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<th>Full Form</th>
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</thead>
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<tr>
<td>CES</td>
<td>Central Equatoria State</td>
</tr>
<tr>
<td>CE</td>
<td>County Engineer</td>
</tr>
<tr>
<td>CPA</td>
<td>Comprehensive Peace Agreement</td>
</tr>
<tr>
<td>CSO</td>
<td>Civil Society Organization</td>
</tr>
<tr>
<td>EES</td>
<td>Eastern Equatoria State</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>ESSAF</td>
<td>Environmental and Social Screening and Assessment Framework</td>
</tr>
<tr>
<td>HE</td>
<td>His Excellency</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>ICSS</td>
<td>Interim National Constitution of Southern Sudan</td>
</tr>
<tr>
<td>IPDP</td>
<td>Indigenous People’s Development Plan</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>LS</td>
<td>Lakes State</td>
</tr>
<tr>
<td>MTRB</td>
<td>Ministry of Transport, Roads &amp; Bridges</td>
</tr>
<tr>
<td>MOE</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>NLC</td>
<td>National Land Commission</td>
</tr>
<tr>
<td>PHCC</td>
<td>Public Health Care Center</td>
</tr>
<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
</tr>
<tr>
<td>RE</td>
<td>Resident Engineer</td>
</tr>
<tr>
<td>SSDP</td>
<td>South Sudan Development Plan</td>
</tr>
<tr>
<td>SSPHC</td>
<td>South Sudan Population and Housing Census</td>
</tr>
<tr>
<td>SSRRP</td>
<td>South Sudan Rural Roads Project</td>
</tr>
<tr>
<td>SSTF</td>
<td>South Sudan Transition Trust Fund</td>
</tr>
<tr>
<td>STD</td>
<td>Sexually Transmitted Disease</td>
</tr>
<tr>
<td>TCRSS</td>
<td>Transitional Constitution of the Republic of South Sudan</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WES</td>
<td>Western Equatoria State</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

1.0 Introduction

The environmental and social impact study of the South Sudan rural roads project is a study of 11 roads sections that lie mainly in the Greater Equatoria region of South Sudan. Of the 11 roads only one terminates in the southernmost tip of the Lakes State. There are three interventions to be applied to the roads; they are

- Rehabilitation
- Periodic maintenance and spot improvement
- Labour-based spot improvement and maintenance

The roads are listed below:

<table>
<thead>
<tr>
<th>Project Reference No</th>
<th>Description</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRW 1</td>
<td>Rehabilitation of Selected Rural Roads</td>
<td></td>
</tr>
<tr>
<td>RRW 1-1</td>
<td>Magwi – Lobone (thru’ Parajok) Road – Lot 1</td>
<td>89 km</td>
</tr>
<tr>
<td>RRW 1-2</td>
<td>Amadi – Tali Road – Lot 2</td>
<td>50 km</td>
</tr>
<tr>
<td>RRW 1-3</td>
<td>Tali – Yirol (Awerial) Road – Lot 3</td>
<td>52 km</td>
</tr>
<tr>
<td></td>
<td><strong>Periodic maintenance and Spot Improvement of Roads</strong></td>
<td></td>
</tr>
<tr>
<td>RMW-1</td>
<td>Yei – New Lasu Road</td>
<td>45 km</td>
</tr>
<tr>
<td>RMW-2</td>
<td>Ras Olo – Maridi Road</td>
<td>71 km</td>
</tr>
<tr>
<td>RMW-3</td>
<td>Maridi – Kozi Road</td>
<td>60 km</td>
</tr>
<tr>
<td></td>
<td><strong>Labor-based Maintenance and Spot Improvement</strong></td>
<td></td>
</tr>
<tr>
<td>RMW-4</td>
<td>Morobo – Panyume Road</td>
<td>25 km</td>
</tr>
<tr>
<td>RMW-5</td>
<td>Panyume – Yaribe Road</td>
<td>25 km</td>
</tr>
<tr>
<td>RMW-6</td>
<td>Yaribe – Gimunu Road</td>
<td>30 km</td>
</tr>
<tr>
<td>RMW-7</td>
<td>Panyume – Jamara – Limbe Road</td>
<td>30 km</td>
</tr>
<tr>
<td>RMW-8</td>
<td>Yei – Kergulu – Morobo Road</td>
<td>63.5 km</td>
</tr>
</tbody>
</table>
2.0 Purpose and Need of Project
South Sudan faces critical environmental and socio-economic challenges, including land degradation, deforestation and the impacts of climate change that threaten long term peace, food security, access to markets and services. In addition it faces the challenge of the remoteness and isolation of the rural communities from towns and cities. Improving the various modes of transport infrastructure, especially roads therefore, can help reduce poverty, enhance livelihoods, stimulate trade and yield overall benefits without compromising accommodation of sustainable development practices. It is a well-established fact that road transport has played a very significant role in the growth and development of countries in the recent past. The Ministry of Transport, Roads and Bridges, as part of the South Sudan Development Plan (SSDP, 2012 – 2014) intends to link major towns by constructing up to 1,000 km of asphaltic bituminous paved roads as well as upgrade about 700 km of interstate and trunk roads to engineered bituminous and gravel surfacing road standards, through mechanized and labor-based approaches which will guarantee local youth employment.

The South Sudan Rural Roads (SSRRP) is the Government’s vehicle for delivering 540km of feeder roads to the Greater Equatoria region.

3.0 Project Objective
The SSRRP has the objective of enhancing connectivity to agricultural, economic and social services for rural communities in high agricultural potential areas. It also aims at developing state and national institutions. State institutions presently are incapacitated by their inability to access communities in diverse locations in their operational areas. As one person put it succinctly at one of the community meetings:

“When the road is built, the Government will be able to collect tax.”

It goes without saying; that people who cannot be reached obviously cannot be taxed.

The ESIA study is to ensure that project objectives are achieved in an environmentally sustainable way.

4.0 National Legal, Policy and Institutional Framework
Relevant national and International laws, regulations and policies that would guide the study were reviewed to ensure that the study did not contravene any. It was also to ensure that their relevance to the project was taken into account as mitigation measures were designed to safeguard the environment. The laws considered and their relevance is captured in a table below:
### Table ES 1: Summary of the Policy and Legal Framework

<table>
<thead>
<tr>
<th>Policy/Legal Requirement</th>
<th>Key statutes</th>
<th>Relevance to Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Environmental and Social Screening Report for South Sudan Rural Roads Project</td>
<td>It recommends that all roads be subject to an ESIA study and have a site specific ESMP prepared.</td>
<td>This study is to carry out those recommendations</td>
</tr>
</tbody>
</table>
| The Interim National Constitution of South Sudan & Transitional National Constitution of South Sudan | Women shall be accorded full and equal dignity of person with men  
Women shall have the right to equal pay for equal work and other related benefits  
Every person shall have right to have environment protected for present and future generations through appropriate legislative action and other measures that prevent pollution, prevent ecological degradation, promote conservation, secure ecological sustainable development and use natural resources while promoting rational economic and social development so as to protect genetic stability and biological diversity  
Concerning Lands; States shall manage issues related to land leases, utilization of land in towns and rural planning, agricultural lands within the state boundaries and land tenure | Mitigation measures take into account the statutes of this constitution.                                                                                                                                       |
| SS- National Environmental and Social screening and Assessment framework                | The overall purpose of the National ESSAF is to provide pragmatic operational guidelines and procedures to the GRSS to eliminate, reduce and/or mitigate the environmental and social risks associated with Bank-financed operations implemented under the ISN period; and to develop procedures for the effective environmental planning and management of selected development projects | The ESIA prepared for RRP in line with the National ESSAF and all the measure indicated under this ESIA would comply and follow the guideline and procedures indicated in the NESSAF |
The national ESSAF was prepared to provide the basis for simplifying the application of Bank safeguard policies and related provisions of the Bank’s disclosure policy to all Bank-finance operations in South Sudan during the ISN period.

<table>
<thead>
<tr>
<th>Environmental &amp; Social Safeguards Assessment Framework (Transport Sector)</th>
<th>This framework acknowledges that transport projects may be a source of adverse impacts and therefore it develops procedures for the effective environmental and social planning and management of such projects. The Framework defines environmental and social requirements at each phase of project development, the roles and responsibilities for carrying out assessments, reviewing reports and ensuring implementation of ESMP requirements. Among others the framework outlines what is expected of the ESIA, ESMP and RAP reports. In accordance with the ESSAF MTRB carried out a screening of the SSRRP and recommended the preparation of ESIA, ESMP, and other reports like Resettlement Action Plan (RAP) for the roads selected</th>
<th>ESSAF was used as a guide</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Draft Environment policy (2010)</th>
<th>The policy demands that livelihoods of South Sudanese be improved through sustainable management of the environment and utilization of natural resources. Environmental considerations be incorporated into development policies, plans, programs at all administrative levels Promote effective, widespread public participation in conservation and management of the environment</th>
<th>Mitigation measures were guided by the principles captured in this Policy</th>
</tr>
</thead>
</table>

| Draft Environmental Protection Bill (2010) | ESIA should be done if there will be varying levels of impact, The study should be done by competent ESIA Practitioners. Regulates atmospheric pollutants | This study is in accordance with the recommendations of this Bill |
| **Southern Sudan Land Act** | Expropriation of land for public interests (including road construction among others) should be based on the consultation process with communities. Negotiation and agreements endorsed by the impacted community and individuals evidenced by written protocol between individual or traditional authorities and their communities and signed by the local government and traditional authority. | Since project roads will keep their old alignment, negotiation and agreement with traditional authorities would be irrelevant |
| **Wild Life Conservation and National Parks Act (2003)** | No person shall within any national park cut, clear or remove any tree, bush or other vegetation, mine, quarry and gravel and use the park as a disposition ground for any kind of waste. | Taking cognizance of this no mitigation proposed cutting of trees or bush in national parks. Mitigation also proposes that naturally occurring trees that are cut should be replaced with fast growing trees. |
| **World Bank OP4.01 - Environmental Assessment** | Screening should be done to ascertain project category. It could be A, B or C. The category determines whether the Bank would fund Project and the instrument of Environmental assessment required. | Project was screened by MTRB in 2012. ESSAF report dated March 2012 was included in the study’s literature review. |
| **World Bank OP4.12 - Involuntary Resettlement** | Project affected persons (PAP) must not be made worse off because a project is brought into their area. Resettlement Action Plan (RAP), Abbreviated RAP (ARAP) or a Resettlement Framework must be prepared depending on the extent of impact. | Reconnaissance study identified an issue which was the extension of a garden fence made of bamboo into the right-of-way. During consultation which occurred two months later, the fence had been removed and the crops harvested. Even though during consultation people often asked what would happen to them if their lands, houses or farms were taken. I think it was an indication that people knew their rights. At no point during the reconnaissance or consultation was any property identified as lying within the ROW. OP4.12 is not triggered in the Project area. |
| **World Bank OP/BP4.10 - Indigenous People** | Indigenous people are groups of people distinctly different from dominant groups in their national societies. | The vast majority of people in the project area meet the requirements of OP 4.10. |
The cultures and the very existence of indigenous people are inextricably linked with the lands they live on. Should a project impact on their existence, remediation must be planned and executed.

<table>
<thead>
<tr>
<th>World Bank OP/BP4.11 Physical and Cultural Resources</th>
<th>Investigate and take inventory of cultural resources likely to be affected. Mitigate adverse impacts</th>
<th>Identified tree with historic significance in Magwi Symbolic graves at Agyimutala and Lakamadi Rock deity at Ginyapio Taga Sacred grave in Kichenga. Any occurrences of impacts on unknown cultural resources during construction, the chance find procedure annexed in this document will be used as a guideline (see annex 5).</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Bank Disclosure</td>
<td>Reports must be disclosed by MTRB and Ministry of Environment</td>
<td>Public Forum will be held. Reports would be shared with stakeholders. Their comments would be inculcated into the final report</td>
</tr>
</tbody>
</table>
## ES.2 Review of ESSAF

<table>
<thead>
<tr>
<th>Section</th>
<th>ESSAF Stipulation</th>
<th>Observation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of structure of the Framework Section 2.1 paragraph 4</td>
<td>“…Approval of ESIA’s for each transport project once their designs are reasonably advanced.”</td>
<td>The stipulation is inconsistent with the flow chart in Fig 1 which indicates that the ESIA is done after preliminary Engineering is done</td>
<td>Adapt as per flow chart! which allows alternative designs to be properly evaluated and choice for advanced design based on the alternative with the least impact and cost</td>
</tr>
<tr>
<td>Under the section on Draft Environmental Bill (2010) ,line 1 reads</td>
<td>….Stipulates the need to undertake an Environmental Impact assessment where and when the Lead Agency deems the project...</td>
<td>Does not allow for transparency and consistency because it lends itself to all manner of interpretation</td>
<td>The agency should list the projects where an ESIA is mandatory.</td>
</tr>
<tr>
<td>Under Stage 1: Screening (Classification of projects) the fifth paragraph</td>
<td>Building of Houses Misplaced item since it has nothing to do with transportation</td>
<td>Not applicable to this project</td>
<td></td>
</tr>
<tr>
<td>Institutional framework</td>
<td>Institutional arrangement :National &amp; Local levels Unclear terms of reference for National, State and Village</td>
<td></td>
<td>The terms of reference for the National, State, Local and Village levels ought to be clearly defined. The types of projects which ought to be handled at each level should be stated. This is because smaller units could be handicapped in dealing with sophisticated areas which requires standards and measurements which may be beyond their ability. However committees mandated to issue permits, conduct audits and monitor should have representation from all levels</td>
</tr>
<tr>
<td>Anticipated Environmental &amp; Social Impacts of Transportation Projects</td>
<td>Annexes Standards</td>
<td>Establish standards which can be used for assessment e.g. Noise, air quality, water quality etc.</td>
<td></td>
</tr>
</tbody>
</table>
5.0 Description of Road Network

Under the SSRRP, eleven (11) selected roads have been packaged for rehabilitation and maintenance/spot improvement which will open up high agricultural potential areas.

All the roads are in a considerable state of disrepair. In fact in some areas the road has been overgrown by vegetation to the extent that the road has been reduced to a track just wide enough to accommodate one vehicle at a time. (See Fig. ES 1)

**Fig ES1 : Magwi - Lobone**

For most of them the pavements have failed, potholes and ruts have developed in addition to the narrowed carriageway which has been overtaken with shrubs, grass and trees. On some road sections the extent of pavement failure is such that with a little rain potholes become troughs filled with mud; even four-wheeled vehicles traverse those sections with great difficulty. (See Fig. ES 2 and Fig. ES3)
6.0 Description of Environment

South Sudan is a land locked country that shares borders with six other countries. They are Sudan to the North, Ethiopia to the east and Kenya to the southeast and Uganda to the south, Democratic Republic of Congo to the Southwest and Central African Republic to the West.
Climate

South Sudan has a tropical climate that alternates hot dry seasons with wet seasons. The average temperatures range between a minimum of 24°C and a maximum of 40°C. In the majority of the country, rain received per annum is between 750-1000mm. However, in areas in the Western parts of the country, rainfall is slightly higher and ranges between 1000-1500mm annually.

Flora & Fauna

The high rainfall woodland savannah extends into most parts of Bahr el Ghazal and Equatoria states in the south. Trees in this region are generally tall and broad-leaved. Coarse tall tussocks of perennial grasses predominate and fires are hence usually fiercer than in the low rainfall woodland savannah. The most important tree species are Khayyam senegalensis and Isoberlina doka. Other species are Parkia oliveri, Daniella oliveri, Afzelia africana, Terminalia mollis, Burkea africana and itellaria paradoxa.

Sudan’s tropical forests are confined to a few small and scattered localities: the Talanga, Lotti and Lobone forests at the base of the Imatong mountains and the Azza forest in Maridi in Western Equatoria, and other small areas on the Aloma plateau and near Yambio. Species occurring in these tropical forests are similar to those found in the drier parts of the forests of West Africa. The most common are Chrysophyllum albidum and Celtis zenkeri, with Holoptelea grandis in the Azza forest. A number of valuable timber trees are also found, including Khaya grandifolia (mahogany), Chlorophora excelsa, and Entrandrophragma angolense.

In the wooded area, in many of the road corridors, the land is heavily cultivated and on uncultivated soils the woodland has been heavily degraded by human activity and locally replaced by secondary thicket and shrub land. Teak, bananas, maize, sorghum is some of the common crops grown. There are also stands of Bamboo on the Magwi-Lobone road even though on some sections of the road the bamboo is dying off from disease. There are a number of reserved areas in the country but none of the selected roads pass through or lie near a forest reserve.

The country’s wildlife includes large mammals like elephants, giraffes, hippopotamuses, buffaloes, zebras, warthogs and there are numerous varieties of antelopes, chimpanzees, baboons and smaller monkey species. Birdlife is rich and there is an abundance of insects. Reptiles include crocodiles, various snakes and lizards. In Kashiko and Kichenga troops of baboons were seen on a rock outcrop but no other animals were
sighted even though in Maridi the Consultant’s teams were told about animals straying into the area from the Mbia Ngarari Park that straddles the borders of South Sudan and the Democratic Republic of Congo.

✓ **Drainage and Water Resources**

The Country of South Sudan is drained mainly by the Nile and its tributaries. A few of the rivers/streams in the project area flow all year round but most of them flow only during the wet season. Some of the rivers and streams are Yei River, Tali River, Ayii, Kimoru, Maridi, Wolo and Otruk.

✓ **Demography**

The total population in the counties in which the 11 road sections lie is 887,179. The smallest of the counties in terms of population is Mundri West (33,975) and the largest is Yei (201,443). Population densities were as low as 9.51 per km in Mundri East and as high as 76.85 in Morobo.

The roads when rehabilitated would serve a number of communities which include Magwi, Morobo, Yei, Amadi, (Ras Olo) Dukudu Olo, Maridi, Panyume, Limbe, Jamara, Gimunu and Yirol.

✓ **Source of Livelihood**

The common sources of livelihood were crop farming, animal husbandry, self-owned businesses and public service jobs in teaching, health care, security and work in Payam, Boma and state offices.

Since there are many communities in the road corridors and it is obvious that jobs are in short supply, the Contractors will come under a lot of pressure to employ youth in the road corridors. The challenge they will have is that, there will be more hands than they require and it may create conflicts between them and local populations. Already there are conflicts in the making when in some communities, the elders suggest that the contractor employ indigenes only.

✓ **Sources of water for Domestic Use**

The common sources of water for domestic use are from boreholes, wells, rivers and streams. In many instances borehole water was insufficient or the borehole had broken down so populations depended on streams and rivers. In some areas like in the Amadi-Tali road corridor, water is scarce during the dry season.

Contractors working in the relatively dry areas will face many challenges especially since they also need fresh water for construction.
### Table ES 1: Summary of Impacts, Mitigation and Cost

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Proposed Mitigation and Enhancement Measures</th>
<th>Responsible Party</th>
<th>Estimated Cost of mitigation (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Anxiety – The long wait for project commencement is causing anxiety; Indulgence in reckless sexual behavior could increase the incidence of HIV/AIDS and other STIs; Disregard for local customs could create conflict between workers and locals, Hunting and illegal logging by workers could have impact of flora and fauna</td>
<td>➢ During waiting period MTRB should provide information to County Administrators that would then trickle down to communities ➢ Induction of workers should include community relations, spread, treatment and control of HIV/AIDS &amp; STIs ➢ Contractor shall employ a community liaison officer ➢ All workers contracts shall prohibit hunting and illegal logging ➢ Implement GRM</td>
<td>MTRB Contractor Engineer</td>
<td>30,000 for MTRB dissemination of information</td>
</tr>
<tr>
<td>Removal of vegetative cover - grasses, trees of (200mm girth or less), weeds and shrubs will be removed to widen carriageway Trees, shrubs, grasses and weeds shall be removed to gain access to borrow material and create access road to borrow pits</td>
<td>➢ Contractor must seek authorization from engineer and LEC for commercial trees ➢ Limit removal of vegetation to design width of road-from end of carriageway clearing should not exceed 3m (drain=1.8m; construction area=1m)(Priced in the BOQ) ➢ Provide tree seedlings for tree planting where it is deemed necessary ➢ Commercial trees would be counted by engineer and priced in Bill of Quantities ➢ Permits will be sought by contractor from LEC ➢ Negotiations will be done with community or individual owners of trees ➢ Agreed seedlings would be provided for re-aforestation</td>
<td>Contractor Engineer LEC MTRB</td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>Siltation of water bodies resulting from excavation and material deposition from exposed surfaces and</td>
<td>➢ Contractor must seek approval from Engineer for any river works ➢ Approach selected must ensure the avoidance of floods, drying up of river downstream and unnecessary sedimentation.</td>
<td>Contractor Engineer</td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>Issue</td>
<td>Preventive Measures</td>
<td>Responsible Party</td>
<td>Contract Provision</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Uncovered stockpiles of material</td>
<td>When contractor finds it difficult to avoid the above listed alternative sources of water should be provided for nearby communities, covering of sand both stockpiled or in haulage trucks, inspection of surfaces of vegetation.</td>
<td>Contractor Engineer</td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>Sedimentation reduces quality of water for household use and also reduces oxygen available for aquatic flora and fauna</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contamination of water by oil from vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block flow of river during construction of culverts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust generation, burning of plastics and other harmful substances and emissions from haul trucks and other vehicles would reduce air quality.</td>
<td>Road surfaces shall be dowsed with water 3-4 times daily, speed control signals and ramps shall be used, sand and gravel both stockpiled or in haulage trucks shall be covered all the time, inspection of surfaces of vegetation, all vehicles and equipment shall be maintained according to manufacturer’s manual, contractor will be instructed to properly dispose of non-organic waste (plastic, oils, chemicals, etc.).</td>
<td>Contractor Engineer, LEC</td>
<td></td>
</tr>
<tr>
<td>The use of heavy machinery and the movement of vehicles up and down the road shall increase noise levels</td>
<td>Construction shall be limited to day time, workers exposure to noisy and vibrating equipment shall be controlled, workers shall use PPEs and its use shall be enforced, during induction workers shall be trained to minimize noise by not leaving engines running. Drivers will be trained to avoid unnecessary revving of engines.</td>
<td>Contractor Engineer, EHS officer</td>
<td></td>
</tr>
<tr>
<td>Workers and the general public could be involved in vehicular accidents resulting in injury</td>
<td>All workers shall be trained in proper use equipment at induction, regular toolbox(safety) meetings will serve as reminders, awareness creation, training of 1st aid team and provide a well-stocked first aid kit on site.</td>
<td>Contractor Engineer, Payam/Boma Administrators, Community Liaison</td>
<td></td>
</tr>
<tr>
<td>Potential spread of HIV/AIDS and other STI infection due to reckless sexual behavior</td>
<td>Officer Ministry of Health CE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Indiscriminate dumping of waste and free ranging could lead to ru
| Contractor HIV/AIDS commission & NGOs |
| contractor
| Provision of 25,000 for education and distribution of condoms |
| Indiscriminate dumping of waste and free ranging could lead to ru
<p>| Contractor Engineer Payam and Boma Administrators LEC |
| Provision of 5,000 for waste management |
| Road diversions can cause vehicular accidents especially when signage is inadequate Road diversions may lead to loss of vegetation Diversions may lengthen and also slow down traffic | Contractor Engineer |
| Provision in the Construction Contract |</p>
<table>
<thead>
<tr>
<th>Indiscriminate opening of pits, poor sitting of pits could become a hazard to animals and children. Lack of protection when it is operational and non-reinstatement when project is completed could lead to drowning of children and animals</th>
<th>around active construction sites</th>
<th>Contractor Engineer</th>
<th>Provision in the Construction Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of borrow pit should be according to conditions of contract. All borrow pits should be detailed and submitted to engineer for approval Exploitation should be according engineers specifications When in use pits must be properly designed and protected All pits must be properly reinstated (BOQ)</td>
<td></td>
<td>Contractor Engineer</td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>Unacceptable behavior of workers could mar community worker relationships and create conflict</td>
<td>Contractor would engage a community liaison officer Establish channels of communication with communities and hold regular meetings Listen to complaints, record and track proposed solutions to problems Respond promptly to complaints Establish a Grievance Committee and implement the GRM</td>
<td>Contractor Payam and Boma administrators</td>
<td>Provision of 5,000 for grievances management</td>
</tr>
<tr>
<td>Creation of a base camp and other worksite areas could take land out of community land use plans. When such areas are left without de-commissioning, the area can become un-usable</td>
<td>Contractor should negotiate with land owners and abide by conditions for use The contractor should not enter land until compensation to owners has been agreed and paid Approach for de-commissioning should be submitted to the engineer for approval All contractors’ sites should be formally de-commissioned. Areas should be reinstated as closely to its original state as possible Any sites that must be transferred to MTRB or state institutions should be duly done</td>
<td>Contractor Engineer</td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>The influx of non-local workforce into project area may lead to conflicts between workers and indigenes</td>
<td>A community liaison officer should be employed by the contractor He/she will act as a liaison between workers and the locals The GRM must be implemented</td>
<td>Community Liaison officer, stakeholders in the GRM</td>
<td>Provision of 5,000 for grievances management</td>
</tr>
</tbody>
</table>
Health Care Facilities
There seems to be a fairly good distribution of primary health facilities but they are generally poorly staffed and not well stocked.
The Contractors will need to have well-stocked first aid kits, would probably require an on-site nurse.

Educational Facilities
Almost every community had at least a primary school but in some communities the school was not functional or depended on volunteers as teachers.

Cultural Resources
There was the Taga sacred grove in Kichenga which was out of bounds to all except designated persons. There were the symbolic graves at Lakamadi and Agyimutala. There was also the ‘Lungo Uko’ rock deity at Ginyapio and the ‘historic tree at Magwi.
Apart from the symbolic graves which we have been told can be moved out of the right of way, none of the other cultural resources would be touched.
### 7.0 Impact Identification  Mitigation and Cost

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Mitigation/Monitoring Actions &amp; Requirements</th>
<th>Implementation &amp; Reporting Schedule</th>
<th>Responsible Party</th>
<th>Monitoring /Follow-Up</th>
<th>Net Effects</th>
</tr>
</thead>
</table>
| Removal of vegetative cover to widen road or get to borrow material | ➢ Limit removal of vegetation to design width of road.  
➢ Provide tree seedlings for tree planting  
➢ Limit vegetation removal to approve borrow pit size. Re-instate borrow pit after use. | | Contractor | MTRB  
County Engineers (CE)  
Forestry Commission (FC) | Replace or minimize vegetation lost |
| Dust generation due to construction activities | ➢ Dowsing exposed surfaces with water to suppress dust  
➢ Use dust suppressants where water is in short supply  
➢ Erection of speed control signals and ramps  
➢ Covering of sand both stockpiled or in haulage trucks  
➢ Inspection of surfaces of vegetation | 3-4 times daily  
Continuous  
Daily | Contractor or Construction Gang  
Ministry of Agriculture | Project Engineer  
CE, MTRB, MoE  
FC | Minimize air pollution |
| Siltation of water bodies resulting from excavation and material deposition  
Contamination of water by oil from vehicles  
Block flow of river during construction of culverts | ➢ Completing work on schedule  
➢ Deposition of constructional material at least 50m from water bodies  
➢ Embankment erection around fueling and servicing area for vehicles  
➢ Re-channelization | Continuous  
Continuous  
Continuous | Contractor  
Labor gang | Project Engineer  
CE, MTRB, MoE | Minimize pollution of nearby water bodies |
<table>
<thead>
<tr>
<th>Noise from machine Culvert excavation, construction and other maintenance works Concrete mixing machines</th>
<th>Controlling exposure of workers to noisy and vibrating equipment</th>
<th>Daily</th>
<th>Contractor Labor Gang</th>
<th>Project Engineer CE, MTRB Ministry of Health (MoH) MoE</th>
<th>Minimize noise pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise from Machinery</td>
<td>Tool Box (safety) meetings</td>
<td>Bi-Weekly</td>
<td>Contractor Labor Gang</td>
<td>Project Engineer CE, MTRB, MoH</td>
<td>Reduce health risks to workers and general public. Reduce accidents</td>
</tr>
<tr>
<td></td>
<td>Awareness creation</td>
<td>Monthly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Training of 1st aid team</td>
<td>Quarterly</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Maintenance of accidents book</td>
<td>Weekly</td>
<td></td>
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<tr>
<td></td>
<td>Provision of use of PPE</td>
<td>Daily</td>
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<tr>
<td></td>
<td>Provide adequate signage to inform and warn the public</td>
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<tr>
<td></td>
<td>Sensitize school children on proper road use</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Spread of infection due to neglectful sexual attitudes</td>
<td>HIV/AIDS/STDs Awareness workshops</td>
<td>Quarterly</td>
<td>Contractor HIV/AIDS commission &amp; NGOs</td>
<td>Project Engineer MoH, MTRB, HIV/AIDS Commission</td>
<td>Limit spread of HIV/AIDS and STDs and create enough awareness of mode of transmission, protection &amp; treatment</td>
</tr>
<tr>
<td></td>
<td>Provision of free condoms</td>
<td>Weekly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peer group education</td>
<td>Twice monthly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indiscriminate waste dumping and defecation</td>
<td>Segregation of waste</td>
<td>Daily</td>
<td>Contractor Payam and Boma Administrators</td>
<td>Project Engineer CEs, MTRB, MoE</td>
<td>Reduce pollution of environment by indiscriminate disposal of waste</td>
</tr>
<tr>
<td></td>
<td>Composting of organic waste</td>
<td>Weekly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emptying of waste bins @ approved waste dump site</td>
<td>Daily</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Provide adequate toilet facilities</td>
<td></td>
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<tr>
<td></td>
<td>Decommissioning of toilets after project</td>
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<td></td>
</tr>
<tr>
<td>Risk of accidents to workers and general</td>
<td>Posting of traffic wardens (flag crews) to direct traffic flow</td>
<td>Daily</td>
<td>Contractor</td>
<td>Project Engineer MTRB, MoE</td>
<td>Minimize accidents or eliminate them all</td>
</tr>
<tr>
<td>Issue</td>
<td>Countermeasures</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>-------</td>
<td>----------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Indiscriminate opening of pits, poor sitting of pits. Lack of protection when it is operational and non-reinstatement when project is completed** | - Selection of borrow pit should be according to conditions of contract.  
- All borrow pits should be detailed and submitted to engineer for approval  
- Exploitation should be according engineers specifications  
- When in use pits must be properly designed and protected  
- All pits must be properly reinstated  
- Contractor would engage a community liaison officer  
- Establish channels of communication with communities  
- Listen to complaints, record and track proposed solutions to problems  
- Respond promptly to complaints and follow-up afterwards to ensure issue has been addressed |
| **Unacceptable behavior of workers could manner community worker relationships and create conflict** | - Contractor would engage a community liaison officer  
- Establish channels of communication with communities  
- Listen to complaints, record and track proposed solutions to problems  
- Respond promptly to complaints and follow-up afterwards to ensure issue has been addressed |

**Daily**

**Daily**

**CE** together on work site.

**Throughout project cycle**

**Contractor**

**Project Engineer CE, MTRB, MoE**

**Maintain aesthetics of surrounding landscape. Avoid over exploitation of pit Prevent accidents & reinstate pits so land use patterns are not permanently changed**

**Throughout construction period**

**Contractor** Payam and Boma administrators

**Project Engineer MTRB County officials**

**Keep a healthy relationship between contractors’ workers and communities in the corridor**
8.0 Environmental and Social Management Plans

Environmental and Social Management Plan (ESMP) have been prepared for each road to act as a guide to the implementation of mitigation measures proposed.

The ESMPs prepared have outlined the following but are not limited to:

- Description and costs of mitigation measures
- Personnel responsible for the implementation and oversight
- Environmental management procedures
- Monitoring
- Reporting

A summary of impacts, mitigation, responsible persons and costs are available in section 7.0 above

9.0 Consultations

As part of the ESIA there were consultations with County Commissioners, Payam Administrators and 20 communities in all the 11 road corridors. Below is a summary of comments and concerns raised at consultations.

Summary of Issues from 20 Communities Visited

- All communities were happy that the rehabilitation of their roads was finally going to occur but in a number of communities inhabitants were skeptical about the actual construction occurring any time soon. Their complaint was that so many different groups of people had visited their communities yet the Contractor who was to build the road had still not appeared.
- As is common in most South Sudanese communities, all communities expected that rituals would be performed to commence construction of road. In the Acholi areas in particular they expected that rituals would be performed when construction has to be done at streams and rivers along the road corridor.
- In all communities inhabitants expected that contractors would employ some of their young unemployed persons. However in one community an older woman asked that older persons who were fit be considered for employment as well.
- The Contractors were also expected to keep a cordial relationship with communities.
- Many communities were concerned about the conduct of workers of the contractor and would not tolerate immoral behaviour; like sleeping with married women and raping of young girls.
- While people expected that the roads would lead to market for agricultural produce, there was also the fear in many communities that roads would lead to further insecurity.
- Other communities were concerned that the road would increase the spread of HIV/AIDS.
10.0 Conclusion

The environment and social impact study confirms the findings of the ESSAF that there are no fatal flaws that would prevent this project from being implemented.

The study identified ten key adverse impacts that needed to be managed if road works are to be delivered without incident. The report has addressed the key impacts by proposing mitigation measures and developing environmental and social management plans that will enable the contractor and other stakeholders limit or eliminate the effect of these impacts.

Roads are not concentrated in one geographical area and this will pose a challenge for the Ministry of Roads & Bridges that has direct oversight of the selected roads. The distances of roads from Juba would be a limiting factor and may result in inadequate oversight. Issues of poor delivery by contractors may come to the notice of the Ministry too late and a quick response to emergencies may be difficult.

It is therefore our recommendation that the Ministry builds the capacity of County Engineers where available and uses them to assist in the performance of their oversight role.
CHAPTER ONE: INTRODUCTION

1.0 Background

South Sudan is a land locked country in East-Central Africa that shares borders with six other countries, namely; Sudan to the North, Ethiopia to the East, Kenya to the south east, Uganda to the South and Democratic Republic of Congo to the Southwest and Central African Republic to the West.

South Sudan is the newest country in Africa; only two years old. A 2008 Sudan Population and Housing Census put its population at 8,260,490; however in 2011 World Bank estimated its population to be 10.31 million. The country covers an area of 609,832Km$^2$ and like most African countries it is populated by many ethnic groups who speak many different languages.

The country is divided into 10 states which correspond to 3 historical regions:

<table>
<thead>
<tr>
<th>Historical Region</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahr el Ghazal</td>
<td>Northern Bahr el Ghazal, Western Bahr el Ghazal, Lakes, Warrap</td>
</tr>
<tr>
<td>Greater Equatoria</td>
<td>Western Equatoria, Central Equatoria, Eastern Equatoria</td>
</tr>
<tr>
<td>Greater Upper Nile</td>
<td>Jonglei, Unity, Upper Nile</td>
</tr>
</tbody>
</table>

States are further divided into 86 Counties headed by Commissioners. Counties are sub-divided into Payams and Bomas.

Southern Sudan has emerged from decades of war with their Northern neighbor – Sudan and the ravages of war are still very evident everywhere. Infrastructure like roads were either destroyed or neglected, so in many rural areas roads are almost non-existent or in such deplorable state that it hampers movement of goods and services, jeopardizes security and limits access to education, health and business. In many Administrative areas, rural communities are cut off and isolated and this hampers effective administration.

At the moment Republic of South Sudan is in a re-construction phase of its existence and for this to occur, roads are of significant importance. Road construction would facilitate the movement of goods and services needed to bring the markets, hospitals, schools and other infrastructure required to bring development to
the people’s door. The roads would also improve food security as it enables the movement of food from areas where it is abundant to areas where it is scarce. Movement of farm produce will also improve incomes of farm households, reduce the incidence of malnutrition in children and ultimately reduce the dependence of some urban areas on food imports from neighboring countries.

1.1 Purpose and Need of Project

South Sudan faces critical environmental and socio-economic challenges, including land degradation, deforestation and the impacts of climate change that threaten long term peace, food security, access to markets and services and the remoteness and isolation of the rural communities from towns and cities. Therefore, improving the various modes of transport infrastructure, especially roads, can help reduce poverty, enhance livelihoods and stimulate trade and yield overall benefits without compromising accommodation of sustainable development practices. Local communities will not remain isolated and thereby gain basic inputs and services to improve productivity, enhance their livelihood and improve their well-being.

Some progress has been made in rehabilitating the road transport infrastructure after the war. This, however, now needs to move into a development phase, where rural (feeder), trunk and urban road networks are comprehensively interconnected to ensure all-year round access to markets for the small-holder on whose shoulder food production for this country lies. Meanwhile, sound and well-maintained road infrastructure (both urban, trunk and feeder roads) are needed to improve access to basic social services (health and education) with important implications for social sector indicators, including literacy and maternal and child welfare.

Market accessibility particularly for small scale producers has been identified as a major challenge for growth focused on agriculture. Hence, the Ministry of Transport, Roads and Bridges (MTRB) together with State-level authorities will support construction of asphalted, bituminous surface treatment and engineered trunk and urban roads as well as feeder roads to promote both domestic and international trade.

It is well established that road transport has played a very significant role in the growth and development of countries in the recent past. The Ministry of Transport, Roads and Bridges, as part of the South Sudan Development Plan (SSDP, 2012 – 2014) envisages to link major towns by constructing up to 1,000 km of asphaltic bituminous paved roads as well as about 700 km of interstate and trunk roads to engineered bituminous and gravel surfacing road standards, through mechanized and labor-based approaches which
will cater for local youth employment. Further, MTRB will support State governments in constructing, rehabling and maintaining feeder roads for rural communities to access markets. Road works will be complemented with awareness-raising on HIV/AIDS, to mitigate risks that communities will be exposed to. In addition, roads safety and weighing bridges will be installed to enforce axle load standards on designated roads.

The World Bank, in response to the urgent demands set out by the SSDP for reconstructing and building the new nation, has established the South Sudan Transition Trust Fund (SSTF) to support private sector, health and rural roads projects.

Without the implementation of this South Sudan Rural Roads Project the Government of South Sudan would be unable to deliver the development it has promised its people in its South Sudan Development Plan.

1.2 Project Objective and Description

The South Sudan Rural Roads Project (SSRRP) has the objective of enhancing all season road connectivity to agricultural, economic and social services for rural communities in high agricultural potential areas. This objective is achieved by (i) improving access to high agricultural potential areas; and (ii) enhancing the capacity of participating states and relevant national government institutions to manage rural transport infrastructure. The proposed rural roads project contributes to the overarching goal of increasing agricultural production, ensuring food security, and making agricultural products of South Sudan competitive in the local and regional market. The project is designed as an integral part of agricultural development initiatives in South Sudan. The project contains a package of roads proposed for rehabilitation, and spot improvement and maintenance. Institutional development is a core intervention of the proposed project. The project will have three the following components:

(i) Component 1 – Upgrading and Rehabilitation of Selected Rural Roads Targeting High Agricultural areas.

This component will finance the upgrading and/or rehabilitation of selected rural roads opening up high agricultural potential areas. The objective is to rehabilitate 191 km of roads targeting areas identified by the agriculture sector for having high productivity for production of cereals, much needed to ensure food security. This component provides for rehabilitation/upgrading of selected rural roads, provision of supervision services; and updating the draft Environment and Social Screening and Assessment Framework.
(ESSAF) for the transport sector, and preparing Environment and Social Impact Assessments/ Management Plans (ESIAs/ESMPs), and Resettlement Action Plans (RAPs) as required for roads to be rehabilitated and maintained under the project.

**(ii) Component 2 – Road maintenance and spot improvement:**
This component will finance the maintenance and spot improvement of 286 km of rural roads deteriorated due to lack of maintenance during the civil war period. This component will also include maintenance of: (i) feeder roads improved by the former GoSS over the past five years; and (ii) critical collector roads that will ensure connectivity of the priority feeder roads to trunk (interstate) roads. This component will be executed both by mechanized and labor based contractors and it is split into four sub components: (i) mechanized maintenance and spot improvement of 176 kilometers of select rural roads; (ii) supervision of maintenance and spot improvement works for mechanized maintenance contracts; (iii) labor intensive maintenance and spot improvement of about 173 kilometers of select rural roads; and (iv) supervision of maintenance and spot improvement works for labor based maintenance contracts.

**(iii) Component 3 – Institutional Development for Rural Infrastructure Management**
This component will support institutional development initiatives at pilot states and national levels to enhance the capacity for rural infrastructure management. This component constitutes three sub-components: Sub-Component One, which includes: strengthening of the capacity of Pilot States, in particular their ministries responsible for physical infrastructure, to manage rural infrastructure – encapsulating: (i) handling procurement, contract management and financial management matters, and (ii) preparation of business plans - through provision of goods, technical assistance, services and Workshops and Training required for the purpose; Sub Component Two, including: (i) TA to support establishment of a Planning Department for MTRB; (ii) TA to support the preparation of Roads Sector Development Program; (iii) support to establishment of a Road Maintenance Fund; and (iv) road safety programs and strategic studies emerging during implementation; and Sub- Component Three, carrying out of project coordination and management through provision of goods, technical assistance, services, Workshops and Training and Operating Costs required for the purpose, including: (i) training to the Project Management Team (PMT), states and Ministry of Environment staff; (ii) technical assistants (TAs) to the PMT, (iii) provision of technical, social and financial audit firm (Audit Agent –AA); (iv) procurement of desktops and installation of NAVISION Accounting System including training of staff in the ministry; and (v) operational costs for the PMT.
The Government of the Republic of South Sudan and its development partners intend to implement development and investment programs including this feeder roads development project, anchored in the SSDP.

The immediate objective of this project therefore, is to deliver approximately five hundred and forty kilometers (540km) of im-motorable gravel roads to different parts of the country with high agricultural potential and also facilitate movement of goods, services, and improve security. This first tranche however, targets the Greater Equatoria and the southern end of the Lakes State. The selected roads are listed below:

<table>
<thead>
<tr>
<th>Project Reference No</th>
<th>Description</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRW 1</td>
<td>Rehabilitation of Selected Rural Roads</td>
<td></td>
</tr>
<tr>
<td>RRW 1-1</td>
<td>Magwi – Lobone (thru’ Parajok) Road – Lot 1</td>
<td>89 km</td>
</tr>
<tr>
<td>RRW 1-2</td>
<td>Amadi – Tali Road – Lot 2</td>
<td>50 km</td>
</tr>
<tr>
<td>RRW 1-3</td>
<td>Tali – Yirol (Awerial) Road – Lot 3</td>
<td>52 km</td>
</tr>
<tr>
<td></td>
<td>Periodic maintenance and Spot Improvement of Roads</td>
<td></td>
</tr>
<tr>
<td>RMW-1</td>
<td>Yei – New Lasu Road</td>
<td>45 km</td>
</tr>
<tr>
<td>RMW-2</td>
<td>Ras Olo – Maridi Road</td>
<td>71 km</td>
</tr>
<tr>
<td>RMW-3</td>
<td>Maridi – Kozi Road</td>
<td>60 km</td>
</tr>
<tr>
<td></td>
<td>Labor-based Maintenance and Spot Improvement</td>
<td></td>
</tr>
<tr>
<td>RMW-4</td>
<td>Morobo – Panyume Road</td>
<td>25 km</td>
</tr>
<tr>
<td>RMW-5</td>
<td>Panyume – Yaribe Road</td>
<td>25 km</td>
</tr>
<tr>
<td>RMW-6</td>
<td>Yaribe – Gimunu Road</td>
<td>30 km</td>
</tr>
<tr>
<td>RMW-7</td>
<td>Panyume – Jamara – Limbe Road</td>
<td>30 km</td>
</tr>
<tr>
<td>RMW-8</td>
<td>Yei – Kergulu – Morobo Road</td>
<td>63.5 km</td>
</tr>
</tbody>
</table>

Environmental assessment, guarantees the delivery of development in a sustainable manner; it is for this reason that an environmental assessment of the entire project must be carried out. Ayeh & Ayeh was contracted to carry out the Environmental Impact assessment of the South Sudan Rural Roads Project and prepare Environmental Impact Statement and related reports.
1.3. **Objectives of the Environmental and Social Impact Assessment**

The fundamental objective of this environmental and social impact assessment is to ensure that the proposed rural road rehabilitation, maintenance and spot improvement project is environmentally sound and contributes to the development of environmental assets. It is also expected to provide a means whereby the overall environmental performance of this project can be enhanced through the following specific objectives:

- ensure the environmental factors are considered in the decision-making process and facilitate the design of a monitoring program;
- identification and evaluation of the potential impacts are associated with project implementation and subsequent operation;
- to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the proposed developments which are necessary to mitigate these environmental impacts and reduce them to acceptable levels;
- adoption of measures (and mechanisms for their incorporation in the project) to enhance beneficial impacts; and
- inform the public about the proposal and allow people to examine the underlying need for a project throughout the project preparation and implementation period.

1.4. **ESIA Methodology**

Road projects will create a range of direct and indirect impacts on physical, biological and human environment. Understanding the environmental settings and issues and constraints along the proposed rural road rehabilitation, maintenance and spot improvement activities is essential for the design of the proposed rural road projects. The general ESIA process flow chart which is adopted for the environmental studies is illustrated schematically in Figure 1.1, and the methodology to conduct ESIA is summarized below. The methodology follows the conventional pattern for rural road project ESIA’s and meets the requirements of International Environmental Impact Assessment guidelines and procedure.

**Scoping:** A scoping exercise has been carried out to identify and highlight the key issues and impacts likely to occur during the construction and operation and maintenance phases of the project under consideration. The effort has focused on the most important aspects of impact identification.
Collection of Available Information: The consultant collected and reviewed published regulations, guidelines, and national policy documents. Information on existing environmental conditions, necessary to provide the basic background for impact identification and assessment, has been obtained from these sources. The national and international legislative and institutional framework, policies, procedures, guidelines etc. has also been reviewed.

Field Visits: Detailed site visit was carried out in May 2013 in order to gain first-hand knowledge of existing environmental conditions and also to put the proposed rural road designs and construction works into context. The field visits were also been carried out to supplement the available information with emphasis on those areas identified as being of environmental interest during the scoping process. During the trip, information on physical resources, ecological resources, economic development activities, socio-economic aspects, health, cultural and other values in the project area has been collected.

Public Consultation: The field visits also included consultation with various stakeholders along all sections of the proposed rural roads. The purpose was to obtain supplementary information on social, socio-economic and socio-cultural conditions, and views on various aspects of the project. The consultation was also to obtain background information relevant to impact assessment and environmental management and, in particular, to identify any areas of specific concern which needed to be addressed. Finally, the purpose of the consultation was to reaffirm free, prior, and informed consultation leading to broad community support for the project. Summary of consultation is presented in Annex 2 below.

Characteristics of the project: A review of the project designs and other relevant issues has been carried out with particular reference to establishing the form and scope of the works, probable construction methods and materials, and operational characteristics of the completed rural road, in order to identify potential sources of impact of the project on the environment. The characteristics of the project have been considered having regarded, in particular, to the size of the project, the use of natural resources, the production of waste, pollution and nuisances, and the risk of accidents.

Description of the Existing Environment: baseline data on the physical, biological and socio-economic environment of the project area has been collected and evaluated. Direct information was also obtained by visiting the project area. The Project Area comprises the area which will be under direct influence (i.e., where the environmental impacts of the construction activity can be felt) of the project and includes the road section and its influence area, quarry and borrow areas, etc.
Identification of Environmental Impacts: Key potentially benefits as well as adverse impacts on physical, biological and socio-economic environment associated with the project construction, and operation and maintenance phases of the project have been identified.

Environmental & Social Mitigation Plan: Feasible and cost effective mitigation measures that may reduce potentially significant adverse environmental and social impacts to acceptable levels and enhance beneficial impacts.

Environmental Management and Monitoring Plan: An environmental management and monitoring plan has been developed to be fully integrated with the overall project management effort. A programmed for monitoring environmental impacts during and after construction has been prepared.

Preparation of ESIA report: the final step is the preparation of Environmental and Social Impact Statement which addresses items called for in the National concerned institutions and other international financing institutions guidelines and the local communities and their leaders.
Figure 1.1: Generalized ESIA process flow chart

Generalised EIA Process Flowchart

Proposal Identification

Screening

EIA Required

Initial environmental examination

No EIA

Scoping

Impact analysis

Mitigation and impact management

EIA Report

Review

Resubmit

Redesign

Decision-making

Not approved

Approved

Implementation and follow up

*Public involvement typically occurs at these points. It may also occur at any other stage of the EIA Process.

Information from this process contributes to effective future EIA
CHAPTER TWO: POLICY AND LEGAL FRAMEWORK

2.0 National & International Legal, Policy and Institutional Framework

Under this section, we shall discuss the relevant national laws, regulations and policies, their implications for this project and the regulatory conditions that must be considered for the successful implementation of the project.

2.1 National Legal Policy and Institutional Framework

The laws to be considered include:

- The Interim National Constitution of Southern Sudan (ICSS);
- The Comprehensive Peace Agreement, 2005 (CPA);
- The Transitional Constitution of the Republic of South Sudan, 2011 (TCRSS)
- Environmental & Social Safeguards Assessment Framework (ESSAF)
- South Sudan Environmental and Social Screening and Assessment Framework (2012)
- Southern Sudan Land Act 2009
- Wild Life Conservation and National Parks Act, 2003
- Draft Forestry Policy
- The Forestry Commission Act of 2003

2.1.1 The Interim National Constitution of Southern Sudan (ICSS):

The ICSS is the supreme law of Southern Sudan which stipulates the legal aspects for the protection and management of the environment and natural resources. Part three, article 44 of the Interim Constitution of Southern Sudan (The Environment) has guaranteed every person or community the right to have a clean and healthy environment. The Constitution further commits all levels of government in Southern Sudan to sustainable development in order to ensure that the environment is protected for the benefit of present and future generations, through reasonable legislative action and other measures that prevent pollution
and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting rational economic and social development so as to protect genetic stability and bio-diversity of Southern Sudan. And also all levels of government in Southern Sudan shall promote energy policies that will ensure that the basic needs of the people are met while protecting and preserving the environment.

The Interim Constitution also specifies land issues that are under National powers (Federal level) and those under the control of states as well as joint powers (concurrent powers) shared by the Federal and States institutions. The states manage issues related to State lands that are not under National control. These include: management, lease and utilization of lands belonging to States, town and rural planning and agricultural lands within the state boundaries. The concurrent powers include matters related to urban development, planning and housing, electricity generation, waste management, consumer safety and protection, water resources other than inter – state waters and regulation of land tenure and the rights on land.

Articles of the Constitution that are of direct relevance to this project are the right to expropriate land for ‘public good’ payment of compensation to the owners of affected land, protection of cultural heritage and religious sites. Other issues of relevance are the safety and protection of the inhabitants, penalties that will be paid if damage is caused to the environment or any form of pollution occurs. It also draws attention to respect for all International Environmental Agreements, ratified by the Government of the Republic of South Sudan.

2.1.2The Transitional Constitution of the Republic of South Sudan, 2011 (TCRSS)

The TCRSS specifies that every person or community shall have the right to a clean and healthy environment. (2) Every person shall have the obligation to protect the environment for the benefit of present and future generations. (3) Every person shall have the right to have the environment protected for the benefit of present and future generations, through appropriate legislative action and other measures that: considering to (a) prevent pollution and ecological degradation; (b) promote conservation; and (c) secure ecologically sustainable development and use of natural resources while promoting rational economic and social development so as to protect genetic stability and bio-diversity. (4) All levels of government shall promote energy policies that will ensure that the basic needs of the people are met while protecting and preserving the environment.
2.1.3 The Comprehensive Peace Agreement (CPA)

The CPA provides the general framework and implementation modalities for addressing the management of the environment and natural resources as well as the regulation of land tenure and protection of national heritage and areas of Cultural and social significance.

2.1.4 Environmental & Social Safeguards Assessment Framework for south Sudan transport sector - Review of ESSAF

Table 2.1 Review of Environmental and Social Safeguards Assessment Framework

<table>
<thead>
<tr>
<th>Section</th>
<th>ESSAF Stipulation</th>
<th>Observation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of structure of the Framework Section 2.1 paragraph 4</td>
<td>....Approval of ESIA’s for each transport project once their designs are reasonably advanced.</td>
<td>The stipulation is inconsistent with the flow chart in Fig 1 which indicates that the ESIA is done after preliminary Engineering is done</td>
<td>Adapt as per flow chart! which allows alternative designs to be properly evaluated and choice for advanced design based on the alternative with the least impact and cost</td>
</tr>
<tr>
<td>Under the section on Draft Environmental Bill (2010) ,line 1 reads</td>
<td>....Stipulates the need to undertake an Environmental Impact assessment where and when the Lead Agency deems the project...</td>
<td>Does not allow for transparency and consistency because it lends itself to all manner of interpretation</td>
<td>The agency should list the projects where an ESIA is mandatory.</td>
</tr>
<tr>
<td>Under Stage 1: Screening (Classification of projects) the fifth paragraph</td>
<td>Building of Houses Misplaced item since it has nothing to do with transportation</td>
<td></td>
<td>Not applicable to this project.</td>
</tr>
<tr>
<td>Institutional framework</td>
<td>Institutional arrangement :National &amp; Local levels Unclear terms of reference for National, State and village</td>
<td></td>
<td>The terms of reference for the National, State, Local and Village levels ought to be clearly defined. The types of projects which ought to be handled at each level should be stated. This is because smaller units could be handicapped in dealing with sophisticated areas which</td>
</tr>
</tbody>
</table>
requires standards and measurements which may be beyond their ability. However committees mandated to issue permits, conduct audits and monitor should have representation from all levels.

| Anticipated Environmental & Social Impacts of Transportation Projects | Annexes | Standards | Establish standards which can be used for assessment e.g. Noise, air quality, water quality etc. |

2.1.5  Draft Environment Policy (2010):

The draft environmental policy under section 4.3 Environmental Impact Assessment indicated that the Government of South Sudan will require a systematic environmental impact assessment, audits, monitoring and evaluation to mitigate adverse impacts and enhance environmental benefits. As a policy guidance, 1) the ESIA process is legally binding on all proposed projects; Develop capacity to monitor the state of the environment in South Sudan; ensure that ESIA guidelines for all sectors are developed; and ensure stakeholder participation during the ESIA process right from the initial planning stages of the project.

The Draft Environmental Policy has the following objectives:

1. Improve livelihoods of South Sudanese through sustainable management of the environment and utilization of natural resources;
2. Build capacity of the government at all levels of governance and other stakeholders for better management of the environment;
3. Integrate environmental considerations into the development policies, plans, and programs at the community, government and private sector levels; and
4. Promote effective, widespread, and public participation in the conservation and management of the environment.

The main purpose of the Draft Environment Policy is to provide guidance and direction to all stakeholders, including the sector government agencies, the private sector, NGOs, CBOs and the general public regarding sustainable management of the environment.
2.1.6 Draft Environment Protection Bill (2010)

The Draft Bill stipulates the need to undertake an Environmental Impact Assessment where and when the Lead Agency deems the project may have varying levels of impact on the Environment. The Bill recommends the ESIA should be conducted by an expert retained by the Project Proponent whose name and qualifications are approved by the Ministry.

2.1.7 National Environmental and Social Screening and Assessment Framework (ESSAF)

Currently the World Bank developed a national Environmental and Social Screening and Assessment Framework (ESSAF) for South Sudan as a guideline for all World Bank financed development projects during the ISN period including the proposed South Sudan Rural Road project. Given the proposed road traverses along the existing alignment and the expected impact is minimal, this particular project falls under category B of the World Bank Environmental assessment category classification. This determines also the extent and depth of carrying out ESIA. ESIAs can help integrate environmental management decisions at the planning stage to ensure that potential environmental and social impacts are avoided or develop environmental protection measures to mitigate any adverse impacts, resolve conflicts and enhance positive impacts. Available alternatives may be compared (siting and design) and the optimum mix of environmental/social costs and benefits determined.

The overall purpose of the National ESSAF is to provide pragmatic operational guidelines and procedures to the GRSS to eliminate, reduce and/or mitigate the environmental and social risks associated with Bank-financed operations implemented under the ISN period; and to develop procedures for the effective environmental planning and management of selected development projects and their operation. The national ESSAF has been prepared in line with Bank operational policies and procedures for investment operations and the guidance note for crises and emergency operations for application of Bank safeguard and disclosure policies.

The ESSAF was prepared to provide the basis for simplifying the application of Bank safeguard policies and related provisions of the Bank’s disclosure policy to all Bank-finance operations in South Sudan during the ISN period. The Framework has been developed within the context of National environmental policy and draft legislation and regulations and the Interim Constitution and covers all phases of the project cycle. Specifically, they complement existing Environmental and Social Impact Assessment (ESIA) procedures and
are to be used in undertaking EIAs for the sectors covered and also to support and facilitate preparation of safeguards instruments (ESIA, ESMP, ESMF, RPF, RAP) by providing relevant information on the standard content and structure of each type of instrument.

Under section 4.3 Environmental Impact Assessment of the RSS environmental policy discussed that following the achievement of comprehensive peace in the Country and the upcoming development activities and investment coupled with other more intensive land use practices, the environment in South Sudan is likely going to be adversely affected. The Government of South Sudan will require a systematic environmental impact assessment, audits, monitoring and evaluation to mitigate adverse impacts and enhance environmental benefits. Therefore, the policy Guidance indicated: a) Make the EIA process legally binding to all proposed projects; b) Develop capacity to monitor the state of the environment in Southern Sudan; c) Ensure that EIA guidelines for all sectors are developed; and d) Ensure stakeholder participation during the EIA process right from the initial planning stages of the project.

2.1.8 Southern Sudan Land Act 2009

The Act stipulates the rights of the citizens on land, compensation modalities if people are relocated from the land they had been using. According to Sections 74, 75 and 77 of the Land Act, “expropriation of land for public interests (including road construction among others) should be based on the consultation process with the communities, negotiation and agreements endorsed by the impacted community and individuals evidenced by a written protocol between the individual or traditional authorities and their communities and signed by the local government and traditional authority”

2.1.9 Wild Life Conservation and National Parks Act, 2003

The Act stipulates that “No persons, without authorization, other than wildlife officials on duty shall enter a national park unless in possession of a valid permit” and no person shall within any national park cut, clear or remove any tree, bush or other vegetation, mine quarry and gravel and use the park as a disposition ground for any kind of waste”.

2.2 World Bank Safeguard Policies

The Safeguard Policies are lumped into Environment, Rural Development, Social Development and International Law. The following five out of the ten are relevant for consideration under this study. These are:
• Environmental Assessment (OP 4.01);
• Involuntary Resettlement (OP 4.12);
• Indigenous Peoples (OP 4.10); and
• Physical Cultural Resources (OP 4.11).

2.2.1 Environmental Assessment (OP 4.01)
The OP 4.01 requires among others that screening for potential impacts is carried out early, in order to determine the level of EA to assess and mitigate potential adverse impacts. The Bank’s project screening criteria group projects into four categories:

- Category A – Detailed Environmental Assessment;
- Category B - Initial Environmental Examination and
- Category C – No Environmental Assessment
- Category FI- Project that involve investment of Bank’s funds through Financial Intermediaries (FIs)

The EA ensures that appropriate levels of environmental and social assessment are carried out as part of project design, including public consultation process, especially for Category A and B projects. The OP 4.01 is applicable to the rehabilitation, maintenance and spot improvement of Rural Road project. This project has been categorized as B.

2.2.2 Involuntary Resettlement (OP 4.12)
The Policy on Involuntary Resettlement is intended to assist project-affected-persons (PAP) maintain a livelihood that is not different from what they knew or experienced before a project came into the abode. PAPs must not be made worse-off because of an involuntary resettlement.

Where resettlement is inevitable or loss of assets and impacts on livelihood occurs, a Resettlement Action Plan (RAP) that at least restores the standard of living must be instituted. Consultation with PAPs as well as the host communities where land-based resettlement is required must be done for successful resettlement to occur. The RAP must outline, the consultation processes and implementation of the action plan and must record choices offered to PAPs and the choices made.

2.2.3 Indigenous Peoples (OP 4.10)
The OP 4.10 of the Bank recognizes that the identities and cultures of Indigenous Peoples are inextricably linked to the lands on which they live and the natural resources on which they depend. These distinct
circumstances expose Indigenous Peoples to different types of risks and levels of impacts from development projects, including loss of identity, culture, and customary livelihoods, as well as exposure to disease. Gender and intergenerational issues among Indigenous Peoples are also complex. As social groups with identities that are often distinct from dominant groups in their national societies, Indigenous Peoples are frequently among the most marginalized and vulnerable segments of the population. As a result, their economic, social, and legal status often limits their capacity to defend their interests in and rights to lands, territories, and other productive resources, and/or restricts their ability to participate in and benefit from development. Because of their closeness to nature, Indigenous people have invaluable information that helps them play a vital role in sustainable development.

2.2.4 Physical Cultural Resources (OP 4.11)
This policy is premised on the need to investigate and take inventory of cultural resources likely to be affected. Mitigations are provided for in cases of adverse impacts on physical resources. Mitigation measures should be undertaken in conjunction with the appropriate authorities, organizations and institution that are also required to be consulted and involved in the management of cultural property.

The Bank does not support development actions likely to significantly damage non-replicable cultural property, and does assist only those projects sited or designed to prevent such damage.

2.2.5 Bank’s Policy on Access to Information
The Bank’s policy on disclosure requires that all the people residing in the given areas of a project have the right to be informed of the proposed project in the respective areas. In this regard therefore, the summary of the study of the projects actions and other relevant information shall be disclosed to the South Sudan public prior to the commencement of the project. The disclosure shall be carried out in-country through the Ministry of Transport, Roads and Bridges (MTRB), PMT, the Ministry of Environment and at the States, Counties, Payams and Bomas along the project corridors. It shall also be made available at the World Bank Info-shop.

2.3 International Conventions and Agreements
The Republic of South Sudan has acceded to the Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1987);
Figure 3.1 Showing Locations of Roads and Rivers in South
CHAPTER THREE: DESCRIPTION OF PROPOSED ROAD NETWORK (SELECTED ROADS)

3.0 Introduction

Under the SSRRP, eleven (11) selected roads have been packaged for rehabilitation and maintenance/spot improvement which will open up high agricultural potential areas. Figure 3.1 above shows the location of the various roads on a map of the Republic of South Sudan, marked in black.

The roads are in three project categories; Upgrade and Rehabilitation of Selected Rural Roads, Periodic Maintenance and Spot Improvement of Roads, and Labour-based Maintenance and Spot Improvement. All the roads are in a considerable state of disrepair. In fact in some areas the road has been overgrown by vegetation from the edges so that it has been reduced to a track just wide enough to accommodate one vehicle at a time.

Fig 3:1a A road that has been narrowed by lush growth of vegetation
3.1. Upgrade and Rehabilitation of Selected Rural Roads

3.1.1 Magwi-Lobone through Parajok
This road is a ‘Y’ shaped road. It travels straight from Magwi to Ayaci, where one arm branches to the left to Lobone and the right arm branches off to Pogee. Both arms end at different sections of the South Sudan-Uganda common border. The roads are narrow, poorly maintained and cross several streams. Among the streams that cross this road are Laneka, Atepi, Jeje, Nyolobot, Magee, Jama, Lianga, Ayii and Kimoru. While some of these rivers are perennial, others dry up during the hot season. The bridges that cross these streams are old, narrow, generally low lying and do not have any protection on the sides. The riding comfort of roads is poor because of the lack of maintenance, potholes and ruts have developed in many sections of the road. The gravel pavement has failed so travel speeds are low and in many sections speeds could not exceed 15km per hour. In some sections like Lianga on the road to Lobone, the pavement yields under any load.
The vegetation had grown and tall grass on both sides of the road was common. There was often naturally occurring trees close to the road. The easily identifiable trees were *Shea nut* trees and *Mahogany*.

![Fig 3-A: Section of Magwi-Lobone showing damaged drainage structure](image)

3.1.2 Amadi-Tali Road
The Amadi-Tali road is a 50km road that starts from Amadi in Western Equatoria and runs into Tali in Central Equatoria. It is a feeder road in poor condition. This road commences at Amadi junction of the Juba-Mundri road in Mundri West County and travels through the Mundri East County and terminates in Tali in the south-north direction. The road reservation has been largely preserved, with no physical
developments. A few dried stream crossings were encountered along the road while the road travels across several dry river beds. During the wet season, the streams that flow through these areas are going to inundate the road at their crossing points. Some of the rivers encountered were Tali, Bondri, and Lora.

![Fig 3-B: Section of Amadi-Tali road](image)

3.1.3. Tali-Yirol Road

The Tali – Yirol (Awerial) road is a 52km sequel to the Amadi – Tali road, continuing from Tali in Central Equatoria and terminating at Madbar, a community on the Yirol – Awerial trunk road in the southwestern part of Lakes State. It is a feeder road in a poor condition. The road reservation has been largely preserved, with no physical developments. There are several river and stream crossings along the road that will require particular attention, in order to minimize the risk of pollution and siltation during road rehabilitation. Among rivers identified was the Tali River.
3.1.4 Likely Impacts of Road Rehabilitation

**Removal of vegetation**—Along sections of the Magwi-Lobone and the Tali-Yirol roads in particular, neglect of the roadway over the years has resulted in it been overgrown by weeds, grass and shrubs. Clearing would however be done within the overgrown section of the carriageway to restore the original width and a further 3 meters beyond that to allow for the construction of ditches/drains, turnouts and working area. Within the 3 meters sections are grass and shrubs and incidence of trees with girth less than 200 millimeters. This activity was described as widening is in fact a restoration of the road to its original state. Clearing beyond the working area would result in the removal of trees with girth beyond 200 mm. (See Fig 3-A and Fig 3-C)

**Impact on water resources**—floods, disruption in river/stream flows, siltation/ sedimentation and Pollution—Drainage structures would have to be repaired and this may require erecting a Dam or channelization of the streams and rivers. A dam can lead to flooding upstream and insufficient flow downstream. Alternatively, channeling the stream would entail excavation (earthworks) and if unprotected could allow for some sedimentation. Since communities depend on rivers / streams as well as boreholes for water restricting flow can result in water shortage and or floods which may ruin farms, homes and endanger lives of humans and animals. However since Amadi-Yirol traverses a fairly dry corridor, removal of water from nearby rivers and streams for construction could put pressure on water for domestic use.
Sections of road slope towards rivers/streams (Magwi-Lobone) so clearing of vegetation on slopes could aggravate sedimentation of surface water as the action of rain and wind can carry particulates in to water bodies.

Poor management of liquid and solid waste can result in pollution of water bodies. Poor management of oil, fuel and chemicals could result in pollution of water bodies.

**Generation of Dust and Air pollution** - Construction activities like haulage, excavations, scarifications, winning of material from borrow sites, quarrying and dumping all generate dust. Dust causes upper respiratory diseases, eye irritation, impedes plant growth and hampers visibility.

**High Levels of Noise** - Construction activity increase ambient noise levels significantly. Demolitions, hammering, dumping, movement of construction traffic, riveting would all increase noise levels.

**Increase in Accidents** - Poorly managed traffic on roads would increase accidents especially when rehabilitation is in progress. After roads have been rehabilitated, induced traffic on roads which previously had low traffic volumes would also increase the incidence of accidents.

Work related accidents may also increase as a result of poor handling of equipment and human error.

Unprotected excavations and edge of cuts could result in animals and people falling

**Impact on Health** - The influx of workers and related mobile populations that tend to follow road construction like sex workers can result in the increase incidence of STIs, HIV/AIDS among workers and local populations. Poor management of waste that results in shallow pools of water could result in the breeding of malaria-bearing mosquitoes.

Poor solid and liquid waste management could result in the spread of diseases like diarrhea, cholera and food poisoning

**Impact of Borrow Pit Excavation and Quarrying** - removal of vegetation to get to material will result in loss of vegetation. Excavations may leave pits that are deep enough to endanger the lives of animals and children. Children have been known to drown in pools of water that have collected in borrow pits after they had been exploited.

Borrow pit exploitation and quarrying can also mar the aesthetic beauty of the landscape.

**Community-Worker Conflicts** - Without a deliberate plan to manage the relations between community and the contractor’s work force friction would arise that could disrupt work or threaten the lives of workers.

Unacceptable behavior from workers could also create friction.

**Impact on Cultural Resources** - There is symbolic graves in Agyimutala and Lakamadi that would have to be relocated because they sit in the right-of-way
3.2. Periodic Maintenance and Spot Improvement of Roads

3.2.1. Yei-New Lasu
The Yei-New Lasu road is a 45km road that commences in Yei and terminates at New Lasu which lies on the South Sudan- Congo border. The road traverses four key communities, namely Yei, Asole, Lasu and New Lasu and is located entirely in the Yei County. Like most project roads, the corridor is relatively unencumbered with no issues of involuntary resettlement.

The riding comfort of this road is low because of several potholes along the stretch. During the rainy season many of these potholes are filled with rain water which results in mud patches that makes movement even more difficult and slow.

Among the river/streams encountered on this road were Obuye, Kabule and Oholi

Like many the two other roads selected for periodic maintenance and spot improvement, it needs to be worked on to keep it an all-weather road that links farmers to market centers and improves access for the rural populations in its corridor.

![Fig 3-D: Section of Yei-New Lasu Road showing a combination of failed elements of the road which has resulted in an accident](image)

3.2.2. (Ras Olo) Dukudu Olo-Maridi
The (Ras Olo) Dukudu Olo-Maridi is a 71km road that starts from (Ras Olo) Dukudu Olo (Landili Payam) and terminates at Maridi in Maridi County of Western Equatoria. It is a feeder road that is in poor condition. The road is overgrown with vegetation in sections of it even though the road reservation is largely preserved. A few river and stream crossings were encountered along the road. There are several points at which there are no drainage structures even though there is evidence of river crossings. During the rainy season, traffic will be disrupted by these rivers that would flow across the road at these points. The road runs through a mountainous area along the South Sudan border with the Democratic Republic of Congo. Several teak, bamboo and coffee plantations dot the road corridor.

![Fig 3-E: Section of Ras Olo- Maridi road with grass growing on the pavement](image)

3.2.3. Maridi-Kozi Road

The Maridi-Kozi road is a 60km road that begins at Maridi, a well-populated urban centre with a population of 82,461 persons and 13,537 households (Source: National Baseline Household Survey, 2009) and terminates at Woko in the Kozi Payam. The road is located in Western Equatoria. In its corridor lie a power station, a girl’s primary school and a high school. It is a primary road in poor condition; parts of it are overgrown with weeds though the reservation is largely preserved. A few river and stream beds cross the road at different points and there are several swamps along the stretch. During the rainy season the road could get flooded. Populations tend to concentrate around the two major communities; that is, Maridi and Kozi. A number of mango, teak, coffee and bamboo plantations dot the road corridor. Among the streams encountered were Maridi and Mebiringi.
3.2.4 Likely Impacts of Periodic Maintenance and Spot Improvement

**Removal of vegetation**—Along sections of the Maridi-Kozi and Ras-Olio-Maridi roads in particular, neglect over the years of the road carriageway has resulted in it been overgrown by weeds, grass and shrubs. Clearing would however be done within the overgrown section of the carriageway to restore the original width and a further 3 meters beyond that to allow for the construction of ditches/drains, turnouts and working area.

Within the 3 meter sections are grass and shrubs and incidence of trees with girth less than 200 millimeters. This activity was described as widening is in fact a restoration of the road to its original state. Clearing beyond the working area would result in the removal of trees with girth beyond 200mm. (See Fig 3-E and Fig 3-F)

**Loss of Vegetation**—Vegetation in these road corridors is lush. Removal of vegetation beyond 3 meters of the edge of the roadway may lead to significant loss of trees. There are Government established Teak plantations in Kergulu and in the general area of the Yei road corridor but beyond the 3 meter envelope; removal of vegetation in this area will result in loss of trees of economic value. South Sudan is losing its forest cover at an alarming rate so any removal of vegetation must be properly managed. Removal of
trees of girth 200mm will be avoided as much as possible and when they cannot be avoided, the contractor would have to seek a permit, negotiate with owners and do so only with the approval of the Engineer

**Impact on water resources- floods, disruption in river/stream flows, siltation/ sedimentation and Pollution**-Drainage structures would have to be repaired and this may require creating a Dam or channelization of the streams and rivers. Damming could lead to flooding upstream and insufficient flow downstream. Channelization if not well supervised will lead to sediments being transported along the stream. In the road corridors of Maridi-Kozi and Ras Olo- Maridi if drainage works are not done at the right time the impact on surrounding areas would be disastrous because rainfall in these areas is high. Since communities depend on rivers / streams as well as boreholes for water can result in water shortage and or floods which may ruin farms, homes and endanger lives of humans and animals.

The Contractor would depend on extraction from local water sources for construction work but his may put pressure on water for domestic use. However water required for periodic maintenance and spot improvement will be significantly lower than what is required for a complete rehabilitation.

Clearing of vegetation on slopes could make the slope prone to sheet erosion when it rains. In Western Equatoria where frequency of rain is higher there is a need to avoid activity that can lead to sheet erosion...

Poor management of liquid and solid waste can result in pollution of water bodies. Poor management of oil, fuel and chemicals could result in pollution of water bodies.

**Generation of Dust and Air pollution**- Construction activities like haulage, excavations, scarifications, winning of material from borrow sites, quarrying and dumping all generate dust. Dust causes upper respiratory diseases, eye irritation, impedes plant growth and hampers visibility.

**High Levels of Noise**-Construction activity increase ambient noise levels significantly. Demolitions, hammering, dumping, movement of construction traffic, riveting would all increase noise levels.

**Increase in Accidents**-Poorly managed traffic on roads would increase accidents especially when rehabilitation is in progress. After roads have been rehabilitated, induced traffic on roads which previously had low traffic volumes would also increase the incidence of accidents. Work related accidents may also increase as a result of poor handling of equipment and human error.
Unprotected excavations and edge of cuts could result in animals and people falling

**Impact on Health**-The influx of workers and related mobile populations that tend to follow road construction like sex workers can result in the increase incidence of STIs, HIV/AIDS among workers and local populations. Poor management of waste that results in shallow pools of water could also result in the breeding of malaria-bearing mosquitoes.

Poor solid and liquid waste management could result in the spread of diseases like diarrhea, cholera and food poisoning.

**Impact of Borrow Pit Excavation and Quarrying** – removal of vegetation to get to material will result in loss of vegetation. Excavations may leave pits that are deep enough to endanger the lives of animals and children. Children have been known to drown in pools of water that have collected in borrow pits after they had been exploited.

Borrow pit exploitation and quarrying can also mar the aesthetic beauty of the landscape.

**Community-Worker Conflicts**-Without a deliberate plan to manage the relations between community and the Contractor’s work force friction would arise that could disrupt work or threaten the lives of workers. Unacceptable behavior from workers could also create friction.
3.3. Labour Based Maintenance and Spot Improvement

3.3.1. Morobo-Panyume Road
The Morobo – Panyume road is a 25-km stretch that commences at Gulumbi and a well-populated urban center (population 31,523) and about 5,317 households (*Source: National Baseline Household Survey, 2009*) and runs to Panyume, also in the Morobo Payam, both in the Central Equatoria State. The road runs through a market famous for its bananas; the Kendila market. It is a feeder road in a poor condition. The road reservation is largely preserved, free from physical developments or any encroachment. A few river and stream crossings were encountered along the road, while several dry stream beds were observed. Several Teak plantations dot the road corridor.

![Fig 3-G A section of the Morobo-Panyume Road](image)

3.3.2. Panyume-Yaribe Road
The Panyume - Yaribe road is a 25-km stretch that continues from where the Morobo – Panyume road ends at Panyume and continues through a richly vegetated area to Yaribe. A few seasonal crossings were encountered along the road. There is a borehole at (km09+100).
Fig. 3-H A Section of Panyume-Yaribe Road

3.3.3. Yaribe-Gimunu Road
The Yaribe - Gimunu road is a 30-km stretch that continues from where the Panyume - Yaribe road ends at Yaribe and continues through a richly vegetated area to Gimunu through Jamara 7. A few seasonal crossings streams were encountered along the road.

Fig. 3-I A Section of Yaribe-Gimunu Road

3.3.4. Panyume-Jamara-Limbe Road
The Panyume- Jamara-Limbe road is a 30-km stretch which begins from Panyume travels down to Jamara 7 and then branches off the Panyume – Yaribe road at Jamara 7 and continues towards Jamara and then on to Limbe which lies on the Yei – Juba trunk road.
The width of this carriageway is 7m; therefore there will be no need for further widening of the road.

Fig 3-J A Section of Panyume-Kanchu-Limbe Road

3.3.5. Yei-Kergulu-Morobo Road

The Yei – Kergulu – Morobo road is a 76km stretch that has been inappropriately named. The road actually begins at Kergulu Junction which is about 1.5kms from the center of Yei town. It is important to note that the same section from Yei town to the Kergulu Junction falls under the Yei – New Lasu road, another road section under the SSRP. It will facilitate travel between Yei and Morobo Counties of Central Equatoria.

Fig 3-K A Section of Yei-Kergulu-Morobo Road
CHAPTER FOUR: DESCRIPTION OF ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

The eleven roads are spread across four administrative states in the Republic of South Sudan. For the purpose of describing the environment within which these roads are located, the roads have been categorized along their Administrative locations, i.e. the states in which they are located. Of the 11 roads, there is one in Eastern Equatoria (Magwi – Lobone through Parajok), two originating in Western Equatoria (Amadi – Tali, (Ras Olo)Dukudu Olo- Maridi), one terminating in the Lakes State (Tali – Yirol) while the remaining seven are located in the Central Equatoria. The roads located in the Central Equatoria State are the Amadi – Tali Road (origin), Maridi Kozi, Panyume – Yaribe, Yaribe – Gimunu, Morobo – Panyume, Panyume – Kanchu – Limbe, Panyume – Yaribe, Yei – New Lasu, and the Yei – Kergulu – Morobo roads. Table 4.1 below shows the geographical distribution of the projects within South Sudan.

Table 4.1 Geographical Distribution of SSRRP Road in RSS

<table>
<thead>
<tr>
<th>Eastern Equatoria</th>
<th>Central Equatoria</th>
<th>Western Equatoria</th>
<th>Lakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Magwi – Lobone thru’ Parajok</td>
<td>Tali - Yirol (originating in CE)</td>
<td>Ras Olo – Maridi</td>
<td>Tali – Yirol (terminating in Lakes)</td>
</tr>
<tr>
<td>2</td>
<td>Panyume – Yaribe</td>
<td>Maridi - Kozi</td>
<td></td>
</tr>
<tr>
<td>3 Yaribe – Gimunu</td>
<td>Amadi – Tali (originating in WE)</td>
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<td></td>
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<tr>
<td>4 Morobo – Panyume</td>
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<tr>
<td>5 Panyume – Kanchu - Limbe</td>
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<tr>
<td>6 Yei – New Lasu</td>
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<tr>
<td>7 Yei – Kergulu - Morobo</td>
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</tbody>
</table>

It must be mentioned that only a section of the Tali – Yirol Road falls in the Lakes State so we deemed it not necessary to profile the state. It has therefore not been described under this section.
The natural environment has been sub-divided into the physical and biological, and the human into the social and economic, environments. The section is in two parts consisting of the bio-physical and socio-economic and cultural setting.

4.1 Biophysical and Socio-cultural & Economic Environment:

The impact of a given development project is largely the outcome of the interaction between the nature and scope of the project itself on the one hand, and the physical environmental characteristics of the project area on the other. This section provides a general overview of the South Sudan Rural Road Rehabilitation, maintenance and Spot improvement Project area. The description mainly focuses on those aspects which are deemed to be especially relevant for the ESIA as it pertains to the respective roads.

4.1.1 Magwi-Lobone through Parajok _ Eastern Equatoria State

Biophysical Environment

✓ Climate
South Sudan has a tropical climate that alternates hot dry seasons with wet seasons. The average temperature is typically above 25°C and can rise above 40°C, particularly during the dry season. In the majority of the country, rain received per annum is between 750-1000mm. In this corridor rainfall averages 1200mm per annum in the mountainous region of Lobone nightfall temperature can be considerably low.

✓ Topography
The project areas’ altitude ranges between 1500-2000m above sea level on average. The Imatong mountain ranges are located in Eastern Equatoria where the Magwi-Lobone road runs for a stretch mainly in the plains below these mountains.

✓ Flora
The vegetation ranges from equatorial dense forests in the mountains through wooded savannah grasslands to semi-arid to arid scrubland in the north and northeast. The project road comprises of Sudanian woodland with abundant *Isoberlinia* species (a tropical hardwood), undifferentiated woodland, and a transition from undifferentiated woodland to Acacia deciduous bush land and wooded grassland. The Sudanian woodland trees have wide geographical ranges and wide ecological tolerances.
The undifferentiated woodland comprises areas of semi-permanent cultivation and bush fallow. In some places the original vegetation may have been dry forest. These areas may also include small patches of dry evergreen forest, semi deciduous riparian forest and transition woodland, edaphic grassland and rupicolous communities. The original vegetation was probably floristically rich woodland in which *Isoberlinia* was confined to rocky hills. The land is now heavily cultivated and on uncultivated soils the woodland has been heavily degraded and locally replaced by secondary thicket and shrub land. Relatively undisturbed undifferentiated Sudanian woodland only survives on rocky hills and in places where there is no available water for cultivation purposes. Teak plantations and bamboo groves are common. Common crops and trees cultivated in the corridor are Teak, bananas, maize, and cassava.

- **Fauna**

During the reconnaissance and public consultations, no endangered species were recorded. However a troop of baboons were sighted on a rock outcrop near Kichenga during the reconnaissance.

- **Geology, Soils and Soil erosion**

The soils found here are commonly lateritic soils. They are common at the foothills of the mountain ranges along the South Sudan-Uganda border. These soils are made up of red loam and ironstone (Van Noordwijk, 1984) these soils generally occur in places where annual rainfall exceeds 800 mm and drainage of excess water is possible. Water can easily infiltrate into these soils and water availability for vegetation is good as long as the loamy topsoil is intact. When, due to erosion, the subsoil becomes exposed to the sun, a hard ‘iron pan’ can form, and rainwater is unable to infiltrate.

- **Drainage/water resources**

There are about seven seasonal swamps/wetlands of smaller systems that are either seasonal or permanent and are already crossed by small bridges. According to the NEAP (Mohamed, 2007), the project area has substantial water resources, but they are unevenly distributed and vary considerably from year to year. Water demand for domestic and productive uses has been growing rapidly, and that trend is expected to continue, placing even greater pressure on water availability. Many of the bridges and culverts straddling these water bodies are damaged, old and weak, and need to be replaced.
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✓ Source of materials for road construction
The Geology of the area in the baseline study indicates availability of Lateritic soils. This is an indication of sufficient gravel being found within the jurisdiction of the project.
The quantity of gravel established at each borrow pit shall be done by detailed soil investigation to conform to the specifications drawn by the Engineer. The detailed investigation shall indicate the depth and permissible area of exploitation.
The methods of acquisition, exploitation and reinstatement after use shall to conform to the ESMP.
The evidence of a used borrow pit is not a guarantee of available material in that pit. The contractor would have to show by rigorous testing its acceptance and the remaining volume of material and the depth to which it can be exploited.
All materials used for the purpose of Construction for both permanent and temporary works, shall be procured by the Contractor. (Refer to Annex 4)

Socio-cultural and Economic Environment
The Magwi – Lobone thru’ Parajok road connects a number of important farming communities and food markets such as Obbo, Palwar, Lerwa, Kichenga, Lobone, Pogee and Parajok. Additionally, it is a major link between South Sudan and Uganda, from where the majority of the former’s imports arrive.

✓ Population and Demography
According to the 5th South Sudan Population and Housing Census held in 2008 (SSPHC 5, 2008), the populations for some of the communities were Lobone 13,177, Magwi 41,778 and Parajok 21,343. These numbers would have increased considerably by 2013.
During consultations in the corridor, Lobone population was stated to be over 46,000, Magwi was 26,751, Palwar was 14,000 and Kichenga was 7,775.
Communities repeatedly described their populations as being mainly returnees who have come back since the war ended this may be the reason for the significant change of population in a place like Lobone.

✓ Ethnic Groups Living along the Magwi-Lobone Road Corridor
The Magwi-Lobone corridor is populated by people of Acholi community. The Acholi in South Sudan number about 30,000 - 50,000 people inhabiting what is now Magwi County, originally part of Torit District east bank Equatoria. The nationality has been fragmented by the international border with Uganda with part of the Acholi found in northern Uganda. The Acholi land lies on the western slopes of Imatong Mountains and Acholi hills that rim the southern borders of South Sudan. This environment has influenced Acholi lifestyle and economy. They practice a form of mixed farming in which they keep cattle, goats,
sheep and fowls in addition to subsistence agriculture; by growing sorghum, millet, beans, tobacco and sweet potatoes.

In communities like Kicenga and Palwar, the people described themselves as homogeneous communities of Acholi but in Magwi there were Lokoya and Madi in addition to the Acholi. In Lobone where internally displaced persons had been located during the war, there were in addition to the Acholi, Lokoya, Opikatie, Lango, Bari and Lolobo.

The Acholi are mainly agriculturists. They grow mostly seasonal crops like sesame, groundnuts, cassava, sweet potatoes, maize, millet and sorghum. They also practice fishing and hunting.

**Employment/Livelihood**

The main sources of livelihoods among households in the Eastern Equatoria State are Crop farming (74%), Animal husbandry (12%), Wages and Salaries (6%), Owned Business enterprises (2%) and Property income (3%). Thus the majority of the people in the Eastern Equatoria State are farmers and animal husbandry. Consultations confirmed agriculture, trading and public service jobs as main livelihood sources.

**Main Drinking Water Sources**

About 32.6 percent of the people in EE have access to water from hand pumps, 28.2 per cent to deep boreholes without a distribution network (water carted by donkey carts), and 27.5 per cent from running, open water sources such as rivers, ponds and tura'as. About 4 per cent depend on shallow wells while only 1.8 per cent has access to water from a water filtering station with a common network or a stand pipe. Consultation confirmed boreholes, rivers and streams as main sources of water for household use. Contractor would have to carefully plan his source of water for construction to avoid putting additional pressure on water for household use.

**Health Facilities**

With 57 percent Access to Health Care Facilities, Eastern Equatoria State ranks seventh among the ten states in that respect, a position it shares with Western Bahr el Gazer State (Source: SYSS 2010). Along the road corridor, there is a Public Health Care Facilities in Magwi, Obbo, Palwar, Lobone, Kichenga and Parajok.

**Education**

Magwi County has the highest number of school teachers in Easter Equatoria State, with 536 teachers, compared to 439 in Torit County and 408 in Lagoon County. All communities visited had primary schools
even though the one in Kichenga depended only on volunteer teachers. There were also secondary schools in Magwi and Lobone.

- **Food Security/Market Centers**
  There is a bulk center (Food and Grain Store) at kilometer 15+200 and a food market along the road section.

- **Cultural Resources**
  There were no other cultural sites or resources along the project road other than the Taga sacred grove in Kichenga which was out of bounds to all except designated persons and the historic tree in Magwi. Apart from the historic tree in Magwi which we have been told can be moved out of the right of way, the other cultural resources would be affected.

- **Garden at Lerwa**
  A farmer in Lerwa had extended his vegetable garden till it lay in the right-of-way of the Magwi-Lobone road. The team took note of it and raised it in the Inception Report. However, when they returned for consultations the crop had been harvested and the fence used as protection had been removed. At consultation meetings with locals in different communities along the road, the locals considered giving a farmer time to harvest his seasonal crops reasonable compensation.

### 4.1.2 Amadi-Tali (Western Equatoria and Central Equatoria States)

**Biophysical Environment**

- **Climate**
  South Sudan has a tropical climate that alternates hot dry seasons with wet seasons. In the study area, the average temperature vary between 24°C and 40°C, with annual precipitation in the project area varying between 800 mm 1000 mm.

- **Topography**
  Much of the area is a fairly uniform plateau punctuated here and there by hills and low-lying valleys.

- **Fauna**
No endangered species were recorded during the site visit and from public consultations. It has been assumed that small rodents that can tolerate human-impacted areas are still in range in the areas of the project road. Annual bushfires and intensive farming in the road corridors have driven away most wildlife. However a troop of baboons were sighted at Kashiko on the Amadi-Tali road during the reconnaissance. During consultations the locals confirmed regular sighting of the baboons at that location. The only fauna that may be found in abundance may be small rodents and reptiles common to areas impacted by human activity.

✔ **Flora**

The vegetation of this State is mainly savannah; it is classified as subtropical of low-density woodland, which is characterized mainly by mixed scrub and grassland. Vegetation along this road can be classified as mosaic of drier peripheral semi-evergreen. Common trees in this drier savannah interspersed with grass are the acacia. It has no value as timber species but it is used for local construction, fuel wood and burning of charcoal. Pictures captured of the corridor shows thorn bush growing by the road side as shown in fig. 4.3

![Vegetation in sections of Amadi-Tali road](image)

**Fig 4.3: Vegetation in sections of Amadi-Tali road**

✔ **Geology, soil and soil erosion**

The most common type of soil is a clayey soil which occurs in the broad floodplain of the upper reaches of the White Nile and its tributaries and is prone to sheet erosion.
South Sudan is underlain by metamorphic and granitic rocks belonging to the northern portion of the Tanganyika Craton bordered by gneissic rocks. The geological framework consists of three main units of which lateritic soils are part. (Source: The Director-General, Geological Survey, Republic of South Sudan, P.O.Box375, Juba, Republic of South Sudan)

✓ Drainage and water resources

Drainage is characterized by seasonal floods of which could be seen at various bridges and drainage crossing points along the entire road section. Water resources are scarce especially in the dry season, but available during the wet season. The major rivers that drain the project areas are the White Nile, Yei, Tali and their tributaries.

✓ Sources of Road Construction material

There are enough materials within the project area of influence as indicated through consultations and visual inspection. In Bitti the locals had attempted to fix the road with ‘murram’ won locally.

The Geology of the area as published by (H Elaribi, M Taha, T Ekhawah in “Study of Geotechnical properties of Lateritic soils” - Research Journal of Environmental & earth Sciences 0015 issue 06 published in June 2013 and Lateritic Soils in Distinct Tropical Environment (South Sudan and Brazil by Mary McNeil) shows availability of Lateritic soils for engineering applications such as roads and earth embankments.

The quantity of gravel established at each borrow pit shall be done by detailed soil investigation to conform to the specifications drawn by the Engineer. The detailed investigation shall indicate the depth and permissible area of exploitation.

The evidence of a used borrow pit is not a guarantee of available material in that pit. However the contractor would have to show by rigorous testing quality of material available, the remaining volume of material and the depth to which is can be exploited.

According to specifications, all materials used for the purpose of Construction for both permanent and temporary works, shall be procured by the Contractor. (Refer to Annex 4)

Socio-Cultural and Economic Environment

The Amadi – Tali road traverses several important farming communities and food markets such as Kediba, Bitti, Agyimutala, Kashiko and Lakamadi. Additionally, it is a major link between Central Equatoria and Western Equatoria.
Population and Demography
According to the 5th South Sudan Population and Housing Census held in 2008 (SSPHC 5, 2008), the populations for some of the communities along the road corridor were Amadi (2,434), Kediba (14,395), and Lakamadi (5,257). With an estimated 2.052% annual population growth rate, these numbers would have increased accordingly by 2013.
The increase in population would increase pressure on social amenities like water, housing, sanitary facilities and the like. Positioning of the Contractor’s camp could add to the pressure if not properly sited. Water resources which are in short supply during the dry season could become a more serious problem as workers come to add to the numbers.

Ethnic Groups on the Amadi-Tali Road
The Amadi-Tali road is occupied by the Moru and Mundari.
Numbering about 80,000 to 120,000, the Moru occupies the western part of the road, while the Mundari covers the eastern part of the road. The Moru are flanked by Jur Beli in the west and northwestern, Atuot and Aliab Dinka in the north, Bor Dinka in the north east, Bari-speaking Nyangwara and the Bari to the south and south-eastern. Their main towns are Terekeka, Tombe and Tali.
Moru-land is wooded savannah lying on the western side of the River Nile. The land is drained by numerous seasonal and perennial streams. They are ago-pastoralist and the economy is centered on subsistence agriculture and herding of livestock.
The main crops are Cassava, Millet, sorghum, maize, groundnuts, simsim. They raise a small number of cattle, goats and sheep that are essential as mediums and are mostly used for marriages and for appeasing the gods.

The second ethnic group is the Mundari. Numbering about 70,000 to 100,000, the Mundari form a buffer between the largely pastoral Atuot and Aliab Dinka; the masses of the agricultural Moro in the west and northwest; and Bor Dinka in the east and north east.
In the south-west they are flanked by Bari-speaking Nyangwara and the Bari to the south and southeast. Their main towns are Terekeka, Tombe and Tali.
Mundari-land is wooded savannah lying on both sides of the River Nile. The western part is drained by numerous seasonal and perennial streams and becomes swampy during the rainy season. The Mundari are ago-pastoralist and the economy is centered on subsistence agriculture and herding of livestock.
The main crops are sorghum, maize, groundnuts, and simsim. The Mundari raise a considerable number of cattle, goats and sheep that are essential as mediums: connecting human beings and their of gods.
During consultations in Amadi the key informants stated that in their community there were other groups like the Morukodo and Bitti.

Employment/Economic Engagement
The main sources of livelihoods among households in the Western Equatoria State are Crop farming (90%), Animal husbandry (1%), Wages and Salaries (6%) and Owned Business enterprises (2%). Thus the majority of the people in the Western Equatoria State are farmers, followed by people in regular employment (Source: National Baseline Household Survey, 2009). During consultations in Amadi, Bitti and Tali main sources of livelihood mentioned were crop farming, animal husbandry, self-owned businesses which include trading and salaried employment which includes teachers, health workers and workers in the state and county administration offices. Jobs provided by the Contractor to locals would diversify the range of jobs and skills available to persons living in the corridor.

Main Drinking Water Sources
About 10.4 percent of the people in Western Equatoria State have access to water from hand pumps, 18.1 per cent to deep boreholes without a distribution network (water carted by donkey carts), 4.0 per cent to deep boreholes with a distribution network, and 1.9 per cent from running, open water sources such as rivers, ponds and tura’as. About 17.1 per cent depend on shallow wells while only 0.1 per cent have access to water from a water filtering station with a common network or a stand pipe (Source: National Baseline Household Survey, 2009). The main river in this road corridor is the Yei River. In addition to this river there are smaller streams that form part of the Yei River network. These streams probably dry up during the dry season. Consultations confirmed boreholes and rivers/streams as sources of water for most households.

Health Facilities
With 96 percent Access to Health Care Facilities, Western Equatoria State ranks first among the ten states in that respect (Source: National Baseline Household Survey, 2009). Along the road corridor, there is a Public Health Care Center (PHCC) at Amadi, and a Public Health Care Unit (PHCU) at Kashiko.

Education
Mundri West County had a teacher population of 248 in 2009, while the Mundri East County had 235 teachers in the same year (Source: National Baseline Household Survey, 2009). Along the road corridor, an agricultural training school (Amadi Rural Development Institute) was sighted at Amadi, while a primary school was sighted at Lakamadi.
Cultural Resources

There were three symbolic graves located in the right-of-way at Agyimutala. One additional symbolic grave was found in Lakamadi. These graves are wooden crosses planted to remind families of members who have died away from home. They are not graves in the real sense of the word because no corpses have been buried at the location. In consultation with locals it was suggested that the crosses be relocated out of the right-of-way after a Christian Priest has prayed. Mitigation measures have been inculcated to ensure that rites to be performed would be paid for.

Fig. 4.4 Three symbolic graves at Agyimutala – They lie in the Amadi-Tali Right-of-way

4.1.3 Tali-Yirol (Central Equatoria and Lakes State)

Biophysical Environment

Climate

South Sudan has a tropical climate that alternates hot dry seasons with wet seasons. In the study area, annual precipitation can exceed 1 600 mm but generally ranges between 1000-1200mm and the average temperature vary between 24°C and 30°C,

Topography

Much of the area is a fairly uniform plateau punctuated here and there by hills and low-lying valleys.
Flora

The road traverses through savannah, classified as subtropical of low-density woodland, mixed scrub and grassland. Vegetation along this road can be defined as mosaic of drier peripheral semi evergreen. This road travels northwards towards Yirol which is a drier part of the country. The savannah would increasingly become grass and fewer trees. The trees are used mainly for fuel wood and local construction.

Fauna

No endangered species were recorded during the site visit and from public consultations. It has been assumed that small rodents that can tolerate human-impacted areas are still in range in the areas of the project road.

Geology Soils & Soil Erosion

The most common soil type is a clayey soil which occurs in the broad floodplain of the upper reaches of the White Nile and its tributaries. This soil type is prone to sheet erosion. South Sudan is underlain by metamorphic and granitic rocks belonging to the northern portion of the Tanganyika Craton bordered by gneissic rocks. The geological framework consists of three main units of which lateritic soils are part. (Source: The Director-General, Geological Survey, Republic of South Sudan, P.O.Box375, Juba, Republic of South Sudan)

Drainage and Water Resources
Drainage is characterized by seasonal floods of which could be seen at various bridges and drainage crossing points along the entire road section. Water resources are scarce especially in the dry season, but available during the wet season.

The Contractor needs water during the dry season to suppress dust but since water is scarce during the dry season alternatives like sinking boreholes or introducing advance technology like using chemical dust suppressants may need to be considered.

✓ **Sources of Materials**

The Geology of the area as published by (H Elaribi, M Taha, T Ekhawah in Study of Geotechnical properties of Lateritic soils - Research Journal of Environmental & earth Sciences 0015 issue 06 published in June 2013 and Lateritic Soils in Distinct Tropical Environment (South Sudan and Brazil by Mary McNeil) shows availability of Lateritic soils for engineering applications such as roads and Earth embankments. The quantity of gravel established at each borrow pit shall be done by detailed soil investigation to conform to the specifications drawn by the Engineer. The detailed investigation shall indicate the depth and permissible area of exploitation.

The evidence of a used borrow pit is not a guarantee of available material in that pit. The contractor would have to show by rigorous testing quality of material, volume available and the depth to which the pit can be exploited.

All materials used for the purpose of Construction for both permanent and temporary works, shall be procured by the Contractor. (Refer to Annex 4)

✓ **Socio-cultural and Economic Environment**

The Tali – Yirol (Awerial) road serves an area with scattered and isolated farming and pastoral communities such as Atti and Madbar. Several other communities are known to be located away from the road, which is a major link between Central Equatoria and Lakes States. There used to be cattle rustling in the area but it has reduced considerably since the military started patrols in the area.

The socio-cultural and economic data presented here refers mainly to the Central Equatoria State. Where specific data is provided for a county or community, it will be specified.

✓ **Population and Demography**

The road commences at Tali (Terekeka County) and runs through a sparsely populated savannah area, occupied mainly by pastoral communities to terminate at Madbar. Several communities are located away from the road. Some major communities along the road corridor were Tali (population 30,387; SSPHC 5,
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2008) Mina, Dari Atti and Madbar. Atti marks the traditional boundary between the Mundari and Dinka ethnic groups.

Ethnic Groups on the Tali-Yirol Road

The Tali-Yirol road is occupied by the Mundari and the Dinka.

Numbering about 70,000 to 100,000, the Mundari form a buffer between the largely pastoral Atuot and Aliab Dinka; the masses of the agricultural Moro in the west and northwest; and Bor Dinka in the east and north east. In the south-west they are flanked by Bari-speaking Nyangwara and the Bari to the south and southeast. Their main towns are Terekeka, Tombe and Tali.

Mundari-land is wooded savannah lying on both sides of the River Nile. The western part is drained by numerous seasonal and perennial streams and becomes swampy during the rainy season. The Mundari are ago-pastoralist and the economy is centered on subsistence agriculture and herding of livestock.

The main crops are sorghum, maize, groundnuts, and simsim. The Mundari raise a considerable number of cattle, goats and sheep that are essential as mediums: connecting human beings and their of gods.

The second ethnic group in the Dinka is the largest single national grouping in South Sudan. Numbering about 2.5 to 3 million and constituting of more than 25 aggregates of different Dinka sections (Wut). The Dinka are found mainly in Bahr el Ghazal, and Upper Nile regions. However, some are found in North of Central Equatoria and the Lakes State. Each Dinka section has a separate political entity with established rights to a well-defined territory.

Their economy is largely traditional animal husbandry, subsistence agriculture, fishing and hunting. Ownership of livestock is familial; and is a basis of social status/standing in society; the larger the herd the more prestigious the family. The Dinka land is in western and northern Upper Nile and Abyei which is endowed with huge petroleum reserves. Other natural resources include forest products such as shea nuts in Rumbek and Yirol, fisheries resources, etc.

Employment/Livelihoods

The main sources of livelihoods among households in Central Equatoria State are Crop farming (57%), Animal husbandry (1%), Wages and Salaries (19%) and Owned Business enterprises (4%). Thus the majority of the people in the Central Equatoria State are farmers, followed by people in regular employment, which represents about 44% of urban dwellers (Source: National Baseline Household Survey, 2009).

Consultation identified crop farming and animal husbandry as the main sources of livelihood. The Dinka are known for their large herds of cattle so even though the Central Equatoria has animal husbandry as a
minute source of livelihood in this corridor it will be fairly important to the locals. During consultations for instance the team was told that in this area conflicts between pastoralists and farmers was common.

✓ **Main Drinking Water Sources**
About 10.5 percent of the people in Central Equatoria State have access to water from hand pumps, 25.9 per cent to deep boreholes without a distribution network (water carted by donkey carts), 11.2 per cent to deep boreholes with a distribution network, and 21.5 per cent from running, open water sources such as rivers, ponds and tura’as. About 17.1 per cent depend on shallow wells while only 1.1 per cent have access to water from a water filtering station with a common network or a stand pipe (Source: National Baseline Household Survey, 2009). On this road, households depend on borehole for water. During consultation the locals requested for additional boreholes because yet again there were conflicts over water uses because of competing interests between pastoralists and local community needs. If the contractor decides to use the same source as water for construction, he would be aggravating the already existing tension.

✓ **Health Facilities**
With 81 percent overall Access to Health Care Facilities, Central Equatoria State ranks third among the ten states in that respect. Ninety three percent (93%) of its urban population and 66% of its rural population have access to access to health care. (Source: National Baseline Household Survey, 2009). Along the road corridor, there is a Public Health Care Center (PHCC) at Tali and a Public Health Care Unit (PHCU) at Dari and Mina.
These primary health facilities are usually poorly equipped so the Contractor would need a well-equipped first aid box and a resident nurse at least.

✓ **Education**
Terekeka County had a teacher population of 147 in 2009, while the Yirol East County had 160 teachers in the same year (Source: National Baseline Household Survey, 2009).

✓ **Market Facilities**
There is a market center at Lakamadi.

✓ **Cultural Resources**
Based on the consultation with locals it was established there are no sites of cultural importance. However, should there be any discoveries during the construction period that may require relocation; the cost incurred would be borne by the project.
4.1.4 Yei-New Lasu (Central Equatoria State)

Biophysical Environment

✓ Climate

South Sudan has a tropical climate that alternates hot dry seasons with wet seasons. In the study area, the average temperature vary between 24°C and 40°C, with annual precipitation in the project area varying between 1000 mm 1200 mm.

✓ Topography

The altitude of Yei-New Lasu is fairly high. In general it is approximately 600m above sea level. Much of the area is uniform plateau punctuated here and there by low lying valleys. The land bordering the Democratic Republic of Congo in the south west rises to form a continuous low range of hills known as the Ironstone hills.

✓ Flora & Fauna

South Sudan’s main vegetational belts run in succession from northwest to southeast. There is the low rainfall savannah which is mainly grassland intercepted with thorny trees. Acacia trees dominate these savannas. The high rainfall savannas of the south central part of the country are lush with rich grasses along the Nile that support a large number of cattle. The intermittent woodlands dotting this belt gradually merge southward with the true rainforest that is now found only in remnants in the southernmost portions of the country.

Teak (*Tectona grandis*) plantations are spread all over Yei County. Prior to the conflict, the largest and best managed plantations were located in Kergulu, 8 km south-west of the town of Yei, between 04°03’34’’ N and 30°36’56’’ E.

The community living around the plantation, the Kakwa ethnic group, mainly practices subsistence agriculture, though some members also plant their own woodlots for cash income and construction materials.

The country’s wildlife includes large mammals like elephants, giraffes, hippopotamuses, buffaloes, zebras, warthogs and there are numerous varieties of antelopes, chimpanzees, baboon and monkeys. Birdlife is rich and there is an abundance of insects. Reptiles include crocodiles, various snakes and lizards.
Annual bushfires and intensive farming in the road corridors have driven away most wildlife. Throughout consultation and visual inspections no endangered species were seen or mentioned. Only fauna that may be found in abundance may be small rodents and reptiles common to areas impacted by human activity.

✔ **Geology, soil and soil erosion**

The soils found in this area are of the Kakwa type that consists of schists, gneiss and quartz. These reddish brown soils occur abundantly in better drained parts of South Sudan. The alternating of water-logging and drying under high temperatures are believed to result in lateritic weathering. Soil erosion was evidenced by ruts and gullies observed in some sections of the road as shown in Fig 4.5 below.

![Deep Ruts in the Yei-New Lasu Road](image)

**Fig. 4.5: Deep Ruts in the Yei-New Lasu Road**

✔ **Drainage and water resources**

The major river that drains this area is the Yei River and its network of smaller streams. The road crosses the Yei River as well as the smaller streams at different points along the road.

**Sources of Road Construction material**

There are enough materials within the project area of influence as indicated through consultations and visual inspection.

The Geology of the area in the baseline study indicates availability of Lateritic soils. This is an indication of sufficient gravel being found within the jurisdiction of the project.
The quantity of gravel established at each borrow pit shall be done by detailed soil investigation to conform to the specifications drawn by the Engineer. The detailed investigation shall indicate the depth and permissible area of exploitation.

The methods of acquisition, exploitation and reinstatement after use shall to conform to the ESMP.

The evidence of a used borrow pit is not a guarantee of available material in that pit. The contractor would have to show by rigorous testing quality and volume of material available and the depth to which the pit can be exploited.

All materials used for the purpose of Construction for both permanent and temporary works, shall be procured by the Contractor as contained in the civil works contracts (Refer to Annex 4)

**Socio-Cultural & Economic Environment**

- **Demographics**
  
  There are 201,443 persons living in the Yei County. The road lies in the most densely populated area of the Central Equatoria State and has a population density of 30.21 persons per square kilometer (Km²). This average is higher than the State average of 25.64 and the Juba average of 20.03.

- **Ethnic Groups on the Yei-New Lasu Road**
  
  The Yei-New Lasu road is occupied by the Kakwa.

  The Kakwa is one of the Bari speaking people living in Yei River and Morobo Counties in the tropical rain forest belt of central Equatoria in South Sudan. However, they extend into west Nile District of Uganda and north-eastern Democratic Republic of Congo (DRC).

  Their main district lies in the tropical rain forest. This has influenced the lifestyle of the Kakwa, who are now predominantly agrarian. They engage in subsistence production of food crops mainly maize, cassava, telebun, yams, fruits: mangoes, citrus, pineapples, palm trees, coffee, bananas etc. They also have exotic and economically important hard wood trees such as mahogany, teak, Cidrella, ebony, Mvule etc. In addition to that, they also engage in hunting large game, for example, elephants, buffalos, giraffe and small game such as the bush rats.

  Based on the consultation with the communities, it was established that, that the Kakwa as a people have evolved different customs and social values as a result of the Domiciliation in different countries and also being surrounded by many other ethnic groups including the Pojulo, Keliko, Lugbara, Baka, Mundo, Avokaya, Azande and others.
Sources of Water & Energy for Household Activity
The three common sources of water in the Central Equatoria State are from deep boreholes (25.9%) surface water (21.5%) and shallow wells (17.1%). The commonest sources of power for lighting are paraffin (29.5%), lamps (30.1%), grass (22.2%) and candles (12.4%). Fuel for cooking is mainly firewood (72.4%) and charcoal (25%). In Urban areas of the state like Yei and Juba water is commonly supplied from hand pumps. It is obvious from these statistics that natural resource management is critical in this project area. Utilization of raw water by Contractor must be judiciously managed and removal of vegetation particularly trees must be limited to that which is particularly necessary.

Transportation
The commonest means of transport in Central Equatoria is the bicycle. Approximately (40%) of households own bicycles. This may mean that in bicycle traffic must be taken into account when traffic management is being designed and road signs should also inform cyclists.

Availability of Public Media
44.5% of households in Central Equatoria own radios, therefore informing the public via radio may be the easiest way to reach the general public.

Health
81% of population in Central Equatoria has access to health care facilities. In the Project corridor there were health facilities in Yei, New Lasu and Lasu. Neo-natal mortality rate for the State is 56 per 1000 live births, for infant mortality it is 107 per 1000 and for (less than five), mortality is 141 per 100 live births. Maternal mortality is 1867 per 100,000 live births. This can be reduced by making access to health care more available. The spot improvement and periodic maintenance will therefore reduce maternal and child mortality significantly.
Malaria is a common cause of mortality among children, it is important therefore stagnant pools should be quickly eliminated to ensure that the spread of malaria is controlled.

Livelihood
57% of households in Central Equatoria depend on crop farming for their livelihood and 19% depend on wages and salaries. Even in urban areas of the state a significant number of households (22%) still depend
on crop farming. Any activity of the Contractor that disrupts farming activities shall impact on many households. Main sources of livelihood for the smaller communities like Lasu and New Lasu (Libogo) is farming and trading; however in Yei all the different activities (trading, public service jobs, private sector jobs hospitality etc.) are available.

4.1.5 Ras Olo (Dukudu Olo) – Maridi (Western Equatoria State)

**Biophysical Environment**

- **Climate**
The climate is almost equatorial with wet and dry conditions. The dry season is very short and falls in between two peak rainy seasons, and annual precipitation can exceed 1 600 mm. In the study area, the average temperature varies between 24°C and 30°C, with annual precipitation in the project area varying between 1000mm to 1200mm

- **Topography**
The land is characterized by undulating hills and valleys. However, the land bordering the Democratic Republic of Congo in the south-west rises to form a continuous low range known as the Ironstone hills. These hills also form the boundary between the Nile and Congo watersheds.

- **Flora**
The grass savannah of the north of the country merges into a woody savannah that is rich in tall grasses that support large herds of cattle in the middle belt. This slowly becomes the rain forest which is mainly found in the south west and south east of the country. As a result of human exploitation, farming, neglect as a result of long periods of war the rain forest but it is made up mainly of secondary growth.

- **Fauna**
Information available on wildlife occurrences is negligible and it has little biodiversity species. There were ruminants and rodents and people hunting bush meat for food. Due to the nearby Mbia Ngarari Game Park in the Democratic Republic of Congo, sitings of wildlife have been reported yet no specific species were mentioned.
✓ **Drainage and Water Resources**
This road corridor is drained by the Maridi River and its tributaries. The inhabitants of communities in the corridor depend on water from these streams for their household and other chores.

✓ **Sources of Materials**
The Geology of the area as published by (H Elaribi, M Taha, T Ekhawah in “Study of Geotechnical properties of Lateritic soils” and “Lateritic Soils in Distinct Tropical Environment (South Sudan and Brazil)” by Mary McNeil shows availability of Lateritic soils for engineering applications such as roads and Earth embankments.

The quantity of gravel established at each borrow pit shall be done by detailed soil investigation to conform to the specifications drawn by the Engineer. The detailed investigation shall indicate the depth and permissible area of exploitation.

The evidence of a used borrow pit is not a guarantee of available material in that pit. The contractor would have to show by rigorous testing, volume of material available and its quality and also show depth to which it can be exploited.

All materials used for the purpose of Construction for both permanent and temporary works, shall be procured by the Contractor. (Refer to Annex 4)

✓ **Socio-cultural and Economic Environment**
The (Ras Olo) Dukudu Olo - Maridi road traverses an area that was largely deserted during the war, and is now being gradually being re-populated. Most of the communities in along the road corridor are more than 150 meters away from the road. They include Avokaya Mondo, (km 4 +100), Meke (km 34+800), Bilal (km38+200), Kwaraa (km59+200) and Kazan (km 63+200). It is a major link across the Western Equatoria State, which could reduce travel time around the State drastically. For instance, currently people travelling from Dukudu Olto to Maridi have to route their trip through Bahr Naam.

The socio-cultural and economic data presented here refers mainly to the Western Equatoria State. Where specific data is provided for a county or community, it will be specified.

✓ **Population and Demography**
The only communities along this road corridor can be found near Ras Olo and Maridi. Otherwise the entire stretch lies in the woodland. The very small communities located near Maridi include Bilal, Kwanza and Kazana, where there is a dam. Maridi has a population of 55,602 persons. *(Source: Sudan Population and Housing Census, 2008)*
Ethnic Groups on the Ras Olo (Dukudu Olo)-Maridi Road

The indigenous peoples of this road corridor are Baka and Mundu.

The Baka number about 25,000 to 30,000 and live in and around Maridi and in Yei River Counties but also have their territory extending into the Democratic Republic of Congo (DRC) around the area of Watsa and Faradje.

The climate regime is equatorial with tropical rain forest vegetation due to the fertile soil. The Baka are sedentary agriculturalists engaged in subsistence production of food crops: sorghum, cassava, telebun, simsim, beans, maize, sweet potatoes, groundnuts, palm oil, coffee, etc. The Baka keep fowl and very few goats. The natural resource potentials include timber and other forest products.

The Mundu people belong to the central Sudanic group. They are found in Maridi district in western Equatoria and into the eastern part of Democratic Republic of Congo. On the Sudan side of the border they number about 50,000 to 60,000. Their main settlements and towns are Ras Olo, Maridi, Ibba.

Mundu land is situated in tropical rain forest of Western Equatoria. The terrain is a series of low lying hills that form the Nile-Congo water shed, dissected by valleys drained by perennial streams which flow into the river Nile. The Mundu are predominantly agrarian living in solitary settlements. The economy is subsistence agriculture and the main crops are millet, cassava, sweet potatoes, bananas, yams, palm oil, maize and rice. The area is rich in forest products: timber, honey, and in small games.

Employment/Livelihood

The main sources of livelihoods among households in the Western Equatoria State are Crop farming (90%), Animal husbandry (1%), Wages and Salaries (6%) and Owned Business enterprises (2%). Thus the majority of the people in the Western Equatoria State are farmers, followed by people in regular employment (Source: National Baseline Household Survey, 2009).

Main Drinking Water Sources

About 10.4 percent of the people in Western Equatoria State have access to water from hand pumps, 18.1 per cent to deep boreholes without a distribution network (water carted by donkey carts), 4.0 per cent to deep boreholes with a distribution network, and 1.9 per cent from running, open water sources such as rivers, ponds and tura’as. About 17.1 per cent depend on shallow wells while only 0.1 per cent have access to water from a water filtering station with a common network or a stand pipe (Source: National Baseline Household Survey, 2009). Consultation in communities along the road identified water from rivers, ponds, streams and borehole as their common sources of water for household use and other chores.
Health Facilities
With 96 percent Access to Health Care Facilities, Western Equatoria State ranks first among the ten states in that respect (Source: National Baseline Household Survey, 2009). Along the road corridor, there is a Public Health Care Center (PHCC) at Bilal, and Public Health Care Units (PHCU) at Kazana and Eidi.

Education
Maridi County had a teacher population of 316 in 2009, as against 247 in 2007 (Source: National Baseline Household Survey, 2009). Along the road corridor, there are primary schools at Dukudu Olo, Eidi, Kazana and Maridi. There is also a secondary school in Maridi.

4.1.6 Maridi - Kozi Road (60 Km): (Western Equatoria State)
This is a 60km road that lies solely in the Maridi County of the Western Equatorial State. The road is in an extremely poor state with a section rendered impassable. The stretch is sparsely populated, and only a few settlements can be found between Maridi and Kozi, otherwise the entire stretch lies in the woodland.

Biophysical Environment

- Climate
The climate is almost equatorial with wet and dry conditions. The dry season is very short and falls in between two peak rainy seasons, and annual precipitation can exceed 1 600 mm. In the study area, the average temperature vary between 24°C and 30°C, with annual precipitation in the project area varying between 1000mm to 1200mm

- Topography
The land is characterized by undulating hills and valleys. Marshes and swamps are common features along the corridor, indicating that sections of the road could be flooded during the rainy season.

- Flora
The section is savannah, classified as low-density woodland, mixed scrub and grassland. Sedges and common hydrophytes abound around marshes and swamps.

- Fauna
There is only negligible information available on wildlife occurrences and has little biodiversity species. There were ruminants and rodents and people hunting meat for food.
✓ **Drainage and Water Resources**
A number of wetland areas associated with drainage lines, were observed. These are generally located adjacent to the road. The road also crosses a number of streams.

✓ **Sources of Materials**
The Geology of the area as published by (H Elaribi, M Taha, T Ekhawah in “Study of Geotechnical properties of Lateritic soils” and “Lateritic Soils in Distinct Tropical Environment (South Sudan and Brazil) by Mary McNeil shows availability of Lateritic soils for engineering applications such as roads and Earth embankments.
The quantity of gravel established at each borrow pit shall be done by detailed soil investigation to conform to the specifications drawn by the Engineer. The detailed investigation shall indicate the depth and permissible area of exploitation.
The evidence of a used borrow pit is not a guarantee of available material in that pit. The contractor would have to show by rigorous testing material quality, volume and the depth to which is can be exploited.
All materials used for the purpose of Construction for both permanent and temporary works, shall be procured by the Contractor. (Refer to Annex 4)

✓ **Socio-cultural and Economic Environment**
The Maridi - Kozi road commences at Maridi, the headquarters of the Maridi Payam and a well-populated urban center (population 82,461) and about 13,537 households (Source: National Baseline Household Survey, 2009). The road runs near the power station in Maridi town and near the Maridi Girls’ Primary and High Schools as it exits the town. It traverses an area that was largely deserted during the war, and is now being gradually being re-populated. Most of the communities along the road corridor are more than 150 meters away from the road. They include Onjerima, (km 8+400), Chicora (km 11+200), and Amaki (km27+000). Should road be extended to Mvolo as locals requested, it will be a major link between Maridi County and Mvolo County across the Western Equatoria State, which could reduce travel time around the State drastically. For instance, currently people travelling from Maridi to Mvolo have to route their trip through Mambe.
The socio-cultural and economic data presented here refers mainly to the Western Equatoria State. Where specific data is provided for a county or community, it will be specified.
Population and Demography
Most of the communities along this road corridor can be found near Maridi and Kozi. Maridi Payam and a well-populated urban center (population 82,461) and about 13,537 households (Source: National Baseline Household Survey, 2009). Otherwise the entire stretch lies in the woodland.

Ethnic Groups on the Maridi-Kozi Road
The corridor of this road is occupied by Moru and Baka.

Numbering about 80,000 to 120,000, the Moru occupies the western part of the road, while the Mundari covers the eastern part of the road. The Moru are flanked by Jur Beli in the west and north western, Atuot and Aliab Dinka in the north, Bor Dinka in the north east, Bari-speaking Nyangwara and the Bari to the south and south-eastern. Their main towns are Terekeka, Tombe and Tali.

Moru-land is wooded savannah lying on the western side of the River Nile. The land is drained by numerous seasonal and perennial streams. They are ago-pastoralist and the economy is centered on subsistence agriculture and herding of livestock.

The main crops are Cassava, Millet, sorghum, maize, groundnuts, and simsim. They raise a small number of cattle, goats and sheep that are essential as mediums and are mostly used for marriages and for appeasing the gods.

The Baka number about 25,000 to 30,000 and live in and around Maridi and in Yei River Counties but also have their territory extending into the Democratic Republic of Congo (DRC) around the area of Watsa and Faradje.

The climate regime is equatorial with tropical rain forest vegetation due to the fertile soil. The Baka are sedentary agriculturalists engaged in subsistence production of food crops: sorghum, cassava, telebun, simsim, beans, maize, sweet potatoes, groundnuts, palm oil, coffee, etc. The Baka keep fowl and very few goats. The natural resource potentials include timber and other forest products.

During Consultations in Amaki Boma, the people of Nefisi described their community as a mixed group of people. Among the different groups of people they mentioned were; Avokaya, Mundo, Wadi, Zande and Jur Beli.

Employment/Economic Engagement
The main sources of livelihoods among households in the Western Equatoria State are Crop farming (90%), Animal husbandry (1%), Wages and Salaries (6%) and Owned Business enterprises (2%). Thus the majority
of the people in the Western Equatoria State are farmers, followed by people in regular employment (Source: National Baseline Household Survey, 2009). Communities mentioned farming, hunting, fishing, and animal husbandry, bee keeping and trading as main sources of livelihood.

✓ Main Drinking Water Sources
About 10.4 percent of the people in Western Equatoria State have access to water from hand pumps, 18.1 per cent to deep boreholes without a distribution network (water carted by donkey carts), 4.0 per cent to deep boreholes with a distribution network, and 1.9 per cent from running, open water sources such as rivers, ponds and tura’as. About 17.1 per cent depend on shallow wells while only 0.1 per cent have access to water from a water filtering station with a common network or a stand pipe (Source: National Baseline Household Survey, 2009). Water for household use comes from boreholes and rivers/streams.

✓ Health Facilities
With 96 percent Access to Health Care Facilities, Western Equatoria State ranks first among the ten states in that respect (Source: National Baseline Household Survey, 2009). Along the road corridor, there is a Public Health Care Unit (PHCU) at Chochoro and Amaki, and a Public Health Care Unit (PHCU) at Kozi.

✓ Education
Maridi County had a teacher population of 316 in 2009, as against 247 in 2007 (Source: National Baseline Household Survey, 2009). Along the road corridor, a primary school was sighted at Onjerima and a secondary school at Maridi.
CHAPTER 5: ANALYSIS OF ALTERNATIVES

5.1 Introduction

This chapter discusses the analysis of project alternatives, looking at three possible scenarios and relating it to the need for the project. The Republic of South Sudan is a two-year old country that has emerged from decades of war with its northernmost neighbor. As a result of the civil war its infrastructure was either destroyed or neglected. Its road network is grossly inadequate and what is available is in a deplorable state. The immediate need is to open up the country through the quick delivery of motorable roads. This would guarantee food security, bring development to the doorstep of its populations and reduce the insecurity caused by the remoteness of large swathes of the country. While delivering roads rapidly is desirable, funds are constrained by the many competing needs that generally occur in an environment like this.

To identify a preferred alternative the Consultant carried out a cost-benefit analysis on three possible options; they were:

- The no development scenario
- Project scenario
- New construction scenario

After the cost benefit analysis, the consultant sought to determine which of these three scenario best answered three questions posed below.

1. Does the project design meet the project purpose and need?
2. Is it the only means for meeting the project purpose and need?
3. Is it the most economically viable means of meeting the project purpose and need?

A number of project alternatives have been considered based on cost implications, maintenance policies and environmental assessments of impacts of alternatives selected. In general the choice of the least cost alternative is determined by examining an array of alternatives with a combination of design standards with the same traffic volume (projected and induced).

The major parameters used in the analysis of technological options are Costs and Benefits of each scenario. The factors affecting these are:

1. Cost, indicated by
   - Basic cost of Construction based on design standards
   - Vehicle operating cost
2. Benefits

- Vehicle operating costs saving
- Travel Cost saving
- Maintenance cost saving
- Improvement in Socio-Economic activities within the project sphere of influence.

The alternatives were selected based on the scenario provided below:

5.2 "No Development" scenario

In this case the roads would only be subject to routine maintenance activities such as grass-cutting and cleaning of drainage structures (culverts, ditches). These activities would be the least expensive of all interventions considered in this analysis. However, the roads are in a deplorable state so grass cutting and cleaning of drainage cannot improve the riding quality of road, improve travel time nor reduce vehicle operating costs.

Environmental Considerations

Most road pavements have failed so grass cutting will not halt or reduce the deterioration. Communities in the corridors of these roads would remain inaccessible, their farm produce would not be evacuated, and post-harvest losses would be high. Access to referral health care centers and education facilities will be still difficult and in some cases near impossible. Maternal and child mortality would remain high. Farmer households would remain poor and delivery of goods and services would remain difficult. A no project scenario means that all the challenges experienced by inhabitants will continue and with time may even get worse. Vehicle operating cost will continue to be high and accidents on the roads may increase as vehicles attempt to use deplorable roads. Insecurity in communities that lie in the road corridor would also increase as they get cut off from help.

5.3 Project Scenario (Rehabilitation of the Selected Roads)

Rehabilitation may comprise of any or all of the following:

- Improvement of vertical and or horizontal alignment
- Pavement strengthening
Enhancing the capacity of drainage structures
Providing guard rails for drainage structures

In this scenario, roads would be rehabilitated resulting in improved road network all over the Greater Equatoria area. Because rehabilitation retains the road alignment, there would be minimal cost on resettlement and reinstatement of damaged environment.

Environmental Considerations
Communities in the corridors of these roads would become accessible. It would be easier for their farm produce to be evacuated to markets for sale. Traders would also be able to come to their communities to buy their produce so post-harvest losses would reduce considerably. Access to referral health care centers and delivery of medication to primary health care centers will be easier so health indices would improve. Maternal and child mortality rates would improve. Incomes of farmer households would increase and delivery of goods and services would be better.

Conclusion
Rehabilitation of roads would result in an improvement of life in the communities in the road corridors. Vehicle operating and travel cost would be cheaper and more affordable, road maintenance would be less costly the riding comfort on roads would improve. Safety of roads would improve and security in communities would improve.

5.4 New Construction Scenario
New roads would be constructed in all the selected areas. The new roads would depart from the old alignment and features. This will entail clearing of virgin territory and the abandonment of old roads. The cost of this option is high both financially and environmentally.

Environmental considerations
The only way communities in these selected road corridors can remain the same would be if the new alignments go through those communities or their farm lands. This will result in high resettlement bills for this project. Communities would become accessible and the movement of goods and services would improve. It would be easier for their farm produce to be evacuated to markets for sale. Traders would also be able to come to their communities to buy their produce so post-harvest losses would reduce considerably. Access to referral health care centers and delivery of medication to primary health care
centers will be easier so health indices would improve. Maternal and child mortality rates would improve. Incomes of farmer households would increase and delivery of goods and services would be better.

**Conclusion**

New constructions would result in an improvement of life in the communities in the road corridors. Vehicle operating and travel cost would be cheaper and more affordable, road maintenance would be less costly and the riding comfort on roads would improve.

However, construction of roads may be high because new alignments will come with huge resettlement and environmental reinstatement bills. The impact on cultural resources may also be high. Because these would be new constructions, material needed may be more than what is needed for road rehabilitation and management of construction waste may be more expensive. The cost of mitigation may be costly. The overall cost of construction would be high and may even be prohibitive thus limiting the number of roads that can be built.

Table 5.1a, b and c below show a Multi-Criteria Analysis matrix employed in choice selection under a Cost-Benefit Analysis.

### Table 5.1a Costs

<table>
<thead>
<tr>
<th>Item</th>
<th>Basic Cost</th>
<th>Vehicle Operating Cost</th>
<th>Road Maintenance Cost</th>
<th>Environmental Concerns</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do-nothing</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>New Construction</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

**LEGEND**

5 – Expensive/Severe, 4 – High, 3 – Moderate, 2 – Low, 1 – Very Low

### Table 5.1b Benefits

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Vehicle operating cost saving</th>
<th>Travel time saving</th>
<th>Maintenance Cost saving</th>
<th>Improvement in Socio-Economic activities</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do-nothing</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
<td>-8</td>
</tr>
<tr>
<td>New Construction</td>
<td>+2</td>
<td>+2</td>
<td>+2</td>
<td>+2</td>
<td>+8</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>+2</td>
<td>+2</td>
<td>+2</td>
<td>+2</td>
<td>+8</td>
</tr>
</tbody>
</table>

**LEGEND**

+2 – Excellent +1 – Good, 0 – Satisfactory, -1 – Poor, -2 – Very poor
Table 5.1c below shows the Cost – Benefit analysis which enable us make an informed decision. This is however not based on a rigorous analysis but based on basic indices determined by unit cost of the activities in a Third World country which may be applicable in South Sudan.

**Table 5.1c Cost Benefit Analysis**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Benefit</th>
<th>Cost</th>
<th>Benefit less cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do-nothing</td>
<td>-7</td>
<td>16</td>
<td>-23</td>
</tr>
<tr>
<td>New Construction</td>
<td>+8</td>
<td>12</td>
<td>-4</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>+8</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

**5.5 Conclusion**

To arrive at a conclusion, the team looked at both the cost-benefit analysis and whether the alternative also answers satisfactorily the three questions posed at the beginning of the chapter.

Not only was the ‘No development scenario the worst option in the cost-benefit analysis it was also the worst alternative when the questions were applied. The ‘No development scenario’ answers ‘no’ to all three questions posed above. It does not meet the projects purpose and need, it is not the only means for achieving the improvement South Sudan is aiming at and it is not the most economically viable means of achieving the development the nation aspires to achieve.

The ‘new construction option’ meets the purpose and need of project but it is not the only option for achieving project objective, the project objective can be met with the rehabilitation of roads, the improvement or introduction of new transport systems like rail, construction of airstrips and the operation of internal flights all over. But these forms of transport are expensive to implement and maintain. The option of new construction is also not the most economically viable alternative.

The ‘Rehabilitation option’ meets the purpose and need of the project even though it is not the only means for achieving the project objective because like the ‘new construction’ other forms of transport can meet the objective but they are expensive to develop, maintain and would not be accessible to the general populace. This option of rehabilitation, however, is also the most economically viable option for
delivering the infrastructure needed to move South Sudan forward. In the cost-benefit analysis it was also the best option.

In conclusion, this evaluation therefore proposes the ‘road rehabilitation scenario’ as the preferred choice as it presents the least cost and meets the desired needs of the Country.
CHAPTER 6: ENVIRONMENTAL and SOCIAL IMPACT and MITIGATION MEASURES

The proposed project road is a rural road connecting the agricultural potential area to the main market. There will be both positive and unavoidable negative impacts associated with the proposed rural road rehabilitation and maintenance project. It is anticipated that most of adverse effects, associated with the construction will be reversible in nature. These may stem from ground disturbance, operation of equipment, workshops, open and sheltered storage, parking, etc. The permanent works will include the carriageway, shoulders, embankments, cuttings, side drains, culverts, and any associated erosion control works.

The various stages and components of the proposed SSRRP rehabilitation and reconstruction project would present potential issues of environmental concern. These concerns have been identified from various sources, including site visits, consultations with primary stakeholders, as well as desk surveys and project literature review and application of simple matrixes like what was used in the ESSAF report. They have been quantified as potential environmental and social impacts of the proposed project, and have been categorized under the various project phases, as Pre-construction phase impacts, Construction Phase impacts and Operation and Maintenance Phase impacts.

The proposed road rehabilitation and maintenance operations has been graded as a Category B project considering that the road works are limited in nature and the scale and magnitude of potential environmental and social impacts are relatively small.

Under this section potential impact during pre-construction, construction and operation period of the proposed rural road project on various elements of the biophysical environment have been identified and quantified and mitigation measures that should be adopted to avoid or minimize potential adverse impacts are recommended. Of which, some involve good engineering practices while others viewed from socio-economic as well as humanitarian angle.
6.1 Issues of RAP and Indigenous People’s Development Plan

The study did not deem the preparation of a Resettlement Action Plan as necessary because the roads will maintain their alignments so there will be no additional land take.

Through the community consultation, the team confirmed that the garden in Lerwa no longer existed. For the symbolic graves and other economic trees, funds and procedures have been set aside to pay for rituals, seedlings and any cost that would be incurred in the reinstatement of these properties.

The field visits noted that the vast majority of people in the project area are Indigenous Peoples, per the requirements of World Bank OP 4.10. The ESMP includes measures for an ongoing process of free, prior, and informed consultation leading to broad community support (Chapter 8); measures to address adverse impacts on the local communities and measures for culturally appropriate benefit-sharing (Chapter 7); a grievance redress mechanism (Chapter 7), and a monitoring program (Chapter 7).

6.2 Significance of Identified Impacts

The various phases of the proposed rural road rehabilitation project would present potential issues of environmental and social concern. These concerns have been identified from various sources, including site visits and inspections, consultations with primary stakeholders, as well as desk surveys and project literature review. The identified potential environmental and social impacts of the proposed project have been categorized under the various project phases, as Pre-Construction phase impacts, Construction Phase impacts and Utilization and Maintenance Phase impacts.

Table 6.1 below provides a comprehensive matrix that summarizes the identified potential environmental and social impacts of associated with the proposed project, subdivided into groups according to the project phase (pre-construction, construction, operation and maintenance) in which they may occur. This table also evaluates and quantifies them on a given scale ranging from -5 (extremely adverse) through 0 (zero impact) to +5 (extremely beneficial). Impacts are objectively assessed and quantified based on magnitude, scope/extent, and sensitivity, and duration, probability of occurrence, reversibility and value of the affected resource or receptor. Thus, the numerical scale is a weighted average of the various criteria, and it is explained below:

<table>
<thead>
<tr>
<th>Scale</th>
<th>Impact Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5</td>
<td>Extremely adverse</td>
<td>+1</td>
</tr>
<tr>
<td>-4</td>
<td>Very adverse</td>
<td>+2</td>
</tr>
<tr>
<td>-3</td>
<td>Adverse</td>
<td>+3</td>
</tr>
<tr>
<td>0</td>
<td>Zero impact</td>
<td>0</td>
</tr>
<tr>
<td>+1</td>
<td>Minimally beneficial</td>
<td>1</td>
</tr>
<tr>
<td>+2</td>
<td>Slightly beneficial</td>
<td>2</td>
</tr>
<tr>
<td>+3</td>
<td>Beneficial</td>
<td>3</td>
</tr>
</tbody>
</table>
### Table 6.1: Rapid Impact Matrix (Scale: -5 through 0 (zero) to +5)

<table>
<thead>
<tr>
<th>Environmental and Social Impact/issue</th>
<th>Impact Scale</th>
<th>Impact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rehabilitation</td>
<td>Periodic maintenance</td>
</tr>
<tr>
<td>Pre-construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Anxiety</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of vegetative cover</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>Impacts on water resources</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>Increased Noise levels</td>
<td>-2</td>
<td>-1</td>
</tr>
<tr>
<td>Air Quality (Dust Pollution)</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>Public &amp; Occupational Health and Safety</td>
<td>-3</td>
<td>-1</td>
</tr>
</tbody>
</table>
exposed to accidents on the job because of poor handling of equipment. They may also experience falls, cuts and bruises.

**HIV/AIDS spread**  
-3  
-3  
-3  
Indiscriminate sexual activity by workers and local populations could lead to a higher prevalence rate for HIV/AIDS and STIs.

**Waste Generation**  
-3  
-2  
-1  
Poor management of waste generated from construction activity could mar the aesthetics of the area, contaminate food and water and spread disease.

**Traffic, diversions & detours**  
-2  
-1  
0  
Without management of traffic, detours and diversions would result in travel delays that can affect transportation during emergencies because roads would be in use during construction.

**Borrow pit exploitation**  
-3  
-2  
-1  
Poorly managed borrow pit exploitation could lead to a marring of the aesthetics of the area, danger to children and animals and degradation of farm lands.

**Community-worker Relations**  
-3  
-1  
0  
Unacceptable behavior of workers could lead to conflicts with local populations.

**Loss of cultural artifacts**  
-3  
0  
-3  
Symbolic graves on the Amadi-Tali roads will have to be relocated.

**Traditional Practices and religious rites**  
-3  
-3  
-3  
In communities consulted it was expected that purification rites would be performed at the commencement of road projects. Locals also expected that rites would be performed at stream/river crossings.

<table>
<thead>
<tr>
<th>Post construction</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>During and after construction employment would be generated in the road corridors.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Employment and Income Generation</strong></td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>Road repairs would open up roads to all year round use. As compared to the present situation where travel along most of these roads especially in the rainy season is hazardous.</td>
</tr>
<tr>
<td><strong>Improving of accessibility to project area</strong></td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>Farmers would be able to get their produce to markets thus giving them better return on their investments.</td>
</tr>
<tr>
<td><strong>Improved transportation of farm produce to market centers</strong></td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>Roads open up hitherto inaccessible areas. People, goods and services which could not get into the areas served by these roads would be able to do so now</td>
</tr>
</tbody>
</table>
6.3 **Identified Environmental and Social Impacts and Mitigation measures**

The potential environmental and social impacts that could arise from the road rehabilitation operations have been categorized under the various project phases, namely Pre-Construction, Construction and Operation and Maintenance Phases. The followings are summary of impacts and the details are discussed below:

**Positive impacts**

- Jobs provided especially for youth in road corridors
- Jobs created by the presence of construction gangs (food vending, trading in household items clothing and commencement of new business ventures
- Improved healthcare delivery
- Health care and education become more accessible
- Maternal and child mortality rates would drop
- Market for farm produce become more accessible
- Government agents would be able to collect taxes
- The local, regional and national economies would expand

**Negative Impacts**

- Community anxiety
- Impacts on water resources
- Noise and vibratory impacts
- Dust generation and air quality impacts
- Occupational/Public health & safety impacts
- Increase in incidence of HIV/AIDS, STD
- Relocation of cultural artifacts
- Traditional practices and religious rites
- Waste generation Impacts
- Traffic, Road diversions and detours
- Borrow pit exploitation
- Conflicts between workers and inhabitants

✓ **Jobs provided especially for youth in road corridors**

A contractor will need local staff for both skilled and unskilled labor. In many of the corridors particularly the ones earmarked for rehabilitation, locals told the team during consultations that some of them were trained equipment operators and had work experience from other countries. The challenge the contractor would have is how to choose out of a large pool limited number of workers.
 Jobs created by the presence of construction crews
New business opportunities would be created when a contractor/or labor crew commence work in an area. Many more people will have a regular monthly income as compared to the typical rural dweller whose income is seasonal there will therefore be more expendable income available. Their demand for various items would fuel supply and lead to brisk business in toiletries, cooked food, groceries, clothing and accessories, medicines and many other items.

 Improved healthcare delivery
In South Sudan many communities are remote and cut off from towns because they are inaccessible. For these communities the improvement of the road network will make it possible for them to receive community health care services. Community health care units usually send out staff that give health education and also give care to pregnant women and infants in their homes or communities.

 Health care and education become more accessible
The improvement of the road will result in available public transport. At the moment in most communities the only transport available is motorbikes. Sick adults and children and women in labor have to be carried or taken by motor bikes when referred to a larger hospital. The absence of transport, leads to fatalities that could have been avoided. Once the road is improved other forms of transport like buses; taxis can access the communities along the corridor and get sick people to hospital faster. Children who have to go to school far away from home can also get to school easily because of the availability of transport.

 Maternal and child mortality rates would drop
Poor health care leads to loss of lives especially among women and children because they are usually the most vulnerable. When communities become accessible and these vulnerable populations can access improved care or can be reached by personnel, fatalities will reduce and result in a reduction in mortality rates in these vulnerable groups.

 Market for farm produce become more accessible
In Lobone farmers said they believe they are poor because even though they are hardworking men and women they cannot get their produce to the market because of the poor state of their roads. When the roads to communities in the road corridors are improved farmers would be able to get their produce out to markets for sale. Traders who grain and other food products for sale in big cities would find it easier to
get to those communities. As the Consultant’s teams travelled along the roads, in most cases large trucks and buses were few and far between because of the state of the roads.

- **Government agents would be able to collect taxes**
  The remoteness of many communities because of deplorable roads makes it almost impossible for revenue agents of Government to get there. Lobone for instance is in Magwi County yet it is so difficult to reach. Revenue collectors would probably go there once in a while rather than regularly to collect revenue. This situation will change when the road is rehabilitated.

- **The local, regional and national economies would expand**
  Business will expand and there will be more money in circulation. Farmers will be able to sell their produce so they have more money. Markets in these corridors will become more vibrant because many more people can afford to buy and new businesses will open up to provide all manner of services because now people can afford to pay for services, in Tali there is no Phone network but when the road is completed and incomes improve there may not just one but two or three mobile phone companies providing service there. There could be private schools, clinics and even cottage industries based on crops grown in the given road corridor. Roads make the location of industries in new places easier because whatever is produced can be evacuated. The economies of the locality, the general region and the country expands as many more people invest in commerce, providing goods and services and Industry

6.3.1 Pre-Construction Phase Impacts

**Community Anxiety about road rehabilitation**- In many communities, people were aware of the proposed project. However, they were not sure when the project would take off.

**Recommended Mitigation Measures**

Public Anxiety – public anxiety can be ameliorated by providing inhabitants of road corridors with adequate information about progress of work. The forum that will be held to share this report with Community administrators, County engineers and County Commissioners aims to achieve this. MTRB can keep up the information flow by keeping the Counties informed about progress of work.

6.3.2 Construction Phase Impacts

- **Loss of vegetative cover**
  One of the major unavoidable impacts of road works is the effect on the terrestrial vegetation in the vicinity of the construction works. The impacts on natural vegetation is associated with the construction of
carriageway width, bridge and other drainage structures, operation of quarry and borrow areas, and the construction access to quarry and borrow sites, etc. There are no significant areas of natural or semi-natural forest all along the project roads, and no designated or protected areas of terrestrial ecological interest will be affected by the proposed construction activities. As per the information obtained from field investigation confirms that no locally or regionally endangered species will be affected as a result of the proposed rural road rehabilitation.

A number of the roads would need to be restored to its original width to meet the standard road width of 5.5m. Clearing of vegetation would also be required on other roads that have been overgrown with shrubs and bushes because of the years of neglect. This would result in loss of vegetative cover. On Magwi-Lobone, Amadi-Tali, Tali to Yirol, Yei-New Lasu, Ras Olo-Maridi and Maridi-Kozi vegetation would have to be removed on some sections and this would include grass, shrubs, weeds and mainly trees of a girth less than 200mm. It is in establishing borrow pits, access roads to borrow pits, and detours that trees of larger girth and economic trees such as mahogany would be cleared. Already South Sudan is losing its tree cover to over-exploitation for charcoal production, firewood, construction and other related activities. Removal of trees will have to be carefully managed and replacement of lost trees should be encouraged.

**Recommended Mitigation Measures:**

It is recommended to adhere to principles of environmental conservation during the construction period in order to avoid excessive destruction of vegetation and disturbance of land in the riverine forest area. Therefore, to minimize the destruction of trees and natural vegetation, it is recommended that:

- excessive destruction of trees and other vegetation should be avoided.
- Vegetation clearing will be limited to limits of construction stipulated in the design reports;
- Wood from trees that are cut down would be given to communities for their use and will be compensate in cash for the loss of privately-owned mature trees and by replanting for the loss of natural vegetation as appropriate;
- Communities would be supplied with fast growing trees of their choice which they will plant at a selected location. The cost must be included in the civil works contracts;
- Consider the location of mature trees during route selection for the access road construction and land clearing for borrow sites; for example if during the design phase the road alignment can be changed slightly so the 3 tree in Tali can be saved, it should be done.
- Specifically prohibit borrowing, spoil disposal and camping within the boundaries of existing productive farmland and riverine forest;
• The Contractor will be responsible for any fire accident caused by his activities within the woodland and riverine forest;
• The contractor is responsible for the conduct of his workforce in relation to environmental protection matters and to specifically prohibit unnecessary felling of trees; MTRB/ESMU to inform the local authorities about the project and arrange special policing to protect illegal timber extraction during construction along the project road;
• The Engineer shall count all trees of commercial value to be removed during construction and include them in the Bill of Quantities. This is to enable the determination of the true cost of clearing done by contractor.
• The contractor should put in writing a request for authorization to carry out clearing. The authorization indicates the width and the exact location where clearance would take place. The engineer will issue a site instruction that will show the dimension and extent of clearing.
• Clearance must be sort from the Local Environment Committee (LEC) before trees are cut
• The contractor would agree with LEC on what type and species of trees will be supplied by the contractor for planting along the road. Cost of such tress must be included in the civil works contract.
• All work contracts shall prohibit illegal logging.

✓ Water Resources- Overuse, Siltation, Sedimentation and pollution
There are a number of river and stream crossings on the roads, including marshes and swamps. Removal of vegetation exposes the bare ground and facilitates erosion of loose material which tends to end up in rivers and streams nearby.
Particularly during construction of culverts, vegetation removed and sediment from excavation could wash into water bodies.
Gravel that has been spread but not compacted can also wash into water bodies.
Blocking of streams to build culverts could lead to flooding upstream especially during the rainy season. It could also lead to a shortage of water downstream
Servicing and fuelling of equipment and machinery could lead to contamination by lubricants washing into the streams and rivers.
Exposing large cleared areas for long periods without the expected road works would render such areas susceptible to sheet erosion (in rainy season), resulting in sedimentation.
Heaped construction materials such as sand and other aggregates could be carried in run-off into the water course leading to siltation and affecting water quality.

**Recommended Mitigation Measures:**

- The Contractor must approve their work program, approach and methodology with the engineer.
- Whatever approach he selects must ensure that it does not cause flooding, reduce flow downstream or increase sedimentation unnecessarily. Dry season construction may be preferred especially if the particular river dries up then.
- The timing for culvert construction will avoid the rainy season to prevent potential flooding and other water flow and quality impacts.
- Instructions on selected design for culvert repairs would be as per specifications.
- The culvert construction design should incorporate measures such as adequate size to direct and contain the River to prevent overflow or erosion of the adjoining road, thereby avoiding siltation of the water body.
- Drains will be constructed to direct storm water and run-offs. Siltation traps shall be installed to trap silt and sediment and reduce contamination of water bodies.
- Where sedimentation was unavoidable during construction, communities should be provided with alternative sources of water. This could be provided by tanker services or a borehole can be sunk at an agreed location for the use of the communities affected.
- When heavy contamination of water by sediment or silt occurs, the Contractor should quickly remedy the situation by removing the source of sediment or silt from near the water body so that aquatic life is not destroyed.
- Clearing of grass along the corridor will be restricted to the right-of-way (RoW), and road works should progressively follow clearing. This will avoid exposing large cleared areas to the eroding effects of rainfall.
- Heaped construction materials will be covered.
- Excavated materials will be retained away from the river and covered, to avoid possible losses into the water course.
- Vehicle washing, servicing and fuelling, etc. will be carried out at suitable and confined designated places, away from the river. Containment measures such as drains, oil trap, sump and bins will be provided to receive all wastes (liquid and solid) generated.
- Rainwater collection is encouraged on construction site.
Water Pollution from Sanitary and other Wastes and Spillages

Rivers, groundwater and springs are used for potable supply purposes within the project area for drinking, washing purposes and cattle watering. There are also water supply ponds along the project road. Pollution of these resources may arise at or close to the base camp or work sites as a result of inadequate provision of sanitary and waste facilities, and accidental or deliberate spillage or leakage of polluting materials. Such pollution adversely affects those who depend on local water resources. Inappropriate disposal of refuse and some materials used in construction can also lead to public and animal health hazards.

Recommended Mitigation measures

Water source pollution is of potentially high significance along the project road. Therefore, the contractor should take all appropriate mitigation measures to minimize pollution risk.

- The contractor would be required to make specific and adequate provision for the disposal of sanitary and other wastes in such a way as will not result in any form of pollution or hazard to human or animal health.
- The contractor to take all reasonable precautions to prevent spillages and leakage of materials with the potential to pollute water resources. Impermeable lining should be used to protect storage areas for such materials. The measures should be maintained in an effective condition throughout the life of the base camp.
- Specifically prohibit washing of vehicles and plant in or adjacent to any water sources. All washing to be carried out at designated areas away from water sources.
- The contractor is responsible for cleaning up any pollution caused by his activities and the payment of full compensation to those affected.
- Workers should be provided with clean and adequate toilet facilities at work site. This may include mobile toilets where it is needed.
- To construct toilets the Project Engineer would have to approve site location and facilities provided

Air quality (Dust Pollution)

Excavation, loading and emptying of dump trucks will generate dust. Exhaust emissions from vehicles moving between sites will also contribute to air pollution. Excessive dust is known to cause upper
respiratory diseases, aggravate allergies like Asthma and cause eye irritation. Dust also impedes visibility and increases the risk of accidents.

Dust settles on foliage and disturbs plant growth.

**Recommended Mitigation Measures:** The potential risk of air pollution will be mitigated or minimized by implementing the following measures:

- Water dowsing shall be done several times daily to access road sections and construction sites to reduce fugitive dust generation to prevent damage to dwellings and avoid nuisance to persons;
- Construction roads should be watered near settlement/villages on a set schedule depending upon weather conditions;
- Construction machinery should be well maintained to minimize excessive gaseous emissions. A program of servicing all equipment and vehicles to ensure optimum performance and control of emissions of noxious gases will be rigorously followed to minimize pollution levels;
- Avoid exposing of any volatile chemical to the air;
- Use community dumps if they exist for domestic waste but if they do not, incinerate garbage in designated areas and away from nearby villages and in accordance with Applicable Law;
- Avoid the burning of materials such as tires, plastics, rubber products or other materials that create heavy smoke or nuisance odour. Do not burn material which produces toxic gases.
- Haul trucks will be covered; and
- Speed control measures on the road will be enforced.
- Contractor should inform the affected population of the works schedule and explain simple measures of personal protection from dust.

**Increase in Noise levels**

Baseline noise levels were not ascertained as part of this study but the absence of heavy traffic on these roads and the absence of large industries generally made these areas relatively quiet. In most African countries noise is generated by industry, road traffic, the hustling and bustling of people attending to their daily business in urban centres and blaring music from shops and markets. In the road corridors this kind of activity was generally absent so these places could be deemed as quiet. However construction will bring in construction equipment like excavators, dumper trucks, rollers, drills and jack hammers. As a result of shaping and compacting of the formation and re-gravelling, the use of heavy duty equipment such as
The ESIA for South Sudan Rural Roads Project

Graders, bulldozers, excavators, rollers and concrete mixers noise levels will increase. The use of these equipment will generate noise between 78 – 111dB. The impact of sustained noise on humans includes stress, headaches and in extreme cases hearing impairment. Noise also affects wildlife as it drives animals away from their natural habitat.

**Recommended Mitigation Measures:**
The potential noise impacts will be mitigated or minimized by adopting the following measures:

- The Standard Specifications insists that all vehicles are maintained in accordance with manufacturers’ specifications, with particular regard to control of noise.
- To reduce noise and vibration, plant and equipment used during construction stage should be well maintained in accordance with manufacturers’ specifications and manuals.
- To cause least disruption to local population, it is recommended that construction producing nuisance noise level be minimized or rescheduled so as not to disrupt functions or special religious holidays;
- Work should be restricted to day time (6.00-18.00hrs) to avoid increasing unnecessarily the background noise levels in the night when people need to sleep.
- Construction workers would be provided with hearing protection (ear muffs) and its use shall be enforced. During induction, workers should be trained to avoid and minimize unnecessary noise caused by revving of engines, leaving motors and machines idling;
- Near settlements, activities producing excessive noise level including blasting should be restricted to day time except for underground works;
- Equipment normally producing high levels of noise should be used only when it is really necessary.

✓ **Public/Occupational health and Safety**
During the construction phase, workers in the construction zone will be exposed to work-zone accidents such as, slips, falls and strain from repeated movements. Neglect to follow laid-down procedures for carrying out construction activity could also lead to work related accidents.
Workers will also be exposed to increased levels of noise. Inhalation of dust could lead to increased incidence of upper respiratory diseases.
The road would still be in use during the rehabilitation and spot improvement activities. Without adequate road signage for pedestrians and road users (especially bicycle and motor bike riders) there will be an
increase in accidents. Riders now do not have to contend with traffic but when work commences on roads, traffic would increase so poor road etiquette could increase accidents. Slippery and unstable surfaces especially during the rainy season could also lead to accidents. Deep trenches left unprotected from excavation could also increase accidents (falls) for particularly animals and children. Without adequate knowledge of proper road usage, improved roads conditions could increase pedestrian-vehicular collisions.

**Recommended Mitigation Measures:**

- The Contractor shall select staff to be trained by officers from Health directories within the Ministry of Health in first aid procedures.
- The first aid team would be in charge of educating workers on first aid procedures.
- A well-stocked first aid kit must be provided on site.
- The location of first aid kit and names and contacts of first aiders should be provided on site.
- There should always be a project standby vehicle to rush injured persons to the nearest health facility.
- Appropriate signage should be provided along sections of road to inform and warn road users. Examples could be:
  - Road works ahead, Men at work, Danger Construction traffic, etc.
- Warning signs and appropriate barricades would be erected and placed along excavations. An example could be:
  - Beware: Open trench
- Reversing alarm should be fitted on all moving vehicles to avoid accidents.
- Contractors will apply ‘safety first’ rule to govern all activities and operations within the work camp and along the route and areas within his jurisdiction.
- Plan for reinstatement of borrow-pits giving it shape, method of achieving it, drainage and sediment control, re-soiling and re-vegetating it would be as per specifications.
- The contractor must make every reasonable effort to minimize road safety hazards and inconvenience to other road users, resulting from the passage of his, or his subcontractors’ haulage vehicles, and should impose and enforce compliance with speed limits.
- In cases where haul routes pass through towns or major settlements, before commencement of civil works, the contractor shall prepare construction traffic management plans, for approval by the Engineer, which set out clearly the steps which will be taken to minimize the impacts of his
haulage traffic, including but not limited to the regular watering of un-surfaced sections to suppress dust and the enforcement of speed limits.

✓ **Waste generation**

Road construction tends to generate different forms of waste. There is the unsuitable material from road surface, garbage from activities of workers, food wrappers, paper, cartons, plastic containers and human waste. Indiscriminate disposal of waste could breed flies, mice and other pests that can cause disease like diarrhoea, cholera, malaria when mosquitoes breed in water collected in small containers. Littering also destroys the beauty of the natural habitat.

Plastics, especially plastic bottles are a major problem in South Sudan. If plastics are not properly disposed off, they will aggravate the already bad situation. Ruminants are known to die from ingesting plastic bags. Waste could also be carried by runoff into streams where it impedes flow and impacts on water quality.

**Recommended Mitigation Measures:**

- Workers will be trained on the needs and benefits of waste segregation for full cooperation;
- Waste will be segregated;
- All efforts to make sure there is no standing waste water to prevent breeding of mosquitoes
- All material that can be reused or recycled like wood, iron rods and concrete waste shall be reused or given away for recycling (leftover wood can be given to food vendors to be used as firewood, suitable construction debris would be used as part of filling material);
- Plastic containers that did not contain hazardous material could be used as water containers for hand washing;
- Organic and cleared vegetation will be composted near the worksite to enrich the soil that could be used for re-grassing of slopes;
- Waste bins will be provided at all working sites;
- Non-hazardous Waste that cannot be reused or recycled would be incinerated in a pit whose location would be approved by the engineer or dumped at community dump sites;
- Hazardous Waste, hazardous waste containers (plastics, oils, etc.) will be properly disposed of in accordance with the manufacturer’s recommendation or standard best practice – they will not be burned or dumped; and
Sanitary facilities (toilets & urinals) will be provided and would be located beyond 120meters way from any stream, drainage channel or waterway. It shall also not be located in a low lying or marshy area lest ground water or surface water is polluted.

✓ **Road diversion & Detours**

Without adequate signage road diversions could increase the risk of accidents (Speeding vehicles may fall into open ditches, workers and other pedestrians could be knocked down)

Diversions slow down traffic and increase travel time. It could significantly impact on accessing health care for the sick and in times of emergency.

Creation of detours may also impact on vegetation

**Recommended Mitigation Measures:**

- Appropriate warning signs which are reflective should be provided at stipulated intervals;
- Construction site should be barricaded;
- Restriction of speed limits to 20km/hr. should be enforced by flagmen on either side of diversion or detour;
- A reasonably riding level of comfort should be maintained throughout the use of detours and diversions; and
- Before vegetation is removed the Contractor must apply all mitigation measures proposed under ‘clearing of vegetation’

✓ **The Increased incidence of HIV/AIDS and STIs**

Communicable diseases of most concern during the construction phase due to labor mobility are sexually transmitted diseases (STIs) such as HIV/AIDS. Concern was expressed during public consultation that the already high prevalence of HIV found in country could be exacerbated through spread of the disease by the construction workers and sex workers attracted to workers camps.

The increase in untreated HIV/AIDS infected persons leads to the reduction in the pool of available labor

If a contractor has a significant number of people living with HIV/AIDS who are untreated and workers infected with STD it may result in the loss of Man-hours.

High incidence of HIV/AIDS may also result in a high turnover of staff and increases cost of training because every time a staff member is replaced, the new person has to be trained.
An increase in the incidence of HIV/AIDS and STIs in the corridor could overburden the health facilities and destabilize family life.

**Recommended Mitigation Measures:**

Since no single measure is likely to be effective in the long run, successful initiatives shall combine a series of behavioral and environmental modification. Therefore, the recommended measures at the project level shall include the following:

- Incorporate STI/HIV/AIDS awareness and prevention program into the training programmed for all construction workers. Also extend the awareness and prevention program to the nearby local communities. An awareness program will ensure that workers are apprised of the modes of transmission and risk of infection.
- State health directorate, South Sudan HIV/AIDS Commission or affiliated NGOs will ensure that workers are briefed on the nature, transmission mode, treatment, prevention and the implications quarterly. These sessions would involve workers and members of the Communities within the jurisdiction of the project.
- Develop a program designed specifically for promoting safe sex for the construction workforce;
- Condoms should be made available for workers and inhabitants and its use promoted.
- Use various modes of media to educate construction workers on AIDS, its nature, transmission and prevention.
- The contractor and community heads would nominate 3 members of their workforce and community who would be trained as peer group facilitators. Private discussions, counseling and testing would be promoted quarterly.

**Exploitation of Borrow Pits**

The exploitation of Borrow pit material stems from the use of naturally occurring material for the purpose of strengthening the various strata of a road pavement or fill in the case of embankments or backfilling of drainage structures where there is a deficit of gut material within economic distance.

This entails the use of available geological data to locate areas within economically reasonable distances where material whose geotechnical properties meet the specifications of its intended use. It requires establishing the area and depth of exploitation.
The principal environmental concerns related to the exploitation of borrow pits are: loss of vegetation, farmlands, dust, health, public safety. When unprotected during usage and if it is not reinstated after use it would become a hazard for children and animals and becomes breeding ground for disease vectors and with inadequate consultation with land owners, borrow pits can become a source of litigation. Construction in reserves can affect the wildlife population since it would entail exploitation of material in that jurisdiction.

**Recommended Mitigation Measures**

The recommended measures shall include the following:

- Quarry and borrow sites and access roads are deemed to be part of the site, so that the powers and authority of the Engineer extend to them in the same way as to other areas where works are being undertaken;

- The contractor is required to prepare detailed Site Environmental Plans (SEPs) for approval by the Engineer, prior to commencement of any site development, and to execute all work at the sites in accordance with the plans. The SEPs should address all matters relevant to environmental protection and the minimization of impacts. Information provided in the SEPs should include, but not be limited to the following:
  - a site plan showing the location and proposed extent of the quarry, and borrow sites access road and any other facilities which may be installed,
  - details of all landholdings, vegetation and land use,
  - distance from the site to the nearest habitation,
  - measures which will be taken to minimize erosion caused by access road construction and drainage system operation,
  - any other measures which will be taken to minimize environmental impacts, including orientation of working faces to reduce visual impact, and
  - measures to be taken to make the quarry site safe on completion of exploitation, and to rehabilitate any agricultural land which has been affected by access road construction and operation.

- The Contractor shall not enter the land until compensation to owners or legal occupants is effected and the approval of the Engineer has been given.

- The location and size of quarries, borrow pits, spoil and stockpile areas shall be subject to the approval of the Engineer.
• Store the topsoil for site rehabilitation.
• Borrow material shall be excavated within the limits of depth and area shown on the borrow pit plans, and in a manner that will not prejudice the use of the material for the intended purpose.
• Borrow pits shall be continuously protected against the ingress of surface water, and the Contractor shall construct such temporary banks as may be required for diverting surface water, and, in so far as is possible, his operations shall be planned in such a way that the borrow pit will be self-draining, provided that silt traps are installed.
• Borrow areas shall be kept dry and ensure that borrow material is sufficiently dry when required for use.
• Stockpiling areas and maximum heights of stockpiles shall be indicated or approved by the Engineer.
• The reinstatement of the entire area shall be done in a manner so as to blend it with the surrounding area and to permit the re-establishment of vegetation.
• For this purpose the borrow area shall be shaped to even contours without any slopes being steeper than 1:6, The overburden and/or topsoil shall be pushed back, spread evenly to the prescribed thickness and landscaped over the area of the quarry, borrow pit, access road, spoil or stockpile area. After spreading, the topsoil shall be protected by seeding or re-vegetation.

Establishment and use of Base Camp and other Worksites

There is the need for the Contractor to establish a base camp for easy referencing and coordinating of activities pertaining to the realization of the project. It also provides security for his equipment, storage for materials to be used for the works Location of offices and or Residences

This entails:
• Land acquisition/Lease
• Clearing
• Erection of structures
• Provision of Sanitary facilities

Recommended Mitigation measures

• Contractor must enter into negotiations with owners of land and acquire the land legally
• Avoid lands on which disputes already exist
• Base camp construction, sanitation, use and maintenance should be according to specifications
• All the contractor’s sites and facilities should be formally decommissioned to an approved condition. Therefore, prior to completion, the Engineer should check that all requirements regarding clean-up and reinstatement have been met. The Contractor must prepare and implement a plan for the approval of the Engineer, prior to abandonment of base camps. Activities to be carried out should include removal and disposal of all waste, demolition and removal of unwanted structures, removal and disposal of any soil which has been contaminated by the spillage of diesel, or any other polluting material, and any others necessary to restore the site, as far as possible, to its initial state.

✓ Community-Worker Relations
Friction may be caused by inappropriate or unacceptable behaviour of workers in communities along the corridor. Sexual activity of workers with locals may lead to unwanted pregnancies, STIs and increased incidence in HIV/AIDS.

Recommended Mitigation Measures:
• A community liaison officer should be hired by the Contractor
• All communication with the neighbors (community) will be undertaken by the Community liaison officer with assistance from County Engineers or Payam administrators where necessary.
• The Project Management would ensure high level of professionalism by responding to all community enquiries and contacts in a polite and civil manner.
• The Contractor would establish a Complaints Register to receive, log, track and monitor response to complaints within specified timeframes.
• The Contractor shall maintain an onsite register for complaints made directly to Liaison Officer.
• The Community Liaison shall be responsible for notifying all complaints to the Project Manager. Each complaint shall be documented, responded to an action taken shall be recorded.

6.4. GRIEVANCE REDRESS MECHANISM
Introduction
• Grievance committees will be set up in every Payam in the corridor. Because of length of roads number of committees will be determined by length of road and number of Payams available. The purpose is to limit distance a complainant has to travel to make a complaint. To facilitate work of
the committee, every Boma would have a contact person who would be appointed by the community to receive complaints.

**The Committee**

- Each committee will have the following representatives:
  - Payam Administrator
  - Boma administrators for all Bomas within the Payam that are directly affected by the road
  - A representative from the Local Environment Committee
  - A representative from each community within the Payam that is directly impacted by the road (this person could act as the contact person in their community)
  - A representative each from any NGO or CSO operating in the corridor
  - The community Liaison officer
  - An officer from the County Office may be nominated to attend as an ex-officio member (this is to ensure that the County has first-hand information on issues of concern in the project area)

- Each Committee must ensure that women have representation and have an equal opportunity to get elected to serve on the committee

- The Committee would be formed after a round of consultations with all communities within the Payam that is directly impacted by road. In each community a contact person shall be selected.

- The Engineer by letter shall invite office holders like the Payam Administrator, Boma administrator and Local Environment committee member to join the committee (to avoid confusion these officials cannot be nominated at his/her community level or in his /her capacity as a representative from an NGO or CSO

- The committee shall be duly launched on an agreed date and the five-member executive selected by the Committee members

**Mode of Reporting Complaint**

- A complaint shall be reported to the Committee when it sits, reported to the contact person in the community or reported at the base camp to the Community Liaison officer of the Contractor either in writing or be recorded by the person who receives the complaint.
• Every complaint received must have a date, name of complainant and issue reported
• Every complaint must be investigated by the contact person in the company of one other committee member
• Findings should also be recorded in writing

Operation of the Grievance Committee

• The committee shall meet once a month so that independent members of the committee are not overburdened with extra activity.
• An emergency meeting can be held if 5-7 of the voting members of the committee deem it necessary.
• The request for an emergency meeting should be written and submitted to the Community Liaison Officer who will in turn inform members of the pending meeting.
• At least five days’ notice should be given before such meetings are convened.
• At each meeting all complaints received from complainants shall be read and discussed and decisions made shall be carried to the complainant.
• Complainant should be given audience if they wish to make their complaint to the committee.
• The Grievance Committee shall investigate the complaints as follows:
  - Does complaint have any merit,
  - Does additional information or documentation support the complaint.
• The committee shall then recommend remediation for complaint based on locally accepted practice.
  - Compensation must always consider in-kind replacements. Cash compensations must be a last resort.
  - Any decision taken that relates to compensation must be submitted to County office for review and approval.
  - After each meeting, decisions taken must be communicated in writing to complainant within 3 working days.

• The Contractor’s office can respond to complaints that are straightforward and directly related to their work. For example if a complaint is about loss of access to a home, the contractor can rectify this immediately without waiting for the committee to meet. Such grievances would be
recorded by the Community Liaison officer and remediation should occur within a week of complaint being received

• The contractor’s office should make a point of following-up on all such grievances to ensure the issue has been resolved.

• Whenever a complainant’s claim cannot be resolved satisfactorily, MTRB and County Officials shall procure the services of a mediator who shall intermediate between the complainant and Contractor. It is only after this intermediation has failed that a claimant can then exercise the option of going to Court.

✓ **Loss of Cultural Artifacts**

The symbolic graves located in Agyimutala and Lakamadi on the Amadi -Tali road would have to be relocated. Even though they do not contain corpses, because of customary beliefs, they must be treated with respect.

**Recommended Mitigation Measures**

• Families (owners) of the graves must be contacted by the Community Liaison and some members of the Grievance Committee if need be.

• Negotiations should be entered into about rituals required, when it must be performed and the proposed alternate location outside the ROW before the construction works commences.

• Rituals must be performed and the cost must be included as part of the construction cost in civil works contract

✓ **Traditional Practices & Religious Rites**

During consultation communities repeatedly mentioned that they expected that purification rites would be performed at commencement of project and also at various stream/river crossings. A neglect of such purification rites tends to make people anxious because they believe that without it they incur the wrath of their ancestors and local deities. They also believe that purification rites evoke the blessings of their ancestors on the construction.

**Proposed Mitigation Measures**

• Contractors should be sensitized on traditional beliefs and expectations
• Traditional leaders should be consulted on rituals required and when it must be performed by Community Liaison Officer in the company of Boma and Payam administrators.
• Cost of rituals performed must be included as part of the construction cost in civil works contract

✓ Employment and Income generation (including Technology transfer and capacity building)
Some local labour will be employed during the construction phase, as the road rehabilitation is partially labour-based. This will result in employment opportunities and income generation for some local people. A component of the project is also to build capacities of local people in road construction and maintenance. This could later result in employment creation for local road maintenance teams.

Benefit enhancement measures
Although labor recruitment is a matter for the contractor, who has the right to determine whom he shall and shall not employ, he should be formally encouraged to hire locally wherever possible, in so far as this is compatible with his skill requirements, in order to maximize the benefit distribution and social acceptability of the project. He should also be encouraged to procure supplies from local sources to the maximum extent possible in the circumstances.

6.3.3 Operation and Maintenance Phase Impacts

✓ Improved accessibility to the project area
The areas where roads are rehabilitated will become more accessible. In consultations communities were looking forward to the rehabilitation and its positive impacts on their everyday lives. The inhabitants of Lobone were so desperate for a road they were willing to offer their annual crop harvest as payment for some form of rehabilitation of the road to their community. The improved roads will improve education in the project areas as children get to school on public transport rather than by walking. Teachers will be more willing to move into those areas. People can get to referral hospitals and the general health of women and children in the areas would improve. Maternal mortality and infant mortality indices would all improve.

✓ Improved transportation of farm produce to market centres
The project area lies within the Greenbelt agro-climatic zone of South Sudan, reputed for its great food production potential. Roads will enhance the quick movement of agricultural produce to market centers and this in turn will improve household incomes of farmers who can increase their production.

✓ **Improvement of Food Availability/Security**
Agricultural produce can be moved from areas of abundance to areas of scarcity thus improving food security for the entire Greater Equatoria.

✓ **Improvement in maternal and infant mortality rates**
Access to better health care because roads are im-motorable and public transport becomes more available will translate to better health care for the vulnerable like pregnant women and infants.

✓ **Induced development**
The construction of the road could lead to the development of new areas hitherto unoccupied by people. Houses will be constructed and new farms will be cultivated in hitherto virgin lands, leading to a reduction of natural forests to anthropogenic uses.

✓ **Edge effect**
At the utilization phase, the road will open up hitherto closed areas (forest reserves, game parks, etc), to encroachers and poachers.
## Table 6.2 Impact Mitigation Table

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Impact Area</th>
<th>Mitigation/Monitoring Actions &amp; Requirements</th>
<th>Implementation &amp; Reporting Schedule</th>
<th>Responsible Party</th>
<th>Monitoring/Follow-Up</th>
<th>Net Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree and other vegetation</td>
<td>Removal of vegetative cover to widen road or get to borrow material</td>
<td>Limit removal of vegetation to design width if road. Provide tree seedlings for tree planting. Limit vegetation removal to approve borrow pit size. Re-instate borrow pit after use.</td>
<td>Monthly and progress report</td>
<td>Contractor</td>
<td>MTRB County Engineers (CE) Local Environmental Committee (LEC)</td>
<td>Replace or minimize vegetation lost</td>
</tr>
<tr>
<td>Dust &amp; Air Quality Management</td>
<td>Dust generation due to construction activities</td>
<td>Dowsing with water. Erection of speed control signals and ramps. Covering of sand both stockpiled or in haulage trucks. Inspection of surfaces of vegetation</td>
<td>3-4 times daily. Continuous. Daily. Monthly</td>
<td>Contractor or Engineer</td>
<td>Project Engineer CE, MTRB, MoE</td>
<td>Minimize air pollution</td>
</tr>
<tr>
<td>Water Resources, Erosion control, Flood prevention management</td>
<td>Siltation of water bodies resulting from excavation and material deposition. Contamination of water by oil from vehicles. Block flow of river during construction of culverts</td>
<td>Completing work on schedule. Deposition of constructional material at least 50m from water bodies. Embankment erection around fueling and servicing area for vehicles. Re-channelization</td>
<td>Continuous. Continuous. Continuous. Continuous</td>
<td>Contractor Engineer</td>
<td>Project Engineer CE, MTRB, MoE</td>
<td>Minimize pollution of nearby water bodies</td>
</tr>
<tr>
<td>Public, Occupational Health &amp; Safety</td>
<td>Accidents resulting in injury</td>
<td>Toolbox(safety) meetings, Awareness creation, Training of 1st aid team, Maintenance of accidents book, Provision of use of PPE, Provide adequate signage to inform and warn the public, Sensitize school children on proper road use</td>
<td>Bi-Weekly Monthly Quarterly Weekly Daily</td>
<td>Contractor Labor Gang</td>
<td>Project Engineer CE, MTRB, MoH</td>
<td>Reduce health risks to workers and general public. Reduce accidents</td>
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</tr>
<tr>
<td>Noise from Machinery</td>
<td>Bi-Weekly</td>
<td></td>
<td></td>
<td>Contractor Labor Gang</td>
<td>Project Engineer CE, MTRB, MoH</td>
<td>Reduce health risks to workers and general public. Reduce accidents</td>
</tr>
</tbody>
</table>


| Waste management | Indiscriminate waste dumping and defecation | Segregation of waste, Composting of organic waste, Emptying of waste bins @ approved waste dump site, Decommissioning of toilets after project | Daily Weekly Daily | Contractor Payam and Boma Administrators | Project Engineer Project Engineer, CEs, MTRB, MoE | Reduce pollution of environment by indiscriminate disposal of waste |

<p>| Road diversion &amp; accident prevention | Risk of accidents to workers and general public | Posting of traffic wardens (flagmen) to direct traffic flow, Mounting of road signs, Protecting actual working area with barricade, And Monitoring the | Daily Daily Daily | Contractor Engineer | Project Engineer MTRB, MoE CE | Minimize accidents or eliminate them all together on work site. |</p>
<table>
<thead>
<tr>
<th>Borrow Pit exploitation management</th>
<th>Implementation of all management measures</th>
<th>Throughout project cycle</th>
<th>Contractor Engineer</th>
<th>Project Engineer CE, MTRB, MoE</th>
<th>Maintain aesthetics of surrounding landscape. Avoid over exploitation of pit Prevent accidents &amp; reinstate pits so land use patterns are not permanently changed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiscriminate opening of pits, poor sitting of pits. Lack of protection when it is operational and non-reinstatement when project is completed</td>
<td>➢ Selection of borrow pit should be according to conditions of contract. ➢ All borrow pits should be detailed and submitted to engineer for approval ➢ Exploitation should be according engineers specifications ➢ When in use pits must be properly designed and protected ➢ All pits must be properly reinstated</td>
<td></td>
<td>Contractor</td>
<td>Project Engineer</td>
<td></td>
</tr>
<tr>
<td>Community – Worker management</td>
<td>Unacceptable behavior of workers could manner community worker relationships and create conflict</td>
<td>➢ Contractor would engage a community liaison officer ➢ Establish channels of communication with communities ➢ Listen to complaints, record and track proposed solutions to problems ➢ Respond promptly to complaints</td>
<td>Throughout construction period</td>
<td>Contractor Payam and Boma administrators</td>
<td>Project Engineer MTRB County officials</td>
</tr>
<tr>
<td><strong>Loss of Cultural Artifacts</strong></td>
<td>The symbolic graves located in Agyimutala and Lakamadi on the Amadi-Tali road would have to be relocated.</td>
<td>Families (owners) of the graves must be contacted. Negotiations should be entered into about rituals required, when it must be performed and the proposed alternate location outside the RoW. Agreement must be sought from the family on who performs the action of physically relocating the crosses. Rituals must be performed with all expense borne by the project.</td>
<td>One off</td>
<td>Contractor Liaison officer Payam &amp; Boma administrators</td>
<td>Project Engineer MTRB CE</td>
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</tr>
<tr>
<td><strong>Traditional Practices &amp; Religious Rites</strong></td>
<td>During consultation communities repeatedly mentioned that they expected that purification rites would be performed.</td>
<td>Contractors should be sensitized on traditional beliefs. Traditional leaders should be consulted on rituals required and when they must be performed. Cost of rituals performed must be borne by the project.</td>
<td>When required</td>
<td>Contractor Community Liaison officer Traditional priests Community leaders</td>
<td>Project Engineer Payam and Boma Administrators CE MTRB</td>
</tr>
<tr>
<td><strong>Establishment and use of Base Camp and other Worksites</strong></td>
<td>There is the need for the Contractor to establish a base camp for easy referencing and coordinating of activities.</td>
<td>Contractor must legally acquire land. Base camp construction, sanitation, use and maintenance should be according to specifications. All the contractor’s sites and facilities should be formally decommissioned to an approved condition.</td>
<td>Throughout project</td>
<td>Engineer Contractor MTRB CE EHS officer</td>
<td>Guarantee healthy safe working environment</td>
</tr>
</tbody>
</table>
CHAPTER 7: ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

7.1 Introduction
A principal Project goal is to achieve an appropriate balance in the environmental protection of the South Sudan Rural Road Rehabilitation, Maintenance and Spot improvement and its immediate surroundings. It is achieved through avoidance or mitigation of potential impacts associated with the Project, and enhancement of Project benefits. Towards this goal, an environmental management is recommended.

In order to be effective, environmental management must be fully integrated with overall project management effort at all levels, which itself should be aimed at providing a high level of quality control, leading to a project which has been properly designed and constructed and functions efficiently throughout its life. Appropriate road design issues need to be addressed as well as specific construction related activities, construction labor issues, and resettlement and compensation management issues prior to implementation of an environmental management and monitoring plan. These are highlighted in the following paragraphs. Some of these management issues are sectoral in nature, requiring outside participation of other Government authorities or the NGO.

Most of the project environmental management activities will be carried out during the construction phase, since this is when most impacts can be expected to arise. Management will very largely be concerned with controlling impacts which may result from the actions of the Contractor, through enforcement of the construction contract clauses related to protection of the environment as a whole and of the components within it. In this respect, it is important to recognize that successful mitigation of construction impacts can only be achieved if the environmental protection measures, as set out in the construction contract, are properly enforced.

Rehabilitation, periodic maintenance and spot improvement are activities of different intensities. While rehabilitation affects the entire stretch of road, periodic maintenance is limited to some activities like brushing of vegetation, cleaning of drains, de-silting of culverts and re-gravelling of sections of road. Spot improvement however is repairing sections of road. It may also include re-gravelling of sections of road, repair, replacement or expanding of drainage structures and repair of drains.

Because of similarity of activities, the environmental and social management plan summary presented below could apply to all roads irrespective of interventions applied. The extent of management would however be
determined by activity that is being carried out. Special specifications focused in environmental actions would be included in contract given to contractors. (Refer to Annex 4)

Environmental Management
The contractor shall abide by and implement the requirements of the ESMP with the support of relevant agencies like Ministry of Environment, Ministry of Transport, Roads and Bridges, County administration, Ministry of health and NGOs. To ensure that the Contractor takes environmental management seriously part of the special specification will spell out activities to be carried out by contractor on project site to ensure that environment is protected as required by the laws of South Sudan. The Contractors responsibility shall include but not be limited to:

- The procurement of the services of a competent Environment Health and safety officer. He should have a good knowledge of environmental management and be able assess risk to the environment and implement measures proposed to mitigate them.
- The provision of regular information, instruction, training and supervision as are necessary to ensure sound environmental management on the works
- The management of waste of all kinds which should include provision of latrines and other sanitary arrangements
- Train workers to minimize, waste, noise, dust and vibration. Avoid contamination of water sources, vegetated areas with excrement

The prepared ESMP that would guide construction covers the areas listed below.
- Water resources, erosion control and flood prevention management
- Noise and vibration management
- Construction dust management
- Public and occupational health and safety
- HIV/AIDS and health management
- Waste management
- Traffic management: road diversion and accident prevention
- Borrow pits management
- Management of fuels and oils
- Emergency response management
- Contractor/workers-community relations management
Table 7.1 Summary of Environmental Management

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Impact Area</th>
<th>Mitigation/Monitoring Actions &amp; Requirements</th>
<th>Implementation &amp; Reporting Schedule</th>
<th>Responsibility</th>
</tr>
</thead>
</table>
| Dust & Air Quality Management                        | Dust generation due to construction activities                               | ➢ Dowasing with water  
➢ Erection of speed control signals and ramps  
➢ Covering of sand both stockpiled or in haulage trucks  
➢ Inspection of surfaces of vegetation                                                                 | 3-4 times daily  
Daily  
Monthly                                           | Contractor/Site Engineer  
MoE/MTRB  
County Engineer                                      |
| Water Resources, Erosion control, Flood prevention management | Siltation of water bodies resulting from excavation and material deposition  
Contamination of water by oil from vehicles  
Block flow of river during construction of culverts | ➢ Completing work on schedule  
➢ Deposition of constructional material at least 50m from water bodies  
➢ Embankment erection around fueling and servicing area for vehicles  
➢ Re-channelization                                   | Continuous  
Continuous  
Continuous                                             | Contractor/Site Engineer  
Ministry of Env.  
MTRB                                                    |
| Noise & vibration exposure management                | Noise from machine Culvert excavation, construction and other maintenance works Concrete mixing machines | ➢ Controlling exposure of workers to noisy and vibrating equipment  
➢ Regulating distance of stationary noisy equipment from public places | Daily  
Monthly  
Monthly/ Daily                                       | Contractor/Resident Engineer  
MTRB                                                   |
| Public, Occupational Health & Safety                 | Accidents resulting in injury  
Road accidents  
Falling into unprotected trenches — children, animals, vehicles | ➢ Toolbox(safety) meetings  
➢ Awareness creation  
➢ Training of 1st aid team  
➢ Maintenance of accidents book  
➢ Provision of use of PPE  
➢ Provide signage that informs and warns the public of danger  
➢ Use flagmen                                           | Bi-Weekly  
Monthly  
Quarterly  
Monthly  
Weekly  
Daily                                                  | Contractor/Resident Engineer  
MTRB                                                   |
| HIV/AIDS/STD Management                              | Spread of infection due to neglectful sexual attitudes                      | ➢ HIV/AIDS/STIs Awareness workshops  
➢ Provision of free condoms  
➢ Peer group education                                  | Quarterly  
Weekly  
Twice monthly                                           | Contractor/RE NGOs  
Min of Health                                           |
| Waste management                                     | Indiscriminate waste dumping and defecation                                | ➢ Segregation of waste  
➢ Composting of organic waste  
➢ Emptying of waste bins                                 | Daily  
Weekly  
Daily                                                   | Contractor/RE MTRB  
CE  
Sanitation Unit                                        |
### Community Management

**Conflicts between workers and communities**

- Official Introduction of Contractor to County, Payam and Boma heads
- Employ community liaison officer
- County officers assist in resolving conflicts between workers and community
- Provide community with regular information on progress of work
- Induction of workers will include capacity building on worker community relations

<table>
<thead>
<tr>
<th>Task</th>
<th>Frequency</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once</td>
<td>MTRB Contractor</td>
<td></td>
</tr>
<tr>
<td>Continuous</td>
<td>County Officials</td>
<td></td>
</tr>
<tr>
<td>When needed</td>
<td>Contractor/RE</td>
<td></td>
</tr>
<tr>
<td>Continuous</td>
<td>Contractor/RE</td>
<td></td>
</tr>
</tbody>
</table>

### Road diversion & accident prevention

**Risk of accidents to workers and general public**

- Posting of traffic wardens (flagmen) to direct traffic flow
- Mounting of road signs
- Protecting actual working area with barricade
- And Monitoring the implementation of all management measures

<table>
<thead>
<tr>
<th>Task</th>
<th>Frequency</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly/Daily</td>
<td>Contractor/RE</td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>MTRB CE</td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>Contractor/RE</td>
<td></td>
</tr>
</tbody>
</table>

### 7.3 Capacity Building

Capacity building in environmental and social impact management will be essential. Personnel at the forefront of the various road rehabilitation projects need to understand the purpose of the ESMP implementation and their expected roles. This will stimulate the required collaboration.

The target groups for the training will include:

- PMT/ESMU staffs and engineers at National and State levels
- County Engineers;
- Payam and Boma Administrators;
- Grievance Committee representatives;
- Contractors’ construction workers; and
- Affected population.

7.3.1 PMT/ESMU staff at National and State levels

To build the capacity of staffs in the ministry at national and state level on safeguards management, an intensive training will be provided for Engineers and ESMU staffs under MTRB on Environmental and Social safeguards management and implementation and supervision of safeguards instruments. This will be conducted through a provision of Technical Assistance to the PMT.

7.3.2 County Engineers

County engineers lack capacity in the areas of environmental and social management and reporting as well as monitoring of adherence to required environmental and social principles, standards and commitments.

- They will undergo training that will enable them have oversight over the contractors implementation of environmental and social measures identified in the ESMP.
- Also trained on creation of public awareness /educational techniques (on environmental, social and health issues) and first aid procedures.

7.3.3 Payam & Boma Administrators

The local administrators need to be trained in the use of environmental guidelines so they can appreciate the impact of working being carried out in their communities. When these administrators have adequate information they will assist in monitoring because they understand the implications of contamination of natural resources, the effects of illegal hunting and logging and the over-exploitation of natural resources.

Training for them would cover:
- Environmental assessment
- EA legislation and relevant environmental policies
- Potential impacts of projects and mitigation
- The need for environmental management, monitoring and evaluation

7.3.4 Grievance Committee members

Members of grievance committee must have their capacity built so they can understand their role in minimizing conflicts and ensuring that project is completed on schedule because people get prompt attention for their grievances. Their training shall focus on the following:
- Environmental assessment
- The purpose of the grievance redress mechanism
- The role of the committee
7.3.5 Induction for Workers

The Project Manager and the EHS officer will be responsible for ensuring that all Project personnel under their control receive both initial and ongoing environmental awareness training sufficient to ensure they are familiar with their environmental responsibilities under the ESMP.

The Project induction will provide all site employees with an overview of the works and the associated Environmental Management System and key aspects that would be adversely impact on the project. Records of the induction would be maintained in a register which would clearly log in workers that attend and the respective topics covered as well as the dates of induction training.

The Environmental induction training will, as a minimum cover:

- Individual responsibilities under the ESMP.
- Risk management strategies for addressing potential Environmental impacts and for developing appropriate control strategies for any activity perceived to pose an Environmental risk.
- Key Environmental concerns and associated control strategies.
- How fuel and oils will be handled.
- Waste minimization, recycling, and disposal guidelines.
- Incident and emergency response actions including reporting and recording guidelines
- Complaint handling procedures.
- HIV/AIDS awareness training

7.3.6 HIV/AIDS Awareness training

The HIV/AIDS Commission will identify NGOs in the corridor who will contact communities in the corridor, fix training days on which they will

- They will also hold sessions for counselling and voluntary testing.

At such trainings attendants should be made aware of other sexually transmitted diseases and tuberculosis.

7.4 ESMPs Implementation Budget

A number of management items would be priced by the contractor as preliminary or general items included in the bill of quantities. Among these items would be:

- Construction of toilets
- Provision of waste bins
• Transportation of waste
• Disposal of excrement
• Barricades
• Provision of Traffic wardens
• Creation of diversions and detours
• Reinstatement of borrow pits
• Transportation and management of fuels & oils
• Provision of community liaison officer
• Induction training for workers

The cost estimates provided in the Table 7.2 is for the implementation of mitigation measures, monitoring plan and capacity building requirements.
Table 7.2 Budget for Implementation of Mitigation Measures

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Proposed Mitigation and Enhancement Measures</th>
<th>Estimated Cost of mitigation (US$)</th>
</tr>
</thead>
</table>
| Community Anxiety – The long wait for project commencement is causing anxiety; Indulgence in reckless sexual behavior could increase the incidence of HIV/AIDS and other STIs; Disregard for local customs could create conflict between workers and locals, Hunting and illegal logging by workers could have impact of flora and fauna | ➢ During waiting period MTRB should provide information to County Administrators that would then trickle down to communities  
➢ Induction of workers should include community relations, spread, treatment and control of HIV/AIDS & STIs  
➢ Contractor shall employ a community liaison officer  
➢ All workers contracts shall prohibit hunting and illegal logging  
➢ Implement GRM | 30,000 for MTRB dissemination of information |
| Removal of vegetative cover - grasses, trees of (200mm girth or less), weeds and shrubs will be removed to widen carriageway Trees, shrubs, grasses and weeds shall be removed to gain access to borrow material and create access road to borrow pits | ➢ Contractor must seek authorization from engineer and LEC for commercial trees  
➢ Limit removal of vegetation to design width of road-from end of carriage way clearing should not exceed 3m(drain=1.8m; construction area=1m)(Priced in the BOQ)  
➢ Provide tree seedlings for tree planting where it is deemed necessary  
➢ Commercial trees would be counted by engineer and priced in Bill of Quantities  
➢ Permits will be sought by contractor from LEC  
➢ Negotiations will be done with community or individual owners of trees  
➢ Agreed seedlings would be provided for re-aforestation | Provision in the Construction Contract |
| Siltation of water bodies resulting from excavation and material deposition from exposed surfaces and uncovered stockpiles of material Sedimentation reduces quality of water for household use and also reduces oxygen available for aquatic flora and fauna Contamination of water by oil from vehicles Block flow of river during construction of culverts | ➢ Contractor must seek approval from Engineer for any river works  
➢ Approach selected must ensure the avoidance of floods, drying up of river downstream and unnecessary sedimentation.  
➢ When contractor finds it difficult to avoid the above listed alternative sources of water should be provided for nearby communities  
➢ Covering of sand both stockpiled or in haulage trucks  
➢ Inspection of surfaces of vegetation | Provision in the Construction Contract |
| Dust generation, burning of plastics and other harmful substances and emissions from haul trucks and other vehicles would reduce air quality. | ➢ Road surfaces shall be dowsed with water 3-4 times daily  
➢ Speed control signals and ramps shall be used  
➢ Sand and gravel both stockpiled or in haulage trucks shall be covered all the time  
➢ Inspection of surfaces of vegetation  
➢ All vehicles and equipment shall be maintained according to manufacturer’s manual | Provision in the Construction Contract |
|---|---|---|
| The use of heavy machinery and the movement of vehicles up and down the road shall increase noise levels | ➢ Construction shall be limited to day time  
➢ Workers exposure to noisy and vibrating equipment shall be controlled  
➢ Workers shall use PPEs and its use shall be enforced  
➢ During induction workers shall be trained to minimize noise by not leaving engines running. Drivers will be trained to avoid unnecessary revving of engines. | Provision in the Construction Contract |
| Workers and the general public could be involved in vehicular accidents resulting in injury  
Slippery surfaces at construction site, unprotected excavations, unprotected borrow area could lead to accidents. Improper use of equipment could lead to injury | ➢ All workers shall be trained in proper use of equipment at induction  
➢ Regular toolbox(safety) meetings will serve as reminders  
➢ Awareness creation  
➢ Training of 1st aid team and provide a well-stocked first aid kit on site  
➢ Maintenance of accidents book  
➢ Provision and use of PPE  
➢ Provide adequate signage to inform and warn the public  
➢ Sensitize school children on proper road usage  
➢ Careless driving of project vehicles should be reprimanded  
➢ Traffic wardens would be used to direct traffic flow  
➢ Mounting of road signs  
➢ Protecting actual working area with barricade  
➢ And Monitoring the implementation of all management measures | Provision in the Construction Contract |
| Potential spread of HIV/AIDS and other STI infection due to reckless sexual behavior | ➢ HIV/AIDS/STIs Awareness workshops  
➢ Sensitization of nearby communities on transmission, prevention and treatment  
➢ Provision of free condoms  
➢ Peer group education  
➢ Distribution of condoms | Provision of USD 25,000 for education and distribution of condoms |
| Indiscriminate dumping of waste and free ranging could lead to | ➢ Segregation of waste | Provision of |
ruin of the aesthetics of area, Indiscriminate dumping of human waste and garbage also contaminates surface and ground water sources and increases the incidence of diarrheal diseases especially among children.

<table>
<thead>
<tr>
<th>Issues</th>
<th>Proposed Solutions</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composting of organic waste</td>
<td></td>
<td>USD5,000</td>
</tr>
<tr>
<td>Emptying of waste bins @ approved waste dump site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No dumping of waste in reserve areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide well placed toilets for workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sites for toilets and incinerator when needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decommissioning of toilets after project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emptying of waste bins @ approved waste dump site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No dumping of waste in reserve areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide well placed toilets for workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sites for toilets and incinerator when needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decommissioning of toilets after project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road diversions can cause vehicular accidents</td>
<td></td>
<td>USD5,000</td>
</tr>
<tr>
<td>especially when signage is inadequate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road diversions may lead to loss of vegetation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversions may lengthen and also slow down traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate warning signs would be put up to</td>
<td></td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>warn road users(BOQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel speeds should be limited to 20km/hr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>when construction is on-going.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hour workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A reasonable level of riding comfort must be</td>
<td></td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>maintained on diversion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indiscriminate opening of pits, poor sitting of</td>
<td></td>
<td>USD5,000</td>
</tr>
<tr>
<td>pits could become a hazard to animals and children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of protection when it is operational and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>non-reinstatement when project is completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>could lead to drowning of children and animals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selection of borrow pit should be according to</td>
<td></td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>conditions of contract.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All borrow pits should be detailed and submitted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>to engineer for approval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploitation should be according engineers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When in use pits must be properly designed and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>protected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All pits must be properly reinstated(BOQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unacceptable behavior of workers could mar</td>
<td></td>
<td>Provision of USD 5,000</td>
</tr>
<tr>
<td>community worker relationships and create</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conflict</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor would engage a community liaison</td>
<td></td>
<td></td>
</tr>
<tr>
<td>officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish channels of communication with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listen to complaints, record and track proposed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>solutions to problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respond promptly to complaints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish a Grievance Committee and implement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the GRM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creation of a base camp and other worksite areas</td>
<td></td>
<td>USD5,000</td>
</tr>
<tr>
<td>could take land out of community land use plans.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When such areas are left without de-commissioning,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the area can become un-usable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor should negotiate with land owners and</td>
<td></td>
<td>Provision in the Construction Contract</td>
</tr>
<tr>
<td>abide by conditions for use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The contractor should not enter land until</td>
<td></td>
<td></td>
</tr>
<tr>
<td>compensation to owners has been agreed and paid.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach for de-commissioning should be</td>
<td></td>
<td></td>
</tr>
<tr>
<td>submitted to the engineer for approval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All contractors’ sites should be formally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>de-commissioned.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas should be reinstated as closely to its</td>
<td></td>
<td></td>
</tr>
<tr>
<td>original state as possible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any sites that must be transferred to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTRB or state institutions should be duly done</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The influx of non-indigenous workforce into project area may lead to conflicts between workers and indigenes

- A community liaison officer should be employed by the contractor
- He/she will act as a liaison between workers and the locals
- The GRM must be implemented

| Provision of USD 5,000 for grievances management |

Table 7.3 Proposed budget for Capacity building

<table>
<thead>
<tr>
<th>ITEM</th>
<th>E &amp; S Management Area/Institution</th>
<th>Mitigation Measures/Capacity Gaps Identified</th>
<th>Expected Income/Capacity Building measures</th>
<th>Rate</th>
<th>Estimated Costs(US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MRTB</td>
<td>Capacity enhancement in the Environmental &amp; social safeguard principles implementation</td>
<td>Training of Engineers and E &amp; S safeguard unit staffs in E&amp;S management implementation (consultancy services) for (5 days) Say 15No DSA for staff for 5 days</td>
<td>$300/p/day $100/day</td>
<td>$1,500 $7,500</td>
</tr>
<tr>
<td>2</td>
<td>County, Payam &amp; Boma Administrators</td>
<td>Capacity enhancement in the Environmental &amp; social safeguard principles implementation</td>
<td>Training in E &amp; S management, Community relations (consultancy services) for a total of 5 days in project life. DSA for Officials (10 no)</td>
<td>$300/day $50/day</td>
<td>$1,500 $2,500</td>
</tr>
<tr>
<td>3</td>
<td>Contractors</td>
<td></td>
<td>Training in E &amp; S management implementation for say 1 contractor 1 no SE (2 days)</td>
<td>$300/p/day</td>
<td>$600</td>
</tr>
<tr>
<td>4</td>
<td>Trainer (Consultant)</td>
<td></td>
<td>Training of CEs &amp; SEs for a total of 4 days Cost of Consultancy services-including accommodation and meals for a total of 4 days</td>
<td>$300</td>
<td>$1,200</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>$14,800</td>
</tr>
</tbody>
</table>
CHAPTER 8: Consultations

8.1 Introduction

The Consultant conducted public consultations with PAPs, community elders and local officials with the following key objectives among others:

- To inform PAPs about and discuss the nature and scale of adverse impacts of the project on their livelihoods in a more transparent and direct manner and seek their participation in the project cycle.
- To give PAPs affected communities a chance to have a say and express their views in the planning and implementation of the project that affect them directly.
- To obtain qualitative as well as quantitative information on viable income generation and livelihood interventions which PAPs could engage themselves in order to restore their income and livelihoods in a self-sustaining manner.
- To inform local authorities of the impacts, agree on a cut-off date, solicit their views on the project and discuss their share of the responsibility for the smooth functioning of the overall project operations.

This chapter summarizes all meetings done as part of the ESIA study. The team visited 20 communities in Greater Equatoria (see table 8.1 below).

Table 8.1: List of consulted communities

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Community consulted</th>
<th>Sr.No</th>
<th>Community consulted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Magwi</td>
<td>11</td>
<td>Dari</td>
</tr>
<tr>
<td>2</td>
<td>Obbo</td>
<td>12</td>
<td>Tali</td>
</tr>
<tr>
<td>3</td>
<td>Lerwa</td>
<td>13</td>
<td>Lasu</td>
</tr>
<tr>
<td>4</td>
<td>Palwar</td>
<td>14</td>
<td>New Lasu</td>
</tr>
<tr>
<td>5</td>
<td>Kichenga</td>
<td>15</td>
<td>Ombassi</td>
</tr>
<tr>
<td>6</td>
<td>Lobone</td>
<td>16</td>
<td>Onjerima</td>
</tr>
<tr>
<td>7</td>
<td>Pogee</td>
<td>17</td>
<td>Eidi</td>
</tr>
<tr>
<td>8</td>
<td>Parajok</td>
<td>18</td>
<td>Dukudu Olo (Ras Olo)</td>
</tr>
<tr>
<td>9</td>
<td>Amadi</td>
<td>19</td>
<td>Maridi</td>
</tr>
<tr>
<td>10</td>
<td>Bitti</td>
<td>20</td>
<td>Kazana</td>
</tr>
</tbody>
</table>
In total community consultations was carried out in 20 communities identified as part of the reconnaissance survey.

There are far more communities in the road corridor than the 20 visited but the consultant encountered many challenges that made visit to all communities impossible.

8.2 Methodology:

The consultant visited communities and held meetings at which it interacted with elders, men, youth and women as separate groups. In communities where FBOs and other visible organizations were identified, there was interaction with those groups also.

Questionnaires were designed for use at the meetings:

- To simplify the training of local enumerators who were needed to interpret in local dialects
- To ensure that some basic information would be collected by all teams irrespective of where they were

(Refer to Appendix 2)

During the reconnaissance survey there was consultation with Commissioners, some Payam Administrators and some two communities. The summary of these consultations are also captured in tables below.

A few NGOs were also interviewed.

**TABLE 8.2: Issues Raised during Consultations with Commissioners and other Local Administrators**

<table>
<thead>
<tr>
<th>NO</th>
<th>LOCATION</th>
<th>PERSONS CONSULTED</th>
<th>Designation</th>
<th>COMMENTS/ISSUES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Magwi county</td>
<td>HE. Francis Okech Oteka</td>
<td>Commissioner of Magwi County</td>
<td>- The County administration has kept the road corridor free from permanent structures</td>
</tr>
</tbody>
</table>

- The project is in fulfillment of the people’s request
- Everyone is waiting for the implementation of project
- Project shall strengthen trust between people of the state and the Central Government
- Gravel, sand, stone, water and cheap labor are in abundant supply
- The County is willing to coordinate Contractor-Community relations to forestall unnecessary
<table>
<thead>
<tr>
<th>Location</th>
<th>Name</th>
<th>Position</th>
<th>Remarks</th>
</tr>
</thead>
</table>
|                                 | Maurice Louta               | Deputy Executive Director       | • A conscious effort should be made to employ local labor  
• The county office should be involved in the selection of suitably qualified local personnel                                                                                                           |
|                                 | James Orach Newton          | County Engineer                 | • Information flow between county office and central Government should be improved so Local officials like him can answer the queries from the county inhabitants.                                                |
|                                 | Peter Otim Karlo            | Member of Parliament for Magwi Constituency #27 | • The road is important to RSS because it links RSS to Uganda which is an important export destination for Eastern Equatoria State.  
• There are many farming communities and food markets along the selected road that would benefit immensely from the road improvement.                                        |
| Mundri West County               | Lexson Mabrouk              | Mundri West Commissioner        | • The Amadi Payam has immense food production potential but is inaccessible during the rainy season  
• The Amadi-Tali-Madbar is an important link between Central Equatoria and Western Equatoria  
• The improvement of that section would enhance security in the area and improve police patrol  
• Majority of people in the area were displaced during the war. They desire to come back to their homes but the poor road network hinders movement  
• The County has selected an alternative alignment for the Amadi –Yirol Road. This serves their communities better. |
| Amadi Payam                      | Kenneth Kleopas Korayi      | Head Chief & Acting Executive Director | • The Communities are looking forward to the road improvement  
• The selected alignment will cutoff important communities so they have selected a new alignment                                                                                                          |
| Tali Payam                       | HE Khemis Jetti             | Payam Administrator             | • The Amadi-Tali and the Tali-Yirol roads are major interconnections between Central Western Equatoria and Lakes state and would open up the area for easy travel. |
transportation of agricultural produce and human traffic
- Human lives are lost during medical emergencies such as child delivery and snake bites because of the state of the roads so rehabilitation of these roads will facilitate travel to health centers

<table>
<thead>
<tr>
<th>County</th>
<th>Commissioner/Executive Director</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Morobo County     | HE Moses Simon Soro             | • The County fully supports the road rehabilitation because it would open the county for trade in agricultural produce  
• The Morobo-Juba road should be constructed as well |
| Yei County        | HE David Juma Augustine        | • Rehabilitation of road sections would boost agriculture and facilitate travel within the county  
• It would improve road links with other counties  
• The county administration would offer assistance required to bring project to fruition |
| Maridi County     | John Hezekiah Paul             | • The rehabilitation of the Ras Olo-Maridi, and the Maridi-Kozi roads would open up the area for agricultural and economic development  
• The County Administration would offer any assistance required to ensure that the project is done |
|                   | Stephen Kuyu                  | • The Maridi-Kozi road had been constructed by the locals in the past using hand tools thus the people are willing to support its construction this time round.  
• The Mbia Ngarari Game park which straddles the RSS and DRC is close to Maridi so an improved road may lead to an increase in poaching  
• The proposed road should be extended to Mvolo to reduce travel time from Mvolo to Maridi. At the moment to reach Mvolo one has to make a detour through Mambe  
• Previously, cattle rustling were severe in the area, |
this made the area dangerous. Now it is better controlled by Military Patrols

- Maridi County Administration would be willing to provide patrol teams for the Contractor if the road would be extended to Mvolo.

<table>
<thead>
<tr>
<th>Kozi Payam</th>
<th>John Kumboyo</th>
<th>Executive Officer of Kozi Payam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>He was excited about the construction of food markets and storage facilities because it would motivate farmers to produce more</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Road Section</th>
<th>Communities</th>
<th>Comments/ Issues Raised</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Magwi-Lobone through Parajok</td>
<td>Magwi</td>
<td>• The community is looking forward to the road construction. They have known about this rehabilitation for a long time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lobone</td>
<td>• The state of the road is the main obstacle to the development of market for their agricultural produce in Magwi and Juba • The rehabilitation of the road will facilitate export trade between their community and Uganda</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pogee</td>
<td>• They expect the road to connect their community to Parajok throughout the year at the moment the road is impassable during the rainy season</td>
</tr>
<tr>
<td></td>
<td>Amadi -Tali</td>
<td>Amadi</td>
<td>• The is local population is expecting the road to be rehabilitated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bitti Boma</td>
<td>• The three alternative routes converge here, which is also a market center</td>
</tr>
<tr>
<td></td>
<td>Agyimutala</td>
<td></td>
<td>• There are wooden crosses that mark graves. However these are symbolic graves that contain no bodies per se. These symbolic graves are created for persons who died elsewhere. Relocating the graves should pose no problem at all.</td>
</tr>
<tr>
<td></td>
<td>Kashiko</td>
<td></td>
<td>• A troop of baboons were sited nearby. The locals confirmed regular sittings of baboons in the area.</td>
</tr>
<tr>
<td></td>
<td>Lakamadi</td>
<td></td>
<td>• Lakamadi is a trading center. • There is also another symbolic grave in the road corridor</td>
</tr>
<tr>
<td>Region</td>
<td>Sub-region</td>
<td>Key Points</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Tali</td>
<td></td>
<td>• There are no telephone links with Tali Payam. Any contact has to be made through Terekeka the County Headquarters</td>
<td></td>
</tr>
<tr>
<td>Tali-Yirol (Madbar section)</td>
<td>Atti</td>
<td>• Atti borders Western Equatoria and Lakes State</td>
<td></td>
</tr>
<tr>
<td>Madbar</td>
<td></td>
<td>• Madbar is on the junction of the main road that links Yirol to Awerial</td>
<td></td>
</tr>
<tr>
<td>Yei – New Lasu</td>
<td>New Lasu</td>
<td>• This road leads to the Border of the Democratic Republic of Congo</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• There is an Immigration post here</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• There is also a military Post here</td>
<td></td>
</tr>
<tr>
<td>Ras Olo-Maridi</td>
<td>Maridi</td>
<td>• A public notice had been posted on the notice board in the County office informing the public that a sum of 8m USD had been set aside for the construction of the Ras Olo-Maridi and Maridi-Kozi roads.</td>
<td></td>
</tr>
<tr>
<td>Maridi-Kozi</td>
<td>Kozi Payam</td>
<td>• The inhabitants wanted the road extended to Mvolo in Mvolo county</td>
<td></td>
</tr>
<tr>
<td>Morobo-Panyume</td>
<td>Kendila</td>
<td>• There is a vibrant market here every Friday</td>
<td></td>
</tr>
<tr>
<td>Yaribe-Gimunu</td>
<td>Jamara 7</td>
<td>• The community has been fighting for the project since 1987</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The road rehabilitation would open markets for their agricultural produce</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• There is an object of cultural significance; the Lungo Uko which is a rock Outcrop deity belonging to the people of Jamara, however these deity are located outside the RoW, and should pose no problem at all during the construction of the road.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• An NGO called ZOA runs a farmer field school in this area</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Two other NGOs called SSUHA and PSI are involved in the area of healthcare</td>
<td></td>
</tr>
</tbody>
</table>

**Summary of Issues from 20 Communities Visited**

- All communities were happy that the rehabilitation of their roads was about to happen but in a number of communities inhabitants were skeptical about the actual construction happening any time soon. Their complaint was that so many different groups of people had visited their communities yet the Contractor who was to build the road had still not appeared.
o As is common in most African societies, all communities expected that rituals would be performed to commence construction of road. In the Acholi areas in particular they expected that rituals would be performed when construction has to be done at streams and rivers along the road corridor.

o In all communities inhabitants expected that contractors would employ some of their young unemployed persons. However in one community an older woman asked that older persons who were fit be considered for employment as well.

o The Contractors were also expected to keep a cordial relationship with communities.

o Many communities were concerned about the conduct of workers of the contractor and would not tolerate immoral behaviour; like sleeping with married women and raping young girls.

o At several communities there was fear that roads would lead to insecurity.

Other communities were concerned that the road would increase the spread of HIV/AIDS (details are Annex 2)
CHAPTER 9: CONCLUSION

The environment and social impact study confirms the findings of the ESSAF that there are no fatal flaws that would prevent this project from being implemented.

The study identified ten key adverse impacts that needed to be managed if road works are to be delivered without incident. The report has addressed the key impacts by proposing mitigation measures and developing environmental and social management plans that will enable the contractor and other stakeholders limit or eliminate the effect of these impacts.

Roads are not concentrated in one geographical area and this will pose a challenge for the Ministry of Roads & Bridges that has direct oversight of the selected roads. The distances of roads from Juba would be a limiting factor and may result in inadequate oversight. Issues of poor delivery by contractors may come to the notice of the Ministry too late and a quick response to emergencies may be difficult.

It is therefore our recommendation that the Ministry builds the capacity of County Engineers where available and uses them to assist in the performance of their oversight role.
Bibliography

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- Environment and Social Screening Report – Ministry of Roads & Bridges
- Interim Constitution of South Sudan
- Inception Report, ESIA South Sudan Rural Roads Project – Ayeh & Ayeh
- Lateritic Soils in Distinct Tropical Environment (South Sudan and Brazil) – Mary McNeil
- Statistical Year Book for Southern Sudan 2009 – Southern Sudan Centre for Census, Statistics & Evaluation
- Sudan: Southern Sudan (Comprehensive Food Security and Vulnerability Analysis) – Jonathan Rivers et al (Dec 2007 for World Food Program
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- World Bank Environmental Health and Safety Guidelines
- World Wide Web Sources including Encyclopaedia Britannica on Southern Sudan (Geography, National Parks and Game Reserves etc)
ANNEXES
ANNEX 1

QUESTIONNAIRES FOR COMMUNITY CONSULTATIONS
QUESTIONNAIRE 1-
TARGET – KEY INFORMANT
Could be: – A COMMUNITY HEAD, A COMMUNITY HEAD AND HIS ELDERS, A RESPECTED ELDER IN THE COMMUNITY (e.g. Head teacher, Medical personnel, Religious leader etc.)

NAME OF ENUMERATOR………………………………………………………………………………………………………………
DATE………………………………………………………………………………………………………………………………….…..

NO. OF QUESTIONNAIRE (must be preceded with name of community E.G. MADBAR 01)
………………………………………………………………………………………………………………………………………………

<table>
<thead>
<tr>
<th>1. NAME(s) OF RESPONDENTS</th>
<th>2. POSITIONS HELD IN COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. NAME OF COMMUNITY………………………………………. DOES IT HAVE ANOTHER NAME (state it)………………………………………………………………………………………………………………………………

4. POPULATION SIZE IF AVAILABLE…………………………………………………………………………………………….. or

5. NO OF HOUSEHOLDS………………………………………………………………………………………………………………

6. IS IT A HOMOGENEOUS GROUP OF PEOPLE OR A MIXED GROUP…………………………………………………………

7. WHICH ETHNIC GROUPS ARE REPRESENTED HERE………………………………………………………………………………………………………………………………………………………………………………

8. SOURCES OF INCOME HERE-(farming, trading, teaching, other public service jobs, other income generating activities)………………………………………………………………………………………………………………………………………………………………………………
9. ANY TRADITIONAL PRACTICES OF SIGNIFICANT IMPORTANCE TO COMMUNITY – Taboos, day of no work, places outsiders are not allowed to enter, any activity outsiders are not allowed to indulge in etc)

10. ANY CONFLICTS OR CULTURAL SENSIBILITIES THAT CONTRACTORS/CONSULTANTS SHOULD BE AWARE OF?

11. COMMUNITY EXPECTATIONS-jobs, relationship with contractor and his/her workers etc
QUESTIONNAIRE 2: IN TALI AND IN OTHER PLACES WHERE TREES STAND IN THE RIGHT-OF-WAY

TARGET: TALI COMMUNITY

NAME OF ENUMERATOR

DATE

NO. OF QUESTIONNAIRE (must be preceded with name of community E.G. MADBAR 01)

<table>
<thead>
<tr>
<th>1. NAME OF PERSONS CONSULTED</th>
<th>2. POSITION HELD IN COMMUNITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. SHOULD THE TREES BE CUT, WOULD THE COMMUNITY EXPECT ANY SPECIAL PREVILEGES FOR ALLOWING THE TREES TO BE CUT? YES.............. NO..............

4. IF YES WHAT WOULD THOSE PREVILEGES BE (Please state)
QUESTIONNAIRE 3:
TARGET – FOCUS GROUPS
Could be: – A GROUP OF MALES, FEMALES, YOUTH, OR ANY DISTINCT GROUP IN THAT COMMUNITY LIKE FARMER BASED ORGANIZATION, SPECIAL GROUP FORMED BY AN NGO ETC
FOCUS GROUP DISCUSSIONS (MEN, WOMEN AND YOUTH SEPARATELY IF POSSIBLE)
NAME OF ENUMERATOR…………………………………………………………………………………………………………………………
DATE………………………………………………………………………………………………………………………………………………
NO. OF QUESTIONNAIRE (must be preceded with name of community E.G. MADBAR 01)
……………………………………………………………………………………………………………………………………………………………………

1. NAME OF COMMUNITY ………………………………………………………………………………………
2. NAME OF FOCUS GROUP……………………………………………………………………………………………………

3. LIST OF NAMES OF PERSONS AT THE MEETING (IF SPACE IS NOT ADEQUATE USE BACK OF QUESTIONNAIRE TO RECORD REST OF PERSONS PRESENT

<table>
<thead>
<tr>
<th>NAMES</th>
<th>SEX</th>
<th>ANY DESIGNATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. ANY SCHOOL, WHAT LEVEL DOES IT END ………………………………………………………………………………………………………
5. WHERE DO CHILDREN CONTINUE EDUCATION ………………………………………………………………………………………………………
6. HOW FAR AWAY IS THIS…………………………………………………………………………………………………………………………
7. SOURCE OF WATER………………………………………………………………………………………………………………………………
8. ANY NEARBY STREAMS OR RIVERS-

<table>
<thead>
<tr>
<th>Name of surface water bodies (river/stream/pond)</th>
<th>Does it have water all year round? (Yes or No)</th>
<th>Additional Information – (breaks into string of ponds, flows all year round when rains are heavy etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. SOURCE OF POWER/ENERGY: 


Electricity from Power plants
Traditional sources
Any other (describe)

10. WHERE IS THE NEAREST MEDICAL FACILITY? 

11. HOW MANY PERSONNEL DOES IT HAVE? 

<table>
<thead>
<tr>
<th>PERSONNEL</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOCTORS</td>
<td></td>
</tr>
<tr>
<td>NURSES</td>
<td></td>
</tr>
<tr>
<td>PUBLIC HEALTH NURSES</td>
<td></td>
</tr>
<tr>
<td>HEALTH ASSISTANTS</td>
<td></td>
</tr>
</tbody>
</table>

12. ANY SOURCE OF PUBLIC TRANSPORT 

13. HOW DO YOU TRAVEL IN AND OUT OF HERE? 

14. HOW IS FARM PRODUCE SOLD HERE (HOW IS IT DONE-BOUGHT AT FARMGATE, OR TRANSPORTED CARRIED TO MARKET, ETC)? 

15. HOW FAR IS NEAREST MARKET? 

16. WOULD WOMEN BE ALLOWED TO WORK ON THE ROAD PROJECT (OUTSIDE THEIR HOMES) IF A CONTRACTOR WANTED TO EMPLOY THEM? 

17. WHAT KIND OF WORK WOULD WOMEN BE EXPECTED TO DO IF THEY WERE EMPLOYED? 

18. WHAT KIND OF WORK WOULD MEN BE EXPECTED TO DO?
19. ARE THERE ANY SPECIFIC CULTURAL PRACTICES OF UTMOST IMPORTANCE TO YOU THAT YOU WOULD EXPECT EVEN OUTSIDERS WHO COME INTO THIS AREA TO OBEY? (Please state)

20. WHAT ARE YOUR COMMUNITY'S EXPECTATION FOR THIS PROJECT?    

21. ARE THERE ANY PEOPLE WITH DISABILITY HERE OR PEOPLE WITH SPECIAL NEEDS (State who they are)

<table>
<thead>
<tr>
<th>Persons with special needs</th>
<th>Male</th>
<th>Female</th>
<th>Population size if possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orphans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People living with HIV/AIDS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Returnees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alien settlers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
QUESTIONNAIRE 4

TARGET – OWNER OF FARM

NAME OF ENUMERATOR........................................................................................................................................

DATE...................................................................................................................................................................

NO. OF QUESTIONNAIRE (must be preceded with name of community E.G. MADBAR 01)
............................................................................................................................................................................

1. NAME OF OWNER...........................................................................................................................................

2. WHAT CROP IS BEING GROWN...........................................................................................................................

3. HOW LONG DOES IT TAKE TO MATURE........................................................................................................

4. WHEN WILL CROP BE HARVESTED................................................................................................................

5. MEASURE SIZE OF GARDEN IN Right-of-way IF NEEDED (RECORD SIZE)..............................................

6. COUNT NUMBER OF PLANTS IN Right-of-way

<table>
<thead>
<tr>
<th>NAME OF CROP</th>
<th>NUMBER OF PLANTS</th>
<th>LEVEL OF MATURITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. DESCRIBE LEVEL OF MATURITY-(SEEDLING, NOT MATURE, MATURED BUT NOT READY FOR HARVEST, READY FOR HARVEST)
QUESTIONNAIRE 5:
TARGET: FAMILIES THAT OWN SYMBOLIC GRAVES

NAME OF ENUMERATOR………………………………………………………………………………………………………………
DATE………………………………………………………………………………………………………………………………………………

NO. OF QUESTIONNAIRE (must be preceded with name of community E.G. MADBAR 01)

1. INFORM THEM THAT THEIR GRAVES ARE IN THE Right-of-way AND TELL THEM THE IMPLICATIONS OF CHANGING THE ALIGNMENT

2. NAME OF COMMUNITY………………………………………………………………………………………………………………

3. NAME OF PERSON CONSULTED………………………………………………………………………………………………

4. RELATIONSHIP WITH THE DECEASED (EG FAMILY HEAD, FATHER, MOTHER ETC)…………………………

5. NAME OF FAMILY …………………………………………………………………………………………………………………

6. NAME OF PERSON REPRESENTED BY THE GRAVE…………………………………………………………………………

7. HOW LONG HAS EACH GRAVE BEEN THERE ………………………………………………………………………………………

8. (INVESTIGATE THE PRACTICE)-IS IT ANYONE AND EVERYONE THAT CAN HAVE A GRAVE LIKE THAT?……

9. CAN IT BE MOVED OUT OF Right-of-way…………………………………………………………………………………………

10. WHAT RITES NEED TO BE PERFORMED TO MOVE IT……………………………………………………………………

11. HOW LONG WILL THE WHOLE PROCESS TAKE? ………………………………………………………………………………

…………………………………………………………………………………………………………………………………………………………
ANNEX 2

SUMMARY OF COMMUNITY CONSULTATIONS - COMMENTS CONCERNS AND QUESTIONS
### TABLE A 1: SUMMARY OF CONSULTATIONS IN COMMUNITIES

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Community</th>
<th>Comment/questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magwi-Lobone through Parajok</td>
<td>Pogee</td>
<td>The road project will facilitate transportation and reduce the cost of transporting produce to the market. However, accidents will increase because of the influx of vehicles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The road should be constructed first before the storage facilities are put in place because the UN one time requested for grains, we had it in abundance but we could not get it out. There will be no change if the road is not constructed and thefts will increase. Road construction should be constructed during the rainy season</td>
</tr>
<tr>
<td></td>
<td></td>
<td>We are happy to hear the good news but on the other hand cultural rituals must be performed first. Many people have been here to consult with us so how do we know that you are serious? We do not want MacDowell and Prism here as contractors; we want competent firms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Question: if the road passes through houses or a grave site what will you do?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are so many curves on the road are you going to straighten them out?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some contractors come and on the pretext that there are landmines they run away and don’t complete the road works. Can you please assure us that it will not happen this time?</td>
</tr>
<tr>
<td>Pajok</td>
<td></td>
<td>My concern is at one time there was a contractor assigned to construct 16 immigration offices but he failed here due to the border demarcation. Can GOSS assure us that the border dispute would be resolved because we fear that it may disrupt road works. I expect also security to be provided due to the border dispute. Security must increase in this area and for the construction crew at large. The disputed land is very fertile but we cannot access it because of the dispute. I therefore urge the government to bring boreholes here to help in community integration</td>
</tr>
</tbody>
</table>
We expect to have competent contractors. We are fed up with contractors who deliver shoddy work to loot us. We ask that GOSS bring us competent contractors and not companies like MacDowell, Prism and Eyat whose lack of equipment hindered their work. Contractor’s workers should not flirt with school girls or married women in the community. If this is happens there will be unpleasant consequences for the Contractor. The contractor should not deviate from their call of duty.

My comment is that it would be wise to involve the community of Ngomorom up to Limu river at the early stage to hear their views. Should construction impact on buildings and farms what would the contractor do? Would the road require a new survey to avoid the already existing structures?

What has been said should come to pass this time no telling lies. Rituals must be performed in special places like hills, rivers, streams and valleys. Rituals must also be performed on Alumu buch – a new road.

Question: Would road construction and the construction of the storage and markets occur at the same time or at different stages. Question: The only challenge is that people have been here before you to talk about road construction; just tell us when construction is actually going to start.

When the road is constructed the disabled will also manage to reach Juba, it will also help the pregnant women.

The youth will definitely benefit when construction begins. We are also glad you came. Job opportunities will come to Obbo community.

I am aware now of the project and I think it will improve the marketing of our produce at nearby towns like Torit town. The road would make this area more accessible and that in turn would improve our incomes.

The road when constructed will improve trade relations between neighboring countries such as Uganda and Kenya. It will also improve relations between counties and transportation of the sick will be easier.

The road would improve trade between Payams and Bomas. It will
help small communities develop into big towns. When the road is constructed it will reduce manual labor applied to fix damaged sections of the road.

If the road contractors would also bring tractors for ploughing it would be good for us. In Obbo community there is no secondary school so the educational standards of schools here is low. It has been very difficult to transport sick children to the hospital. Finally the road project will improve the road system and even the president will come here.

The government will not have to import food from neighboring countries. This area can be the food basket of South Sudan when the road is constructed.

One of the benefits is that investors will come to the area if the road is constructed. The feeder roads when completed will make it easy for people to be carried to hospital.

The contractor should have a cordial relationship with the community. Workers should not be rude or arrogant to the locals; they must work in harmony with us. The contractor should not damage buildings or gardens; the contractor should wait for harvest first.

I want to know whether it is full construction or repair because some contractors have only been doing bush clearing. There are many potholes and if not well constructed it may worsen.

GoSS should select the best contractor because there are some contractors who disappear as soon as they are paid. We want a situation where the government provides markets for our products and fixes good prices which are standard. Also the goods coming into the country should be taxed so we would have a comparative advantage.

We are also worried that the contractor would not pay his workers.

Question: Should the contractor compensate a land owner if ‘murram’ is found on his land?

The budget for construction is out how sure are we that these contractors are coming soon in August these consultations should
have been made earlier than now

Questions: When the construction takes place will the potholes and the ruts be fixed? I am saying this because I know of other contractors who did bad jobs.

After thorough consultations the chief thanked the consultant and the team for work done and hoped that the project would start soon. He went on to add that much as the road is to be constructed they are both positive and negative benefits but all in all agricultural production will increase and transport will become accessible for everyone.

Question: Between the storage facilities and the markets, which one will come first?

Question: If a house falls in the right-of-way what will the contractor do?

Question: Is there compensation for boreholes and mango trees?

Will more boreholes be drilled if these ones near the road are affected?

Question: How about the roadside gardens, would there be compensation for those?

Question: If gravel is found in someone’s farm, would the owner be compensated?

Question: Last year so many people came here saying they are going to construct roads from Magwi to Lerwa but when exactly are you starting?

Question: Shall women also be allowed to work

We hope this construction will happen. We have heard the same stories many times but it never happens. If you guys are not attached to government next time don’t come

Question: Will the community have the right to pass information to the Boma chief?

We fear for our dear wives.

Companies such as MacDowell and Prism are not competent to handle road works.

HIV/AIDS should be taken seriously because contractors come with an influx of migrant workers. Condoms must be supplied to the
<table>
<thead>
<tr>
<th>Contractors workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rituals should be performed alongside rivers and hill tops when construction begins but how will the Contractor respond to this?</td>
</tr>
<tr>
<td>There are so many curves in the road what shall be done about them?</td>
</tr>
<tr>
<td>Rituals should be performed alongside rivers; hill tops when construction begins how will the Contractor respond to this?</td>
</tr>
<tr>
<td>There are so many curves in the road what shall be done about them?</td>
</tr>
<tr>
<td>Traditional rituals must be performed on hills because of the noise that will emanate from the machines. This is because one time a company tried to clear a farm and his equipment got damaged A he-goat is used for the rituals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Magwi</th>
</tr>
</thead>
<tbody>
<tr>
<td>We plant a lot of food but it is bought cheaply by Ugandans and processed. We then go back and buy the flour at a higher cost. In the end we get nothing for our sweat</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Magwi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women would be allowed to work - they could mix mortar, carry cement, run errands for work men, do some book keeping and community sensitization. cook for workers, general housekeeping on project site, winning sand and gravel and acting as flag-men</td>
</tr>
<tr>
<td>We have been told several times about the road but we are tired of waiting</td>
</tr>
<tr>
<td>We can provide skilled and unskilled labor. If the contractor provides his laid down criteria for hiring labor we can provide competent people</td>
</tr>
<tr>
<td>The Juba Nimule road has so many sharp curves that have caused us many lives so please make this road better</td>
</tr>
<tr>
<td>Men could be suppliers of construction material; they could be drivers, masons, carpenters, loader operators, site engineers, foremen and sub-contractors.</td>
</tr>
<tr>
<td>Rituals must be performed before construction commences</td>
</tr>
<tr>
<td>Once a year purification rites must be performed to cleanse the land and on that day no work is allowed</td>
</tr>
<tr>
<td>Rituals must be performed before any construction can occur at</td>
</tr>
</tbody>
</table>
streams or rivers. When there is an outbreak of epidemic the community would carry out some rituals to cleanse the land.

Contractor should give priority to the indigenes when he offers jobs; this is because; in the past when an NGO came into the area with employees who were mainly Madi, the Madi workers abandoned the work when trouble broke out between the Acholi and the Madi.

Youth should be trained so they can feel a sense of ownership and also be able to maintain the road when it is completed.

The road would make transportation of farm produce easier.

It would be easier for inhabitants to access referral health care
It would reduce transport cost
THE farmer Based organization group expected that the road would create easy access to markets for their produce
Bring buyers to Magwi
Reduce post-harvest losses, improve their incomes and encourage farmers to adopt modern farming practices

There is a tree on the road that must not be cut because of its historic significance.

The youth would be employed by the contractor
There should be mutual respect between the inhabitants and the contractor.

Palwar

It is their expectation that both skilled and unskilled persons would be employed from the village. Among them, there are construction equipment operators. The community would be willing to supply gravel and any other available construction material for a fee.

Like Acholi in Magwi it is their expectation that before construction commences rituals would be performed. They also expected that rituals would be performed at stream and river crossings before any construction work was done there. No work was permitted on days when purification rites were done for the whole community. In addition to these there are 6 mahogany trees that provide shade for their communal area where they meet and also have their market. They are requesting that the trees be left to stand.

There are no conflicts in their community but they would like the...
Contractor to treat locals employed by him well. They also do not want the workers of the contractor to flirt with wives of locals and cause unnecessary friction.

It is their expectation that both skilled and unskilled persons would be employed from the village. Among them, there are construction equipment operators. The community would be willing to supply gravel and any other available construction material for a fee. It was suggested that older persons who are strong should also be given jobs.

Any extra material not required by the contractor should be given to the community for the construction of the Boma office.

Roads that tee off the Magwi-Lobone road, these roads should be graded by the contractor so they are easily identified.

It is the expectation of the younger men that the road construction would create access to markets for their farm produce, improve the school, would facilitate evacuation of medical emergencies, reduce accidents, and improve communication. The women expect that the construction of the road would improve supply of medication including anti-retroviral. They also expect that locals would be given jobs and the road would bring development like hospitals to their village.

Women would be allowed to work at duties like cooking, digging up gravel, of loading material and washing of clothes while men would be expected to be the drivers, masons, carpenters, security men and foremen.

Question: Would crops destroyed during construction be paid for?  
Question: If a worker gets hurt on the job, will he be compensated?  
Question: Would the contractor build a camp in only one location?  
Question: Can someone get a job to cook for the Contractor’s workers?

The contractor should give communities regular updates on cost of gravel and aggregates so that locals do not waste their time putting material together that they cannot sell.

Question: If a worker gets hurt on the job, will he be compensated?

Kichenga  

Question: If a building is demolished, would the owner be
<p>| Question: would a farmer receive compensation for his crops if they are destroyed? | The women also mentioned some negative impacts of the road as, increased death rates, increase in HIV/AIDS infections and increase in stealing. The road construction would improve their access to markets which in turn would improve their incomes. It would also facilitate faster movement of goods and services and reduce accidents on the road. |
| Question: Can older persons who are fit get jobs when the contractor arrives on site. | Community would expect that the contractor would employ some locals. The elders expect cooperation between Contractor and local inhabitants. |
| The road construction would improve their access to markets which in turn would improve their incomes. It would also facilitate faster movement of goods and services and reduce accidents on the road. | Like the other Acholi communities in the corridor, they would expect rituals to be performed before Contractor commences work and at the stream crossings before any construction is done there. The normal practice is to request for 2 black goats, 2 black hens and some additional items that would cost a total of 1000SSP for rites at the two streams. There is a once a year ritual that is done to “bless” the land, on that day no one is expected to work. The community also has a sacred grove called “Taga” located in a valley near their stream that is out of bounds to strangers. |
| The community also has a sacred grove called “Taga” located in a valley near their stream that is out of bounds to strangers. | Women would be allowed to work and they can direct traffic (flagmen), cook and carry out other housekeeping chores and do record keeping. Men would work as masons, carpenters, drivers, cleaners, laborers and porters. |
| Farmers produce mainly for home consumption so what is sold is bought by traders who come to the community to buy produce. | Lobone Improve their welfare and access to education for their children The road would improve their businesses and improve their finances It would enable them store food and reduce post-harvest losses Would bring mobile phone service to their community |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve the supply of medication especially AZTs for people living with HIV/AIDS</td>
<td>Women can work for the contractor as cooks and be responsible for housekeeping on the site and be employed as traffic wardens</td>
</tr>
<tr>
<td>Glad to have us in their community. They usually are not given any feedback teams just come and go. This team is the 4th team to come to their community.</td>
<td>Question: when will construction commence&lt;br&gt;Question: if houses and farms are affected will we receive compensation&lt;br&gt;Question: Will fruit trees that are destroyed be paid for?&lt;br&gt;Question: when will construction commence&lt;br&gt;Question: How wide would the road be?&lt;br&gt;Question: will old bridges be replaced</td>
</tr>
<tr>
<td>Those in the ROW are ready to move, that is how desperately they want the road. Being in the border area they have suffered immensely from the im-motorable road. They were planning to take their farm produce to the State Governor to pay for the road to be fixed.</td>
<td>MTRB should employ a competent contractor who will not abscond half way</td>
</tr>
<tr>
<td>Inhabitants of Lobone Payam are poor because there is no road.</td>
<td>Yei-New Lasu&lt;br&gt;Lasu&lt;br&gt;Women can be carriers of water on the road project&lt;br&gt;Women can cook for workers and clear the vegetation&lt;br&gt;Women can be traffic wardens&lt;br&gt;Cleaners at the camp site&lt;br&gt;Men can be survey laborers, drivers and messengers.</td>
</tr>
<tr>
<td>The contractor should keep communication lines open&lt;br&gt;Offer employment to inhabitants&lt;br&gt;Contractor should respect married women</td>
<td>Sacrifices should be done at border points. The meat sacrificed should not be eaten</td>
</tr>
<tr>
<td>The road will enhance the development of Lasu&lt;br&gt;It will facilitate the transportation of goods and services&lt;br&gt;Telecommunication network will get here</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Possible Impacts</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Health facilities would be easily accessible</td>
<td>The road may bring an increase in HIV/AIDS, theft and insecurity</td>
</tr>
<tr>
<td>Markets will also be accessible</td>
<td>The road may increase accidents</td>
</tr>
<tr>
<td>Higher education will be available to children</td>
<td>It would make it easy for rebels to attack us</td>
</tr>
<tr>
<td>Facilitate movement of cattle to the market</td>
<td>No compensation required for crops and trees</td>
</tr>
<tr>
<td>Transport fares would be reasonable</td>
<td>Graves in the right of way can be moved. The GoSS should take care of that</td>
</tr>
<tr>
<td>The road will facilitate trading here</td>
<td>Want to have a meeting with the contractor before he commences</td>
</tr>
<tr>
<td>The road may bring an increase in HIV/AIDS, theft and insecurity</td>
<td>There is a high maternal mortality rate, we need a health facility</td>
</tr>
<tr>
<td>The road may increase accidents</td>
<td>The road will bring telecommunication network</td>
</tr>
<tr>
<td>It would make it easy for rebels to attack us</td>
<td>The road will bring development</td>
</tr>
<tr>
<td>No compensation required for crops and trees</td>
<td>More people will move into this area</td>
</tr>
<tr>
<td>Graves in the right of way can be moved. The GoSS should take care of that</td>
<td>Men can work as drivers, foremen, mechanics and laborers</td>
</tr>
<tr>
<td>Want to have a meeting with the contractor before he commences</td>
<td>Women can work as cooks, cleaners</td>
</tr>
<tr>
<td>There is a high maternal mortality rate, we need a health facility</td>
<td>Provide water for construction work</td>
</tr>
<tr>
<td>The road will bring telecommunication network</td>
<td>Work also as flagmen</td>
</tr>
<tr>
<td>The road will bring development</td>
<td>The road will increase the rate of accidents</td>
</tr>
<tr>
<td>More people will move into this area</td>
<td>The incidence of HIV/AIDS in this area is high</td>
</tr>
<tr>
<td>Men can work as drivers, foremen, mechanics and laborers</td>
<td>The contractor must consult with the community so if there are any rifts between him and his workers the elders can resolve it</td>
</tr>
<tr>
<td>Women can work as cooks, cleaners</td>
<td>Annual rituals must be performed</td>
</tr>
<tr>
<td>Provide water for construction work</td>
<td>Rituals must be performed at large trees</td>
</tr>
<tr>
<td>Work also as flagmen</td>
<td>The road will increase the rate of accidents</td>
</tr>
<tr>
<td>The road will bring development</td>
<td>The incidence of HIV/AIDS in this area is high</td>
</tr>
<tr>
<td>More people will move into this area</td>
<td>The contractor must consult with the community so if there are any rifts between him and his workers the elders can resolve it</td>
</tr>
<tr>
<td>Men can work as drivers, foremen, mechanics and laborers</td>
<td>Women can be cooks and even drive as well</td>
</tr>
<tr>
<td>Women can work as cooks, cleaners</td>
<td>Cows must be sacrificed before construction of bridges commence</td>
</tr>
<tr>
<td>Provide water for construction work</td>
<td>Contractor must do a good job</td>
</tr>
<tr>
<td>Work also as flagmen</td>
<td>Contractor should employ locals</td>
</tr>
<tr>
<td>The road will increase the rate of accidents</td>
<td>If the contractor kills a dog he must speak to the owner</td>
</tr>
<tr>
<td>The incidence of HIV/AIDS in this area is high</td>
<td>Contractor is not expected to work on Sunday because most people</td>
</tr>
<tr>
<td>Area</td>
<td>Impacts and Considerations</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>are Christians</td>
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<tr>
<td></td>
<td>Community expect cooperation from the workers of the contractor</td>
</tr>
<tr>
<td></td>
<td>The contractor should not replace workers nominated for jobs with others</td>
</tr>
<tr>
<td></td>
<td>Contractor must meet with community leaders before he commences work</td>
</tr>
<tr>
<td></td>
<td>Incidence of HIV/AIDS here is very high</td>
</tr>
<tr>
<td></td>
<td>The road will bring development to Kazana</td>
</tr>
<tr>
<td></td>
<td>This place will be accessible</td>
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<tr>
<td></td>
<td>Security would be guaranteed because rebels would not be able to move freely</td>
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<td></td>
<td>Government will be able to collect taxes</td>
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<td></td>
<td>The road will bring communication facilities</td>
</tr>
<tr>
<td></td>
<td>Build capacity of youth</td>
</tr>
<tr>
<td></td>
<td>There will be an increase in accidents</td>
</tr>
<tr>
<td></td>
<td>There will be an increase in rape</td>
</tr>
<tr>
<td></td>
<td>There will be an increase in theft</td>
</tr>
<tr>
<td></td>
<td>Eidi Rituals must be performed with a cow, crates of beer, crates of soda and bottles of wine</td>
</tr>
<tr>
<td></td>
<td>The road will bring more schools</td>
</tr>
<tr>
<td></td>
<td>Hospital would be opened</td>
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<tr>
<td></td>
<td>The road would attract traders here</td>
</tr>
<tr>
<td></td>
<td>Farming would become a lucrative business</td>
</tr>
<tr>
<td></td>
<td>Women can clear vegetation for the contractor</td>
</tr>
<tr>
<td></td>
<td>They can also cook for the workers</td>
</tr>
<tr>
<td></td>
<td>Provide water for construction work</td>
</tr>
<tr>
<td></td>
<td>The road will attract investors</td>
</tr>
<tr>
<td>(Ras Olo) Dukudu Olo - Maridi</td>
<td>To avoid accidents on the job a bull or a goat must be slaughtered before work commences</td>
</tr>
<tr>
<td></td>
<td>Most people are Christians so they do not work on Sundays</td>
</tr>
<tr>
<td></td>
<td>The road will improve the public transport situation</td>
</tr>
<tr>
<td></td>
<td>The construction would create employment opportunities</td>
</tr>
<tr>
<td></td>
<td>Improve our access to markets</td>
</tr>
<tr>
<td></td>
<td>Here food production is mainly for the family's use</td>
</tr>
<tr>
<td>Location</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Women will be cooks, cleaners  
Women will clear vegetation  
Fetch water for construction | The road will bring telecommunication network to their town  
It will enable them have mills for maize  
The road will bring them jobs |
| The road can also result in an increase the incidence of stealing and It  
would increase insecurity  
Could lead to an increase in the incidence of HIV/AIDS | Maridi-Kozi  
Maridi  
The chief must be consulted before work commences and must be consulted regularly during the construction of road |
| The project should start quickly because we need jobs  
Men could be drivers, clear vegetation  
Men could do demolitions if it is required.  
Women can be cooks, cleaners  
Contractor should employ both men and women | Onjerima  
The community expects good work from the contractor  
The contractor should sell food to his workers  
The contractor should start work soon  
We want employment for the inhabitants |
| We detest drunkenness  
We do not want the workers to take other people’s wives | Women can provide water for the project  
Women can be clerks for contractor  
Men can carry stones  
Men can help build the camp |
| We want roads as good the ones in Juba | Men would assist contractor with manual work  
Men can win sand for bridge construction  
Women can be cooks, provide water for construction  
Women can be cleaners  
There is no need for contractor to bring workers here |
| Women can be cleaners, flagmen and cooks  
Men can provide, sand and stones | Yei-Kergulu-Morobo  
Ombassi |
<table>
<thead>
<tr>
<th>Location</th>
<th>Expectations</th>
</tr>
</thead>
</table>
| Amadi-Tali-Yirol | Could also be operators of construction equipment  
<p>|                 | Do not expect contractor to work on Sundays                                                        |
|                 | Expecting that road would bring income generating activities to the area                          |
|                 | The road would bring telecommunication networks to Ombassi                                         |
|                 | The road will improve access to hospitals and medication thus improving the health indices of the local population |
|                 | The road will improve access to markets                                                           |
| Dari Boma       | The community needs more trained teachers and their market needs to be expanded                    |
|                 | Big trees should not be cut down                                                                   |
|                 | The primary school needs improvement                                                               |
|                 | The secondary school is not complete                                                                 |
|                 | Farmers need tractors                                                                             |
|                 | Expect that rituals would be performed.                                                            |
|                 | Expect that there will be employment opportunities                                                 |
|                 | The government should open markets for agricultural produce                                         |
|                 | Would like to use Borrow pits as dugouts for water                                                 |
|                 | Transporting goods and services would become easier                                                |
| Dari Boma       | Questions: can we get additional boreholes                                                         |
|                 | Without roads it is difficult for us to access health facilities                                    |
|                 | We have no food storage facilities                                                                  |
|                 | We are 25miles away from the nearest market which is in Tali                                       |
|                 | Community needs agricultural support                                                                |
|                 | We expect that the contractors workers will not flirt with married women                            |
|                 | There are disagreements between animal rearers and farmers                                           |
|                 | There are conflicts over water resources                                                            |
| Tali            | Rituals would be performed at the river                                                             |
|                 | Prayers would have to be said before 3 trees in the right of way are cut                            |
|                 | The road will improve access to for people and farm produce                                         |
|                 | More NGOs will come and help the local populations                                                  |
|                 | The contractor will bring employment                                                               |</p>
<table>
<thead>
<tr>
<th>Location</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amadi</td>
<td>Rituals must be performed before commencement of construction. Women can be cooks, masons, can also collect aggregates for concrete works. Health of people will improve. Access to markets would improve. Security will improve. Telecommunication networks would improve.</td>
</tr>
<tr>
<td>Amaki</td>
<td>The road will provide markets for their produce. Access to schools and hospitals would improve. Men can be laborers, drivers and remove vegetation. Women would work as cleaners, cooks and flag men. It is expected that transport will be provided to take women back home.</td>
</tr>
<tr>
<td>Bitti</td>
<td>We were told that there will be a new road constructed. Will the existing road also be expanded? We are glad for your coming to Biiti Boma if you are representing government. If the work starts we shall thank God because as you can see people are suffering. We are ready for the road and thank you for coming. Would we be compensated for destroyed houses and trees?</td>
</tr>
</tbody>
</table>
Annex 3

Community Consultations - List of persons present (see attached)
Annex 4

Special Specifications to be included in Contracts
CONTRACT SPECIFICATIONS FOR THE CONTRACTOR

1.0 General

a. All Environmental and Social (E&S) safeguards associated with the contract shall be complied with by the contractor. The Contractor shall also update himself about such issue in the ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of the ESMP.

b. The Contractor shall develop a plan of work indicating all Environmental and Social safeguards at the various stages and indicate the period within which site will be maintained to its original state after completion of works to ensure that significant E&S safeguards have been addressed appropriately.

c. The Contractor shall adhere to the proposed plan implementation schedule and the monitoring plan to ensure effective feedback of monitoring information to the County Engineer (CE).

d. The Contractor shall implement all measures to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by all environmental performance requirements specified in the ESMP.

2.0 Dust Mitigation Measures

e. The contractor shall minimize the effect of dust on the surrounding environment resulting from site clearing, vibrating equipment and temporary access roads.

f. During the rehabilitation project, the contractor shall carry out proper and efficient measures, such as water dousing, whenever necessary to reduce the dust nuisance, and to prevent dust originating from the operations.

3.0 Noise Due to Construction Activities

g. The contractor shall ensure the noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.

4.0 Waste Management

h. Construction waste shall not be left in stockpiles along the road, but removed and disposed of/or reused where needed.

i. All waste shall be segregated into organic waste and plastic and glass. The organic waste will
be composted near the work site to enrich the soil while plastics and glass will be taken to the district dump sites

j. All sanitary facilities (e.g. garbage collection and disposal, drinking water facilities, etc.) shall be provided by the contractor in work sites or project sites.

5.0 Water Resource Management

k. No construction water containing spoils or site effluent, especially cement, oil and fuel, shall be allowed to flow into natural water drainage courses.

l. The contractor shall take all possible steps to prevent pollution of streams and other water supplies.

m. Entry of runoff water to the site shall be restricted by constructing diversion channels or culverts to reduce the potential of soil erosion and water pollution.

n. Waste water from washing out of equipment shall not be discharged into water courses.

6.0 Material Excavation and Deposit

O. Vegetation clearing shall be restricted to the area required for safe operation of the rehabilitation work. Vegetation clearing shall not be done more than two weeks in advance of rehabilitation.

Borrow Pit Excavation & Reinstatement

• The Contractor shall not enter the land until compensation to owners or legal occupants is effected and the approval of the Engineer has been given.

• The location and size of quarries, borrow pits, spoil and stockpile areas shall be subject to the approval of the Engineer.

• Borrow material shall be excavated within the limits of depth and area shown on the borrow pit plans, and in a manner that will not prejudice the use of the material for the intended purpose.

• Borrow pits shall be continuously protected against the ingress of surface water, and the Contractor shall construct such temporary banks as may be required for diverting surface water, and, in so far as is possible, his operations shall be planned in such a way that the borrow pit will be self-draining, provided that silt traps are installed.

• Borrow areas shall be kept dry and ensure that borrow material is sufficiently dry when required for use.

• Stockpiling areas and maximum heights of stockpiles shall be indicated or approved by the Engineer.

• The reinstatement of the entire area shall be done in a manner so as to blend it with the surrounding area and to permit the re-establishment of vegetation.
For this purpose the borrow area shall be shaped to even contours without any slopes being steeper than 1:6. The overburden and/or topsoil shall be pushed back, spread evenly to the prescribed thickness and landscaped over the area of the quarry, borrow pit, access road, spoil or stockpile area. After spreading, the topsoil shall be protected by seeding or re-vegetated.

7.0 Contractor's Environment and Social Management Plan (ESMP)

p. Within 6 weeks of signing the Contract, the Contractor shall prepare a work plan to ensure the adequate management of E&S aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an E&S safeguards for the works. The Contractor's work plan will serve two main purposes:

i. For the Contractor, for internal purposes, to ensure that all measures are in place for adequate E&S management, and as an operational manual for his staff.

ii. For the Client, supported where necessary by SE, to ensure that the Contractor is fully prepared for the adequate management of all E&S safeguards issues.

q. The Contractor's E&S document shall provide at least:

• A description of procedures and methods for complying with the Se’ general environmental and social conditions, and any specific conditions specified in the ESMP;
• A description of specific mitigation measures that will be implemented in order to minimize adverse impacts
• A description of all planned monitoring activities and the reporting thereof; and
• The internal organizational, management and reporting mechanisms put in place.

8.0 Health and Safety

r. In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of HIV/AIDS.

s. Adequate road signs to warn pedestrians and motorists of rehabilitation activities, diversions, etc. shall be provided at appropriate points.

Reporting

The Contractor shall prepare monthly progress reports to the Site Engineer on E&S monitoring with these general conditions, the project E&S safeguards. It is expected that the Contractor's reports will include information on:

• E&S management actions/measures taken, including approvals sought from MTRB and Ministry of Environment
• Problems encountered in relation to E&S aspects (incidents, including delays, cost consequences, etc. as a result thereof);
• Lack of compliance with contract requirements on the part of the Contractor;
• Changes of assumptions, conditions, measures, designs and actual works in relation to E&S aspects; and
• Observations, concerns raised and/or decisions taken with regard to E&S management during site meetings.

**Cost of Compliance**

It is expected that compliance with these conditions is already part of standard of good workmanship and state-of-the-art as generally required under this Contract. The item "Compliance with Environmental and Social Management Conditions" in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable E&S impact.
Annex 5 - Procedures for chance find of physical cultural resources
Procedures for chance find of physical cultural resources

The below will be annexed to the contract in case there is the possibility of chance find of physical cultural resources, during construction of Rural Roads and borrow pit excavation activities.

Annex to contracts in case of potential chance find of physical cultural resources

If the Contractor discovers archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

1: Excavation in sites of known archaeological interest should be avoided, where historical remains, antiquity or any other object of cultural, historical or archaeological importance (including graveyards) are unexpectedly discovered during construction in an area not previously known for its archaeological interest, the following procedures should be applied:

a) Stop the construction activities in the area of the chance find.

b) Delineate the discovered area.

c) Secure the area to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the Ministry of Culture, Youth and Sports take over.

d) Notify the supervisory Engineer who in turn will notify the county safeguard focal point to contact the responsible local authorities and the Ministry of Culture, Youth and Sports immediately (less than 24 hours).

e) The Ministry of Culture, Youth and Sports will be in charge of protecting and preserving the area until deciding on the proper procedures to be carried out. This might require an evaluation of the findings to be performed by the archaeologists of the relevant Ministry (within 1 week). The evaluation of the findings will take in consideration various criteria relevant to cultural heritage, including the aesthetic, historic, scientific or research, social and economic values as decided by the Ministry of Culture, Youth and Sports.

f) Decisions on how to handle the finding be taken by the responsible authorities and the Ministry of Culture, Youth and Sports (within 2 weeks). This could include changes in the location of the subproject layout (such as when the finding is irremovable remains of cultural or archaeological importance), conservation, preservation, restoration and salvage.

g) Construction or rehabilitation work will resume only after authorization is provided by the responsible local authorities and the Ministry of Culture, Youth and Sports concerning the safeguard of the heritage.
h) Authorization to resume work shall be communicated to the contractor in writing by the Ministry of Culture, Youth and Sports.

2: In case of delays incurred in direct relation to any physical cultural resources findings not stipulated in the contract (and affecting the overall schedule of works), the contractor may apply for an extension of time. However the contractor will not be entitled to any kind of compensation or claim other than what is directly related to the execution of the physical cultural resources findings works and protections.
Annex 6

STATE MAPS OF GREATER EQUATORIA
WESTERN EQUATORIA
Annex 7

Botanical Names
## WESTERN EQUATORIA- NAMES OF PLANTS AND THEIR USES

<table>
<thead>
<tr>
<th>Botanical name</th>
<th>Modo name</th>
<th>Modo use</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acacia seyal</em></td>
<td>kono</td>
<td>thorn fences; fever medicine</td>
</tr>
<tr>
<td><em>Afzelia africana</em></td>
<td>kpërî</td>
<td>vegetable; leaf apron; tall enough for hives</td>
</tr>
<tr>
<td>Annona senegalensis Pers.</td>
<td>mambolowe</td>
<td>edible fruit; fire sticks; roof construction; game trap; stool frames</td>
</tr>
<tr>
<td><em>Anogeissus leiocarpus</em> (DC) Guill. &amp; Perr.</td>
<td>korc'ba</td>
<td>posts and rafters; roof construction; snares; game trap; leaf apron</td>
</tr>
<tr>
<td><em>Borassus aethiopum</em></td>
<td>mbere</td>
<td>edible fruit; rafters; woven baskets and mats</td>
</tr>
<tr>
<td>Bridalia sp. nr B. scleroneura Pax</td>
<td>sönzu</td>
<td>edible fruit; posts and rafters</td>
</tr>
<tr>
<td>?Burkea sp</td>
<td>mbirënï</td>
<td>posts and rafters; beehives</td>
</tr>
<tr>
<td><em>Butyropermum niloticum</em></td>
<td>kiïnö</td>
<td>oil; edible fruit; posts; hoe handles; game trap; glue</td>
</tr>
<tr>
<td>Cassia sp.</td>
<td>mcbbc a 'bati</td>
<td>stool frames; hernia medicine</td>
</tr>
<tr>
<td><em>Cassia obtusifolia</em> L.</td>
<td>sölï</td>
<td>tall enough for hives</td>
</tr>
<tr>
<td><em>Cassia</em> sp.</td>
<td>lajira</td>
<td>cultivated vegetable; arrow shafts</td>
</tr>
<tr>
<td>Catunaregam sp.</td>
<td>pïrïzö</td>
<td>fish poison; game trap; soap; jaundice medicine</td>
</tr>
<tr>
<td>Cissus integrifolia</td>
<td>lu'ju</td>
<td>rope; ritual function</td>
</tr>
<tr>
<td>Combretum sp.</td>
<td>kirika'da</td>
<td>posts and rafters; leaf apron</td>
</tr>
<tr>
<td><em>Combretum</em> sp.</td>
<td>kidirï</td>
<td>no specific use</td>
</tr>
<tr>
<td><em>Combretum</em> sp.</td>
<td>kangoro</td>
<td>storage container</td>
</tr>
<tr>
<td><em>Crossopteryx febrifuga</em> Benth.</td>
<td>yangayo</td>
<td>game trap; knife sheaths; hoe handles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Botanical name</th>
<th>Modo name</th>
<th>Modo use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dalbergia melanoxylon Guill. &amp; Perr.</td>
<td>kolu</td>
<td>clubs; knife sheaths; formerly arrowheads</td>
</tr>
<tr>
<td><em>Daniella oliveri</em> (Rolfe) Hutch. &amp; J.M. Dalz.</td>
<td>kila</td>
<td>tall enough for hives</td>
</tr>
<tr>
<td>Dichrostachys sp.</td>
<td>kotclik'dë</td>
<td>posts and rafters</td>
</tr>
<tr>
<td>Diospyros mespiliformis A DC</td>
<td>kolome</td>
<td>edible fruit; roof construction; stool frames; tall enough for hives</td>
</tr>
<tr>
<td>Entada sp.</td>
<td>pirizaza</td>
<td>leaf apron</td>
</tr>
<tr>
<td>Erythrina abyssinica DC.</td>
<td>kcmmc kuruku</td>
<td>no known use</td>
</tr>
<tr>
<td>Ficus sp.</td>
<td>këlu</td>
<td>string for nets, pottery mats and hive suspension; storage baskets</td>
</tr>
<tr>
<td>Ficus salicifolia Vahl</td>
<td>këlu</td>
<td>edible fruit; leaf apron</td>
</tr>
<tr>
<td>Gardenia sp. (gnarled)</td>
<td>kirř</td>
<td>spits; yam trellis</td>
</tr>
<tr>
<td>Gardenia sp.</td>
<td>kirř</td>
<td>edible fruit; spits(straight)</td>
</tr>
<tr>
<td>Grewia mollis Juss.</td>
<td>ya'da</td>
<td>vegetable; edible fruit; salt; building rope; bow; game trap; roof construction; ritual function</td>
</tr>
<tr>
<td>Harrisonia abyssinica Oliv.</td>
<td>ngero</td>
<td>bows; stool seats</td>
</tr>
<tr>
<td><strong>Hymenocardia acida</strong> Tul var. <em>acida</em></td>
<td>kilikere</td>
<td>posts and rafters; yam vine posts</td>
</tr>
<tr>
<td><strong>Khaya senegalensis</strong></td>
<td><strong>lbölölbö</strong></td>
<td>fish poison</td>
</tr>
<tr>
<td><strong>Lannea fruticosa</strong> (A. Rich.) Engl.</td>
<td><strong>fcdc</strong></td>
<td>snares; withies for hives; tall enough for hives</td>
</tr>
<tr>
<td><strong>Lannea schweinfurthii</strong> (Engl.) var.<em>schweinfurthii</em></td>
<td><strong>lapiri</strong></td>
<td>no known use</td>
</tr>
<tr>
<td><strong>Lannea sp.</strong> nr. <strong>L. barteri</strong> (Oliv.) Engl.</td>
<td><strong>kudë</strong></td>
<td>beehive; rope for hive suspension; leaf apron</td>
</tr>
<tr>
<td><strong>Lonchorcarpus sp.</strong> nr. <strong>L. laxillorius</strong> Guill. &amp; Perr.</td>
<td><strong>pele</strong></td>
<td>posts and rafters; ulcer medicine</td>
</tr>
<tr>
<td><strong>Maytenus senegalensis</strong> (Lam.) Exell.</td>
<td>biiidö</td>
<td>Salt</td>
</tr>
<tr>
<td><strong>Monanthotaxis buchananii</strong> (Engl.) Verdc.</td>
<td>bōlī</td>
<td>roof construction</td>
</tr>
<tr>
<td><strong>Nauclea latifolia</strong> Smith</td>
<td>singeye</td>
<td>edible fruit; knife sheaths and combs: hernia medicine</td>
</tr>
<tr>
<td><strong>Neorautanenia sp.</strong> nr. <strong>N. (miti)</strong> (A. Rich.) Verdc.</td>
<td>dinyi</td>
<td>fish poison; hip fringes</td>
</tr>
<tr>
<td><strong>Ozoroa insignis</strong> Del. Var. <em>insignis</em></td>
<td>dckcmc</td>
<td>posts and rafters</td>
</tr>
<tr>
<td><strong>Parkia africana</strong> R. Br.</td>
<td>bolctc</td>
<td>edible fruit</td>
</tr>
<tr>
<td><strong>Piliostigma thonningii</strong> (Schumach.) Milne-Redh</td>
<td>mbesi</td>
<td>posts and rafters</td>
</tr>
<tr>
<td><strong>Prosopis africana</strong> (Guill &amp; Perr.) Taub.</td>
<td>kality</td>
<td>charcoal; posts and rafters; drums: game trap; grave posts: beehives</td>
</tr>
<tr>
<td><strong>Pseudocedrela kotschyi</strong> (Schweinf) Harms.</td>
<td>kiyë’dì</td>
<td>stool and deckchair frames; beehives: stomach medicine</td>
</tr>
<tr>
<td><strong>Pterocarpus sp.</strong></td>
<td>ngutu</td>
<td>edible fruit: tinder: for fumigating hives</td>
</tr>
<tr>
<td><strong>Pterocarpus sp.</strong> nr. <strong>P. lucens</strong> Guill. &amp; Perr.</td>
<td>yangilo</td>
<td>vegetable; bows; roof construction</td>
</tr>
<tr>
<td><strong>Rhus natalensis</strong> Krauss</td>
<td>ragba</td>
<td>roof construction: eye medicine</td>
</tr>
<tr>
<td><strong>Sclerocarya caffra</strong> Sond</td>
<td>ngepe</td>
<td>edible fruit</td>
</tr>
<tr>
<td><strong>Sesbania sesban</strong> Merrill var. <em>nubica</em> Chiov.</td>
<td>reere</td>
<td>arrow shafts</td>
</tr>
<tr>
<td><strong>Sterculia sp.</strong> = Padwa 239 <strong>S. setigera</strong></td>
<td><em>?Sterculia setigera</em></td>
<td>binyć</td>
</tr>
<tr>
<td><strong>Stereospermum kunthianum</strong> Cham.</td>
<td>ma’bclc</td>
<td>fixed bedposts</td>
</tr>
<tr>
<td><strong>Tamarindus indica</strong></td>
<td>maa</td>
<td>edible fruit; beehives: tall enough for hives</td>
</tr>
<tr>
<td><strong>Tephrosia sp.</strong></td>
<td>ngamo</td>
<td>fish poison</td>
</tr>
<tr>
<td><strong>Terminalia sp.</strong></td>
<td>lökpö</td>
<td>posts and rafters: beehives; storage containers: tall enough for hives</td>
</tr>
<tr>
<td><strong>Terminalia</strong> sp.</td>
<td>lökpö</td>
<td>storage containers</td>
</tr>
<tr>
<td><strong>Vangueria apiculata</strong> K Schum.</td>
<td>yanbala</td>
<td>edible fruit; rafters</td>
</tr>
<tr>
<td><strong>Vitex madiensis</strong> Oliv. Var <em>madiensis</em></td>
<td>wölö</td>
<td>edible fruit; stool frames; tall enough for hives</td>
</tr>
<tr>
<td><strong>Ximenia americana</strong> L.</td>
<td>madcngiti</td>
<td>edible fruit</td>
</tr>
<tr>
<td><strong>Ziziphus pubescens</strong> Oliv.</td>
<td>kcmckörö</td>
<td>game trap</td>
</tr>
</tbody>
</table>