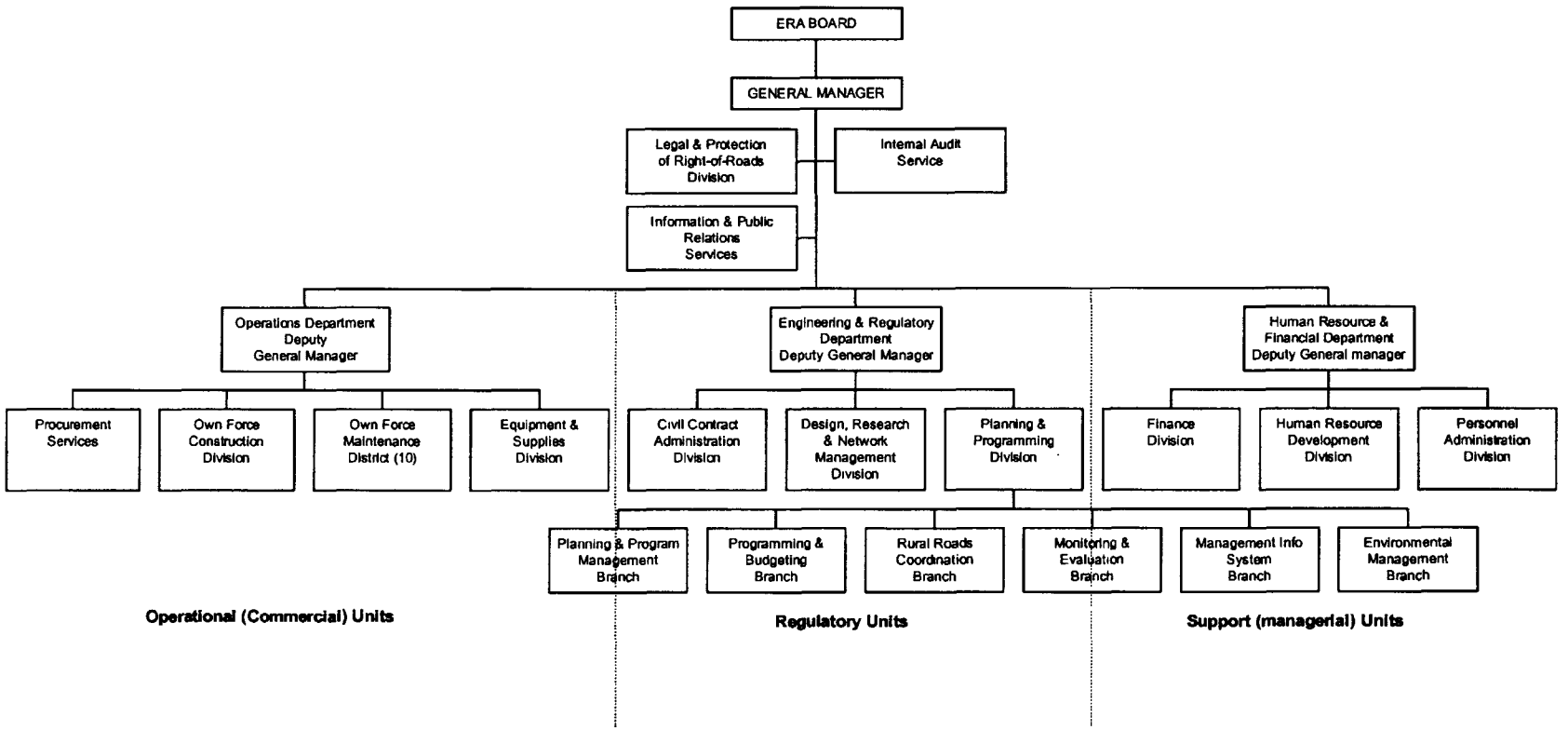
12. Assistance to Inter-Agency Coordination and Public/NGO Participation

The EIA work shall be carried out in close cooperation with ERA. The Consultant shall assist in coordinating the Environmental Assessment with other governmental agencies, notably the Environmental Protection Authority (EPA), Ethiopian Wildlife Conservation Organization (EWCO) and ERA's Environmental Planning Unit (EPU); and in communicating with and obtaining the views of local affected groups and NGOs, particularly in cases of new road alignments.

Annex L
ERA Organization Chart

November 2001

ETHIOPIAN ROADS AUTHORITY
ORGANIZATIONAL CHART



Annex M
Impact Assessment Matrix

November 2001

Impact Assessment Matrix

A key is required to interpret this matrix and it can be found at the end of the matrix. Unfold the page to make the legend continuously available.

Aspect	Impact	Level of Significance	Mitigation
	CONSTRUCTION PHASE		
Soils and Soil Erosion	▪ compaction of soils by earth moving equipment	_	MU
	▪ erosion and modification of surface relief	_ _	MU
	▪ loss of topsoil	_ _	MU
	▪ loss of productive land and property through indiscriminate disposal of soil from the ROW	_ _	MU
	▪ Destabilization of slopes	_ _	MU
	▪ contamination of soil by poor handling of petroleum products	_ _	MU
Ground and Surface Water	▪ modification of surface water flow in borrow pits	_ _	MU
	▪ modification of surface water flows through stream diversion, during cut and fill operations	_ _	MU
	▪ possible modification of groundwater recharge	_ _	MU
	▪ pollution of water through poor fuel handling practices	_ _	MU
	▪ reduction of water availability for community consumption purposes due to competition in use by construction contractors	_ _	MU
	▪ downstream sedimentation including possible siltation problems at Rosieres Dam and Reservoir across the border in Sudan	_ _	MU
Noise and Air Pollution	▪ pollution of air from dust	_ _	MU
	▪ pollution of air from the exhaust of poorly maintained equipment	_	MU
	▪ pollution of air from heavy equipment or plant if used	_	MU
	▪ noise emissions from un-muffled equipment	_	MU
Fauna and Flora	▪ deforestation	_ _	NM
	▪ loss of vegetative cover through several means including alterations in the availability of water, induced slope instability	_ _	MU
	▪ Destruction of plantings (mango trees)	_	M
	▪ Reduction of riverine woodlands at crossings	_ _	NM
	• damage and loss caused by the disposal of spoil materials	_ _	MU
	▪ Reduction of fauna through loss of vegetative cover	_ _	MU
	▪ Increase in poaching	_	M

Aspect	Impact	Level of Significance	Mitigation
	▪ Migration out of the area due to increased stress from noise and dust	– –	MU
Changes in Existing Land Use	▪ Land acquisition especially in settled areas ▪ Siting of borrow-pits on developed land	– M	M M
Road Safety	▪ Conflicts with non-motorized traffic ▪ Uncontrolled traffic deviations without adequate safeguards	– –	M M
Visual Impacts	▪ Visual blight created by poor engineering housekeeping practices, the indiscriminate disposal of spoil materials, and borrow sites	– –	M
Sites of Cultural or Historical Importance	▪ existence of such sites not as yet identified, but road alignment could avoid any such sites that occur ▪ no archaeological resources known as yet, but if located, the road alignment could avoid such resources	NC NC	M M
Social Impacts:			
Public health	▪ dust emissions ▪ noise emissions ▪ spread of HIV/AIDS, from road construction and migrant labour force ▪ conflict between non-motorized traffic and animals and construction equipment ▪ hazardous, poorly secured construction sites and stockyards ▪ contaminated water and soil from petroleum products	– – – – – – – – – – –	M MU M M MU MU
Employment	▪ employment opportunities during construction (temporary) ▪ this will attract migrant labour ▪ only a small portion of the local people will gain employment as most of them are not skilled	+ – – – –	 MU M
Poverty Alleviation	▪ income from labour based construction of road (temporary)	+	
Loss of Property	▪ Loss of property through land taken for ROW ▪ Destruction of property through side tipping of spoil material	– – –	M MU
OPERATION PHASE			
Soils and Soil Erosion	▪ soil contaminated by mine tailings ▪ pollution risk from transport of hazardous substances ▪ erosion from blocked ditches and damaged water control structures ▪ Loss of soil through poor	– – – – – –	MU MU MU

Aspect	Impact	Level of Significance	Mitigation
	agricultural practices of increased in-migrant population	– –	MU
Ground and Surface Water	▪ downstream effects such as eutrophication from irrigation based, large scale agricultural inputs(this includes effects reaching the Rosieres Reservoir across the border in Sudan	– –	MU
	▪ increase sedimentation load of surface water sources	– –	MU
	▪ at drainage basin crossings, modification of surface water flow through road alteration of local hydrology	– –	MU
	▪ alterations in groundwater level resulting from poor placement of fill road or cut road	– –	MU
	▪ increased use of agro-chemicals because easier to obtain them, leading to downstream pollution of water resources	– –	MU
Noise and Air Pollution	▪ dust emissions	–	M
	▪ noise emissions	–	M
	▪ exhaust emissions	NC	M
Flora and Fauna	▪ increased use of agro-chemicals because easier to obtain them, leading to downstream pollution of water resources	– –	M
Changes in Land Use	▪ change from forest land to large scale cultivation or mining, consequently local people will not be able to sustainably exploit forest reserves	– –	M
	▪ traditional grazing areas lost to agriculture or mining	– –	NM
	▪ access to traditional water resources may be restricted or denied	– –	M
	▪ change from traditional slash and burn to large scale (mechanized) cultivation	– –	NM
Road Safety	▪ Improvements in road condition and alignment	+	
Visual Impacts	▪ Poor / insensitive bridge maintenance	–	M
	▪ Indiscriminate solid waste disposal	– –	MU
	▪ Improvements in road environment	+	
	▪ Increased access to scenic vistas	+	
Sites of Cultural or Historical Significance	▪ Propensity to preserve sites if increased access leads to increased appreciation and visitation	+	
Social Impacts			
Public Health	▪ dust emissions	– –	M
	▪ noise emissions	– –	M
	▪ spread of HIV/AIDS, from	– –	M

Aspect	Impact	Level of Significance	Mitigation
	migrant labour force		
Employment	▪ employment created because of agricultural or mining activities ▪ this will attract migrant labour ▪ only a small portion of the local people will gain employment as most of them are not skilled	+ – – – –	 M M
Poverty Alleviation	▪ income from labor-based road maintenance ▪ employment on agricultural farms and mines, but benefits may be limited to migrant workers ▪ sale of more produce because of better access to markets ▪ improved level of nutrition because of improved food supply ▪ improved health, thus increased productivity ▪ improved education levels BUT ▪ although the rehabilitation / construction of the road is not likely to displace any people, the resultant mining/agricultural activities would do so	+ + + + + + + + + + – –	 MU
Changes in Traditional Culture	▪ interaction with migrant population may induce changes in Berta / Gumuz traditional lifestyles ▪ change from forest land to large scale cultivation or mining, consequently local people will not be able to sustainably exploit forest reserves ▪ traditional grazing areas lost to agriculture or mining ▪ access to traditional water resources may be restricted or denied ▪	– – – – – – – –	NM NM NM M
Access:			
To education facilities	▪ by opening up the area, the road will enable BOE to construct schools and expand their activities within Sherkole Woreda (currently virtually devoid of such services) ▪ will improve services provided by BOE with respect to provision of teachers, teaching material, monitoring of teaching standards ▪ will have no effect on school enrollment because children do not travel by public means. ▪ improved income levels may result in increased enrollment numbers	+ + + + NC + +	

Aspect	Impact	Level of Significance	Mitigation
	▪ increased enrollment implies higher literacy rates ▪ school attendance amongst Berta / Gumuz children means they cannot participate in household chores expected of them	+ + _ _	NM
To administrative centers	▪ road will facilitate regional planning (linkages, reporting, monitoring) ▪ road will cut down cost of journey to Guba from Asosa in terms of time and travelling costs (including regional staff time and allowances, vehicle breakdowns) ▪ people will save time and money to get to regional or zonal or woreda centres	+ + + + + +	
To markets	▪ improved access may stimulate crop production at household level, resulting in surpluses that can be sold for income ▪ easier access to agro-chemicals, resulting in higher yields, but may also have negative impacts such as stripping the soil and pollution.	+ + ++ _ _	M
To water resources	▪ may allow people (women) to travel further to get water, resulting in over-exploitation of resource	_ _	NM
To firewood	▪ will allow people (women) to travel further to get firewood, resulting in negative impact on forests	_ _	NM
To health services	▪ by opening up the area, the road will enable BOH to construct health stations/ posts and expand their activities within Sherkole Woreda (currently virtually devoid of health services) ▪ access to areas hitherto not serviced will allow posting of health personnel, delivery of drugs, etc ▪ local people will be able to access health centres more easily and possibly cheaply (eg pregnant women do not have to be admitted a month before, as happens now) ▪ ultimately the health of the population should improve (decreased infant mortality, morbidity rates decreased, etc), implying increased productivity ▪ family planning programs will be able to target more women,	+ + + + + + + + ++	

Aspect	Impact	Level of Significance	Mitigation
	which may stabilize the population growth rate		
CUMULATIVE EFFECTS			
Livelihood	▪ loss of livelihood through loss of productive resource base	_ _	NM

Level of Significance	
++	major positive
+	minor prositive
0	no impact
NC	no change
-	minor negative
- -	major negative
Mitigation	
M	impact can be mitigated
NM	impact can not be mitigated
MU	mitigation of impact uncertain

LEGEND

Impact Assessment Matrix

ERA

Assosa - Guba Road Project

Carl Bro a/s - Dana Consult Plc