

## ZEAT BEAD Feeder Roads Construction Program

### Greater Bahr el Ghazal Region



## CONCEPT NOTE ON COMMUNITY BASED ROAD MAINTENANCE

January 2016

## Executive Summary

Sustainable rural infrastructure development is a vital action to address chronic food insecurity, improve livelihoods and stimulate development. Towards this, the European Union in consultation with the government has committed to support the Greater Bahr el Ghazal (GBG) Zone in its effort to realize agricultural development, leading to the establishment of the 'Zonal Effort for Agricultural Transformation: Bahr el Ghazal Effort for Agricultural Development' (ZEAT BEAD). As part of this programme, a feeder roads construction and maintenance project is considered in four out of the ten States of South Sudan. The project is aimed at increasing the rural small farm holders' food production and sustainable livelihood through market connection, rise in production and trade development. The four target States for the selection of prioritized feeder roads are Lakes, Western Bahr el Ghazal (WBG), Warrap and Northern Bahr el Ghazal.

The EU and UNOPS have signed a contribution agreement for the implementation of the project entitled ZEAT BEAD *"Feeder Road Construction in support of Trade and Market development in South Sudan"*. This project is in line with the EU's strategic objectives, in addition to other programmes and the assessed needs of stakeholders. The project will focus on the construction and maintenance of approximately 120km of feeder roads in target States. The project will also incorporate the implementation of a maintenance and capacity building component with the State Ministries of Physical Infrastructure and local contractors, as well as community engagement and labour intensive support activities.

The objective is to ensure that the feeder roads constructed are sustainably maintained by the communities through a public/private partnership or other appropriate models. So far the Government of South Sudan has not been able to allocate sufficient funds to the States for the maintenance of feeder roads and hence most of them are in a state of disrepair.

UNOPS carried out a feasibility study in March 2015 and during this exercise had an opportunity to interact with the State ministries of physical infrastructure (SMoPI) in order to assess their road maintenance capacities and challenges. In most of the States the MoPIs have equipment that is broken down and do not have funds for repair and maintenance nor for operations. Unless a new approach is investigated the sustainable maintenance of feeder roads cannot be guaranteed.

This concept note therefore captures the current state of affairs in each of the four States and proposes recommendations on the way forward. The key similarity between each state is that the funding and resources to carryout periodic feeder maintenance is not available in State MoPIs. In order to secure the future sustainability of the feeder roads, it is recommended that the local communities are supported to form groups and community based organisations (CBOs) that will be responsible for the feeder roads maintenance. This support should include the provision of low cost intermediate equipment such as tractors and tractor drawn implements.

It is proposed that the intermediate equipment will be owned by the county authorities but operated and maintained by the CBOs in each State. It is also proposed that the CBOs explore other income generating activities (IGAs) that can be carried out to raise funds to support the feeder roads maintenance and, if such activities will require specific implements then the same can be included in the equipment scheme. The additional revenue generated by using this equipment will be used to support the road maintenance.

The CBOs will receive leadership, basic book keeping and road maintenance training in order to build their capacity to run the feeder road maintenance programme at the end of the project. The State MoPI engineers will receive specific trainings to build their capacity to provide technical oversight to the CBOs.

UNOPS will engage the services of non-governmental organisations (NGOs) and a training and capacity development (TCD) expert to create awareness, sensitize and mobilize local communities towards the feeder road maintenance programme. The NGOs and the TCD expert will carry out a training needs assessment in order to establish the gaps and tailor the trainings to the specific needs of each group.

During the construction period the CBOs are expected to work closely with the contractors in order to get some on-the-job training that will help them understand basic principles of road construction as well as better appreciate the maintenance aspects. During the defects liability period it is expected that the CBOs will start some routine maintenance activities as well as negotiate with the contractors to carry out some of the defects rectification works as a way of generating incomes for feeder roads maintenance and gaining useful experience. At the end of the construction of the feeder roads UNOPS will run a maintenance programme of upto a maximum of 12 months together with the CBOs and the State MoPIs in order to ensure that the skills imparted are properly utilized and sufficient to maintain the feeder roads beyond the project period.

UNOPS will establish road maintenance camps during the construction phase of the project that will later be handed over to the CBOs for use as operation centres for the maintenance programmes.

The NGOs will carry out baseline surveys in each State in order to collect some background information and assess the commitment of the communities to participate in the feeder roads maintenance programme. Together with the TCD expert they will also hold further consultations with the county authorities and the State MoPIs in order to come up with a functional structure for the feeder roads maintenance entities as well as agree on the management of the intermediary equipment which will be used for feeder roads maintenance, agricultural production and income generating activities.

The consultations will result to comprehensive training programmes based on the needs, agreed operational structures for the feeder road maintenance entities and a recommended list of intermediary equipment and a detailed plan on how the equipment will be utilized throughout the year to achieve the set objectives.

It is planned that the engagement with the communities will commence at the design stage in order to give the communities an opportunity to contribute to the design of the road as part of the ownership process. At the end of the design stage the design consultants will produce the resettlement action plan that will be implemented by the NGOs, the TCD expert and the local and traditional leaders.

**Abbreviations:**

RoSS	Republic of South Sudan
EU	European Union
UNOPS	United Nations Office for Project Services
GBG	Greater Bahr el Ghazal
NBG	Northern Bahr el Ghazal
WBG	Western Bahr el Ghazal
SMoPI	State Ministry of Physical Infrastructure
SSRF	South Sudan Recovery Fund
ToR	Terms of Reference
MTRB	National Ministry of Transport, Roads and Bridges
SORUDEV	South Sudan Rural Development
SSDP	South Sudan Development Plan
WFP	UN World Food Programme
ZEAT	Zonal Effort for Agricultural Transformation
BEAD	Bahr el Ghazal Effort for Agricultural Development
NBS	National Bureau of Statistics
FAO	UN Food and Agricultural Organisation
CBO	Community Based Organisation
CMC	Central Management Committee
GIZ	German Agency for International Cooperation
NPA	Norwegian People's Aid
NRC	Norwegian Refugee Council
HARD	Hope Agency for Rural Development
VSLA	Village Savings and Loans Associations
FFA	Food for assets
NGO	Non-Governmental Organisation
RAP	Resettlement Action Plan
TCD	Training and Capacity Development
MoAF	Ministry of Agriculture and Forestry

## Table of Contents

### Contents

Executive Summary.....	2
1. Background .....	7
2. Objectives: .....	8
3. Purpose of road maintenance.....	12
3.1. Routine maintenance.....	12
3.2. Regular or recurrent maintenance .....	12
3.3. Repair and Maintenance.....	12
3.4. Emergency Repair and Maintenance .....	13
3.5. Preventive Repair and Maintenance .....	13
4. Maintenance Capacity of State Governments .....	13
5. Lakes State .....	14
5.1. Available machinery resources .....	15
5.2. Key Findings .....	16
5.3. Recommendations .....	16
6. Warrap State .....	18
6.1. Available resources .....	18
6.2. Man power.....	19
6.3. Key findings:.....	19
6.4. Recommendations: .....	20
7. Western Bahr el-Ghazal State.....	20
7.1. Available resources:.....	20
7.2. Key findings:.....	21
7.3. Recommendations .....	21
8. Northern Bahr el-Ghazal State.....	21
8.1. Available resources .....	21
8.2. Key findings .....	22
8.3. Recommendations .....	22
9. Community mobilisation and sensitisation.....	22
9.1. Group formation and training.....	23
9.2. Intermediate equipment.....	24
9.2.1. Road maintenance; .....	24

9.2.2.	Agricultural works; .....	25
9.2.3.	Other uses; .....	25
9.3.	Cost of equipment and maintenance .....	27
9.4.	Maintenance strategy and cycle .....	29
10.	Way forward: .....	33
10.1.	CBO Budget: .....	33
10.2.	Roles and responsibilities of the different actors in the maintenance programme:.....	35
10.3.	Roles and responsibilities for the CMC and key CBO staff:.....	36
10.4.	Budget for purchase of intermediate equipment.....	39
10.5.	Proposed budget for the CBO operations.....	40
10.6.	Trainings:.....	41

**List of tables:**

Table 1	Summary of resources available in the different States and recommendations
Table 2	Advantages and disadvantages of the various maintenance options
Table 3	List of available resources and condition in Lakes State
Table 4	Staffing list at the SMOPI – Lakes State
Table 5	List of available resources and condition in Warrap State
Table 6	Staffing list at the SMOPI – Warrap State
Table 7	List of available resources and condition in WBG State
Table 8	Staffing list at the SMOPI – WBG State
Table 9	List of available resources and condition in NBG State
Table 10	Staffing list at MoPI in NBG
Table 11	Comparison between the costs of a motorized grader compared to tractor drawn
Table 12	Estimated annual maintenance costs for a tractor
Table 13	Community calendar
Table 14	Typical 5 year road construction and maintenance cycle in one State.

## 1. Background

South Sudan has some of the worst socio-economic indicators; 51% of the population lives below the poverty line (NBS 2010), 55% of the rural population is poor compared to 24% of the urban population. About 95% of the total population makes their livelihood from farming, herding and fishery (FAO, 2014). About 83% of the rural populations comprise of farmers (5th SPHC, 2008) and the majority of the small-holder farmers rely on rain fed subsistent agriculture. The erratic rainfall coupled with a number of potential factors impedes increasing agricultural production and food security in the country. More than a third of the population faces food insecurity.

Poor and inadequate rural infrastructure and rudimentary markets with limited access hinder the agricultural development and food security. As identified in South Sudan Development Plan (SSDP) the rural infrastructure development is a vital action to address the chronic food insecurity, improve the livelihood and stimulate development. On this ground the European Union in consultation with the government of the Republic of South Sudan (RoSS) has made commitment to support the Greater Bahr el Ghazal (GBG) Zone in its effort to realize agricultural development through the Zonal Effort for Agricultural Transformation. The support proposal came up with Bahr el Ghazal Effort for Agricultural Development (ZEAT-BEAD) program establishment. As part of the program component a feeder roads construction and maintenance component has been considered in Lakes, Warrap, Northern and Western Bahr el-Ghazal States. The project is aimed at increasing the rural small-holder farmers' access to markets and raise production and trade development. In this regard EU and UNOPS have signed a contribution agreement for the project implementation.

One of the key challenges faced in infrastructure development in South Sudan especially roads construction is maintenance. The national government has not been allocating and/or releasing funds for roads maintenance to the State governments for road maintenance and this has led to the gradual decline of the road maintenance capacity by the State ministries of physical infrastructure that are responsible for the maintenance of feeder roads.

Road maintenance equipment has been grounded due to lack of funds for repair and maintenance while those that are serviceable do not have fuel and other consumables needed for operation. The States lack the capacity to mobilize the required resources to keep a functional road maintenance fleet. As such most of the trunk and feeder roads have deteriorated and require significant funds to rehabilitate.

The EU funded feeder roads programme envisages a road maintenance component that will also include the capacity building of both the local communities and State ministries of physical infrastructure through training and provision of basic tools and equipment for roads maintenance.

## 2. Objectives:

The objective of this concept note is to develop a maintenance strategy that will ensure the sustainability of feeder roads constructed under the ZEAT BEAD programme for the future benefit of the small holder farmers. This concept incorporates the ideas obtained through discussions with key stakeholders, and existing resources and the challenges identified during the feasibility study. It also incorporates all the subsequent discussions between UNOPS, NGOs, State MoPI officials and representatives of the county authorities, these discussions were held in a workshop that was conducted between 20/21 November 2015 at the Amarula Lodge in Wau.

The concept note also takes into account the deliberations held with officials of the SMOPIs with regard to previous experiences with community-based road maintenance approaches, the challenges experienced or anticipated and the willingness of the SMOPI to participate in the proposed maintenance approach.

A key component of the concept note is to conceptualise on the existing capacity within the communities and SMOPIs and present proposals on how the feeder roads could be maintained in a more sustainable approach. The key aspect of sustainability is the community ownership of the whole process and therefore the proposed approach needs to be community centred to be successful.

The State ministries of physical infrastructure will play a key role in providing guidance and technical oversight to the community based organisations (CBO) that will be implementing the feeder roads maintenance and hence the training needs for the SMOPIs will need to be carefully assessed and gaps bridged in order for them to play their role effectively.

The concept note will also address ways of organising the communities in order to achieve the desired results. Various NGOs are currently working in the EU funded SORUDEV programme and these NGOs will play a key role in the mobilisation and sensitisation of the communities living along the road.

The concept note will capture the training methodology for the communities especially on basic elements for example; group dynamics and organisation, basic book keeping and other aspects of the group formation process. Some elements of the technical training that will be provided by UNOPS will be captured in the concept note, though the detailed curriculum will be prepared separately.

Clear division of labour among and between the different players in the programme will be outlined and roles and responsibilities clearly marked out in order to ensure all stakeholders are aware and play their roles effectively in order to ensure sustainability of the programme.

It is also expected that the CBOs will be trained on methods of preparing bids for road maintenance as they would be expected to carry out other works as a means of raising funds for road maintenance.



**Table 1: Summary of resources available in the different States and recommendations**

State	Lakes	NBG	WBG	Warrap
Available equipment	<ul style="list-style-type: none"> <li>• Motor graders (2)</li> <li>• Excavators (2)</li> <li>• Wheel loader (2)</li> <li>• Tipper trucks (4)</li> <li>• Pedestrian roller (1)</li> </ul>	<ul style="list-style-type: none"> <li>• Motor grader (1)</li> <li>• Wheel loader (1)</li> <li>• Tipper trucks (2)</li> </ul>	<ul style="list-style-type: none"> <li>• Motor grader (1)</li> <li>• Water bowser (1)</li> <li>• Roller (1)</li> <li>• Excavator (1)</li> <li>• Tipper trucks (2)</li> </ul>	<ul style="list-style-type: none"> <li>• Tractor drawn grader (1)</li> <li>• Tractor (1)</li> <li>• Tractor powered Excavator (1)</li> <li>• Pedestal Roller (1)</li> <li>• Water bowser (1)</li> <li>• Tractor drawn loader (1)</li> <li>• Pedestrian roller (1)</li> </ul>
Available staff	<ul style="list-style-type: none"> <li>• Civil Engineers (1)</li> <li>• Roads supervisor (1)</li> <li>• Roads foremen (1)</li> <li>• Machine operators (4)</li> <li>• Roller operators (2)</li> <li>• Truck drivers (4)</li> <li>• Mechanics (2)</li> </ul>	<ul style="list-style-type: none"> <li>• Civil engineers (1)</li> <li>• Road inspectors (34)</li> <li>• Plant operators (4)</li> <li>• Truck drivers (3)</li> </ul>	<ul style="list-style-type: none"> <li>• Civil engineers (3)</li> <li>• Plant operators (10)</li> </ul>	<ul style="list-style-type: none"> <li>• Civil engineers (4)</li> <li>• Technicians (8)</li> </ul>
Availability of materials	<ul style="list-style-type: none"> <li>• Gravel available along the road</li> <li>• Aggregates not available in the State</li> <li>• Earth fill material suitable for embankment are available along the route</li> </ul>	<ul style="list-style-type: none"> <li>• Gravel available locally and potential sources identified along the road</li> <li>• Suitable earth fill material available along the road</li> </ul>	<ul style="list-style-type: none"> <li>• There is potentially gravel availability along the road</li> <li>• Suitable earth fill material is also available along the road</li> <li>• Aggregates are also available with 30kms of the project area.</li> </ul>	<ul style="list-style-type: none"> <li>• Gravel is available from Kuajok (80km away)</li> <li>• Suitable materials for earth fill embankment is available along the road</li> </ul>

State	Lakes	NBG	WBG	Warrap
State human resource capacity	<ul style="list-style-type: none"> <li>State MoPI officials are very enthusiastic</li> <li>Maintenance camp set up by GIZ and some training offered</li> <li>No functional equipment</li> </ul>	<ul style="list-style-type: none"> <li>State MoPI are very enthusiastic</li> <li>Ministry already implementing labour based road construction and maintenance</li> <li>Limited functional equipment</li> </ul>	<ul style="list-style-type: none"> <li>State MoPI does not have previous experience and unsure of the success of the labour based maintenance approach</li> <li>Limited functional equipment</li> </ul>	<ul style="list-style-type: none"> <li>No functional equipment</li> <li>No training on labour based maintenance</li> </ul>
SMoPI financial capacity	<ul style="list-style-type: none"> <li>Salaries only</li> <li>No budgets forthcoming</li> </ul>	<ul style="list-style-type: none"> <li>Received allocation of SSP14m and SSP2m disbursed for the 2014 - 2015 financial year.</li> </ul>	<ul style="list-style-type: none"> <li>Salaries only</li> <li>No budgets forthcoming</li> </ul>	<ul style="list-style-type: none"> <li>Salaries only</li> <li>No budgets forthcoming</li> </ul>
Availability of intermediate equipment	No intermediate equipment available	No intermediate equipment available	No intermediate equipment available	<ul style="list-style-type: none"> <li>State MoPI has tractor drawn equipment that were procured by UNOPS under SSRF</li> </ul>
Staff trained on labour-based road maintenance	Staff trained on labour-based road maintenance but training not completed	Four (4) staff of the State MoPI have received training on labour based road maintenance approaches	No staff have been trained on labour based road maintenance approaches	No staff have been trained on labour based road maintenance approaches
State MoPI implementing labour based road maintenance	None	State MoPI implementing food for assets (FFA) programme with WFP where communities open up and maintain roads using labour based approaches	None	None
Future funding certainty	Not certain	Not certain	Not certain	Not certain

State	Lakes	NBG	WBG	Warrap
Existing CBOs	None	Pan Aweil Development Organisation is a local CBO that is operating in Aweil West County	None	None
Existing NGO to support community mobilisation and sensitisation	Norwegian People's Aid (NPA) has been operational in Lakes State and is an implementing partner for the EU funded SORUDEV programme	Concern Worldwide is operating in NBG and implementing the EU funded SORUDEV programme	HARD has been operating in WBG and is one of the implementing partners for the SORUDEV programme funded by EU	Norwegian Refugee Council (NRC) has been operating in Warrap State and is implementing the EU funded SORUDEV programme
Recommended maintenance approach	<ul style="list-style-type: none"> <li>• CBO to be established and trained on road maintenance</li> <li>• Intermediate equipment to be purchased and operated by CBO</li> <li>• State MoPI to provide technical oversight</li> <li>• County authorities to provide management oversight</li> <li>• State MoPI engineers to be trained on labour-based road maintenance approaches in order to provide adequate technical support</li> </ul>	<ul style="list-style-type: none"> <li>• CBO to be established and trained on road maintenance</li> <li>• Intermediate equipment to be purchased and operated by CBO</li> <li>• State MoPI to provide technical oversight</li> <li>• County authorities to provide management oversight</li> <li>• State MoPI engineers to be trained on labour-based road maintenance approaches in order to provide adequate technical support</li> </ul>	<ul style="list-style-type: none"> <li>• CBO to be established and trained on road maintenance</li> <li>• Intermediate equipment to be purchased and operated by CBO</li> <li>• State MoPI to provide technical oversight</li> <li>• County authorities to provide management oversight</li> <li>• State MoPI engineers to be trained on labour-based road maintenance approaches in order to provide adequate technical support</li> </ul>	<ul style="list-style-type: none"> <li>• CBO to be established and trained on road maintenance</li> <li>• Existing intermediate equipment to be used by the CBO for road maintenance</li> <li>• State MoPI to provide both technical and management oversight</li> <li>• State MoPI engineers to be trained on labour-based road maintenance approaches in order to provide adequate technical support</li> </ul>

### 3. Purpose of road maintenance

Road repair and maintenance is undertaken to keep the road in working condition by mitigating the multiple effects of road surface deterioration and road material loss through long term use of the road and environmental impact. The key objectives of road maintenance are to:

- Keep the road serviceable and maintain social and economic benefits,
- Reduce the road maintenance cost,
- Reduce the transportation cost for cargo and people,
- Reduce travel time,
- Minimize the chances of accidents,
- Reduce the need for costly and more complicated repair work, and
- Ensure sustainable use of roads and preserve road assets.

One of the key causes for deterioration of roads is lack of timely repair and maintenance activities. If the required repair and maintenance tasks are neglected, cyclic growth of damage and collapse of roads take place.

The prevailing climate, vehicular traffic, load, engineering design, quality of road construction and type of riding surface material (earth, gravel or asphalt) will determine the frequency, type of repair and maintenance, and required budget.

The following five types of repair and maintenance work are carried out on rural roads;

#### 3.1. Routine maintenance

Routine maintenance covers simple repair and maintenance tasks on all roads to be carried out year-round. These include keeping the right of way clear for purposes of visibility and reduce chances of accidents. They also include clearing any blocked drainage structures and minor improvements of the road surface. These routine tasks are carried out to prevent any unnecessary deterioration due to preventable causes such as erosion as a result of diverted water from blocked drains. Such tasks incur limited costs and can be executed by persons living along the road otherwise known as length-persons through user committees or community organisations along the road.

#### 3.2. Regular or recurrent maintenance

These are minor repairs and maintenance tasks that are carried out at specified times of the year usually before and after the rainy season but not covered under routine maintenance. These tasks are carried out recurrently (two or three times) in a year in order to protect the road surface from damage. These tasks require skilled labour force and in some case the use of machinery to supply and install material. These tasks should be identified and their cost estimates done before executing repair and maintenance.

#### 3.3. Repair and Maintenance

This covers major repair and maintenance tasks that are carried out at intervals of a few years. Since routine and recurrent repair and maintenance is only for minor works, periodic repair and maintenance need to be considered more substantial

repair requirements. Such repair and maintenance work is done once every three to five years on graveled roads, considering the condition of the road. However, in some rural roads periodic maintenance may become necessary every year. Such tasks usually require skilled workforce, equipment and a substantial budget. The scope of the deterioration and maintenance work should be identified through proper inventory of the roads and their cost estimates done before executing works.

### 3.4. Emergency Repair and Maintenance

Emergency repair and maintenance is carried out in situations when movement is stalled or impeded due to unexpected natural or accidental obstructions on the road. This type of repair and maintenance work is carried out to immediately open the road to traffic and prevent further damage of the road. Traffic movement usually comes to a standstill due to an obstruction or closure of the road caused by natural or unforeseen events.

### 3.5. Preventive Repair and Maintenance

Preventive repair and maintenance tasks are carried out to protect the road from possible damage in the future and to extend the interval for doing restoration work. These tasks are determined by geological, geographical and environmental causes. As it is not possible to fix an appropriate time for executing this type of repair and maintenance, efforts should be made to carry out such tasks as soon as it is deemed necessary and as resources availability permits.

The physical condition of roads is critical to any transport network. However, unless roads are adequately maintained, they will inevitably deteriorate, leading to reduced accessibility, higher road user costs and longer travel times. Routine maintenance is often delayed due to various factors such as; lack of funds, insufficient technical capacity and lack of political will. When simple routine maintenance is postponed for long periods, there is often a need for more extensive rehabilitation which becomes costly.

## 4. Maintenance Capacity of State Governments

UNOPS carried out a feasibility study and visited all the four States to assess the capacity and commitment of the State governments and/or road maintenance units in each State and discussed suitable approaches to road maintenance. The following maintenance approaches are considered against available capacity;

- Maintenance by the State Ministry of Physical Infrastructure (MoPI)
- Maintenance by community based organisation
- Length person or family contract
- Maintenance by small scale contractors

**Table 2: Advantages and disadvantages of the various maintenance options**

No.	Maintenance option	Advantages	Disadvantages
1.	State MoPI	<ul style="list-style-type: none"> <li>• Availability of technical skills from the State MoPI</li> <li>• Machinery already exists and hence the cost could be lower</li> <li>• Government funding would assure continuity</li> </ul>	<ul style="list-style-type: none"> <li>• Unreliable funding means maintenance could be unpredictable</li> <li>• Type of machinery used requires parts which may not be locally available</li> <li>• Majority of machinery is in need of repair.</li> <li>• As some machines have not been operational for an extended period</li> </ul>
2.	Community based organisations	<ul style="list-style-type: none"> <li>• Low cost compared to others</li> <li>• Quick mobilisation to regular maintenance</li> <li>• Local skills are retained</li> <li>• Incomes circulate locally</li> </ul>	<ul style="list-style-type: none"> <li>• Requires external source of funding</li> <li>• Quality control cannot be fully assured.</li> <li>• Low capacity may not be ideal for major works</li> </ul>
3.	Length person or family contract	<ul style="list-style-type: none"> <li>• Low cost and can be in form of cash or kind</li> <li>• Rapid mobilisation as communities live near the site</li> <li>• Employment and incomes circulate locally</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulties in controlling quality</li> <li>• Only suitable where no equipment is needed</li> <li>• Doesn't work well where population is scattered</li> <li>• Requires supervisor mobility</li> </ul>
4.	Local (small) contractors	<ul style="list-style-type: none"> <li>• Overheads lower than big contractors.</li> <li>• Low mobilisation costs</li> <li>• Availability of local labour and small scale equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Initial training required</li> <li>• May have difficulties mobilizing resources if task is big</li> <li>• Requires a contract which may not be well understood</li> </ul>

The type of maintenance approach to be adopted will largely depend on the resources locally available, assurance from the State governments to continuously provide maintenance funding and willingness of the local community to participate in the maintenance activities especially for the length person or length family approaches.

The following are the findings of UNOPS in the different States and the recommendation for an appropriate maintenance approach:

## 5. Lakes State

UNOPS held discussions with officials from the Lakes State Ministry of Physical Infrastructure and the ministry has reasonable capacity in terms of equipment and skilled workforce. However, it was evident that lack of funds is a big challenge in carrying out road maintenance activities despite the available capacity. The recurrent inter-communal clashes in the State has also

resulted hostile working environment in the State. Notwithstanding this, the State MoPI executes emergency maintenance activities through limited support of the State government.

The State MoPI has been partnering with GIZ (German Agency for International Cooperation) on community or labour-based road maintenance. A maintenance camp had been established in 2013 and some training to the ministry officials initiated. However, due to the political crisis in December 2013 the GIZ withdrew and has not re-started its activities again. The State officials showed keen interest in the community labour-based road maintenance approach as a way of ensuring sustainability.

### 5.1. Available machinery resources

The following resources are available in the State MoPI that could be engaged on road construction /maintenance activities. The State ministry does not have equipment maintenance workshop and barely has required maintenance tools; this is hampering its capacity to carry out routine and preventive maintenance of the available fleet of road equipment.

**Table 3: List of available resources and condition in Lakes State**

Equipment	Quantity	Condition
Grader	2	1-breakdown,1-working
Excavator	2	1-brekdown,1-working
Wheel Loader	2	2-breakdown,0-working
Tipper trucks	4	2-breakdown, 2-working
Pedestrian Roller	1	1-working



Relatively new grader lies outside the MoPI offices due to lack of maintenance



One of the broken down front wheel loaders





Broken down tipper trucks



Broken down 4WD Landcruiser for supervision

**Table 4: Staffing list at the SMoPI – Lakes State**

Staff	Quantity
Civil Engineers	1
Road Supervisors	1
Road Foremen	1
Machine Operators	4
Tipper Trucks Drivers	4
Mechanics	2
Pedestrian Roller Operators	1

## 5.2. Key Findings

The State Ministry of Physical Infrastructure has reasonable capacity and commitment to support the envisaged roads maintenance activities. However, the following key challenges are broadly considered as an impediment to the State ministry's ability to adequately utilize the available capacity:

- Lack of funding/budget to support the planning, management and operations of road maintenance activity,
- Limited capacity of road technicians in construction and maintenance of rural roads, and
- Insecurity in the State.

The local community along the Aluakluak to Aguran road showed quite some interest in the road due to the inaccessibility experienced during the rainy season impacting access to the main markets in Aluakluak and Rumbek. There are community activities being carried out by the Norwegian People's Aid (NPA) especially the formation of village savings and Loans associations (VSLA) and it is yet to be seen if these groups could be used for road maintenance activities.

## 5.3. Recommendations

Considering the high enthusiasm and commitment witnessed from the State MoPI, it is recommended that the State MoPI be actively engaged during the construction and maintenance period of the Aluakluak-Mapourdit-Aguran road in a hybrid system. However, to ascertain continuity of the maintenance operations after completion of the construction phase the State MoPI needs substantial budgetary support and capacity building/ skills gap training on



planning, management and operations of road maintenance activity. From the discussions held with SMOPI it is clear the State government has not been allocating and this trend is likely to continue.

Previous experience in the State shows that labour based road maintenance methods have been found to be acceptable by the ministry and feasible subject to improvement of the security situation in the area; the recent inter-communal clashes and cattle raiding created a sense of instability to the communities living along the road who are key for labour based road maintenance activities.

One of the immediate tasks recommended is to carry out a training needs assessment for the State MoPI and to build its capacity to carry out labour-based road maintenance with the communities. Given that most of the equipment owned by the State MoPI is not in serviceable condition, it is imperative that additional capacity will be required to in terms of intermediate equipment that could be easily maintained locally and at a lower cost.

A hybrid system would be most suitable in this case where the State MoPI provides the technical oversight for the maintenance of the road while a community based organisation does the actual road maintenance.

UNOPS will engage an NGO for the community mobilisation and sensitisation and the NGO will commence with community mobilisation and sensitisation then followed by community group formation for road maintenance which will include imparting of basic skills e.g. basic book keeping and community group management. During the actual road construction the community groups will also receive technical training on road construction.

The recommended option is one where a community based organisation (CBO) takes charge of the actual maintenance of the road together with the communities living along the road. UNOPS will provide some intermediate road construction/maintenance equipment (mostly tractor drawn equipment) and tools that will be used by the CBO for the maintenance of the roads. The CBO will also be trained on basic operation and maintenance of the equipment that will be provided by the supplier as part of the machinery supply agreement.

The equipment will be owned by the County and the County commissioner's office will provide oversight on the day-to-day operations while the State MoPI provides the technical oversight on the actual maintenance. UNOPS will construct a camp for its operation during the construction phase and this camp will be handed over to the CBO upon completion of the works and used as a road maintenance camp.

Funding is one of the main challenges anticipated in this proposal and the first one year after the expiry of the defects liability period there will be funding provided under the project to cover the maintenance costs. However, as the road will basically be new there will not be a lot of requirements for maintenance as in the years to follow. A few options have been explored on how funds for road maintenance could be mobilised as listed below:

1. Use of the intermediate equipment for agricultural purposes: As this program entails the improvement of the agricultural production it is envisaged that the intermediate equipment could include tractor ploughs to be used during the farming season to open up farms for agricultural purposes. The idea is that the local communities would be able to hire the services of the tractors for ploughing and hence the funds raised could be saved and used for road maintenance. The potential for this to succeed depends on the

need for tractor services for opening up of farm lands. It means that appropriate mobilisation by the other ZEAT BEAD partners to ensure that there is corresponding expansion on the acreage under agricultural production. This option is good but has a risk of the equipment being damaged due to lack of adequate land preparation and chances of the farmers leaving some covered tree stumps that could easily damage the machinery. It therefore has to be carefully examined before being adopted.

2. The other option to be explored includes levying taxes on the commercial usage of the road to raise maintenance funds. This requires legislative regulation and may be outside the scope of influence of the project.
3. Another option to investigate is the use of the intermediate equipment on a hire basis for use in other projects within the county/State and thereby raise some funds for the road maintenance.

The options listed above are to be further discussed with the local government authorities and communities in order to establish some consensus.

## 6. Warrap State

Warrap State has benefited from a programme implemented by UNOPS where some intermediate road construction equipment was handed over as part of a maintenance strategy under the South Sudan Recovery Fund (SSRF). When the UNOPS team visited the State at the time of conducting the feasibility study for the EU funded feeder roads several discussions were held with the senior State ministry officials regarding the maintenance strategy. It was evident that the equipment had not been put to use despite having been handed over to the State ministry in 2013. Some of the reasons provided by the ministry officials were lack of operational budget, lack of training on the operation and maintenance of the equipment handed over among others. The equipment was parked at the ministry yard and looked as new as they were brought in.

### 6.1. Available resources

	
Tractor drawn grader parked outside the MoPI offices in Kuajok	Tractor drawn tipper



Compacting roller

Excavator Tractor attachment

**Table 5: List of available resources and condition in Warrap State:**

Equipment	Quantity	Condition
Tractor Drawn Grader	1	Serviceable
Water bowser	1	Serviceable
Roller	1	Serviceable
Tractor	1	Serviceable
Excavator Tractor attachment	1	Serviceable
Wheel Loader	1	Serviceable
Pedestrian Roller	1	Serviceable

## 6.2. Man power

**Table 6: Staffing list at the SMOPI – Warrap State:**

Staff	Quantity
Engineers	4
Technicians	8

## 6.3. Key findings:

The State has a reasonable fleet of intermediate equipment that could be used in the maintenance of roads. However, there is a lack of trained operators and mechanics that are needed to operate and maintain the fleet. The State also lacks the required training to carry out routine maintenance using the community approach. The State received only SSP 300,000.00 (Three Hundred Thousand South Sudanese Pounds Only) for the year 2014 from the national government which is not enough to support the roads to the required levels.

The director general appeared to be quite interested in the community based road maintenance approaches with his main concern being the funding and technical capacity gaps mentioned above. However, the lower cadres of staff did not appear as enthusiastic.

## 6.4. Recommendations:

Three approaches could be applied in this State as follows:

- To utilize the existing equipment capacity that the ministry has and supplement with the type and quantity of equipment that may be deemed necessary. There will also be an additional component of capacity building to the State ministry officials on their roles in the maintenance programme as well as training on the operation and maintenance of the equipment. This way the equipment will be owned and managed by the State ministry but used for the maintenance of the roads.
- To establish a community-based organisation that will be responsible for the day-to-day maintenance of the road and have the State ministry of physical infrastructure either to hand over the equipment on an agreed format so that the CBO can carry out the maintenance of the roads as well as the equipment. In this case the SMOPI will receive training on the supervision of community-based road maintenance and the CBO staff receives training on the operation and maintenance of the equipment.
- The third option if there are difficulties in getting an agreement for the equipment hand over to the CBO is to buy a completely new set of intermediate equipment and have the same managed by the CBO while the SMOPI provides the technical oversight on the maintenance of the feeder road.

The first option is preferred as it will not complicate matters with the transfers of equipment between the State MoPI and the CBO. However, during maintenance periods the CBO could “borrow” some equipment from the State MoPI for some maintenance tasks and return the same afterwards. The benefit to the State MoPI is that their machinery operators will receive additional training while the operators will receive practical training on the use of equipment which has been identified as a gap.

## 7. Western Bahr el-Ghazal State

Discussions held with WBG State MoPI revealed that there has not been any experience on community based road maintenance and as such it will be new in the State. The State MoPI was somewhat unsure of the success of the community based road maintenance but after some discussions with the UNOPS staff they agreed it is something worth trying.

The State ministry, just like in the other States, does not receive budgets for roads maintenance and therefore cannot maintain the fleet of equipment that they have.

### 7.1. Available resources:

Plant:

**Table 7: List of available resources and condition in WBG State:**

Equipment	Quantity	Condition
Grader	1	Serviceable
Water bowser	1	Serviceable
Roller	1	Serviceable
Excavator	1	Serviceable
Volvo Tipper Trucks (18M3)	2	Serviceable

**Staffing:****Table 8: Staffing list at MoPI in WBG**

Staff	Number
Civil Engineers	3
Machine Operators	10

The State MoPI officials are in the process of recruiting additional staff for the road maintenance unit.

**7.2. Key findings:**

The State MoPI lacks the necessary staffing and equipment needed to carry out feeder roads maintenance. There is no previous experience in the community based road maintenance approaches neither did they demonstrate enthusiasm to embrace the approach.

**7.3. Recommendations**

The role of the State MoPI in the feeder roads maintenance cannot be overstated and training needs assessment needs to be done in order to identify areas where capacity development is required. SMOPI's role in providing technical oversight is important for the sustainability of the maintenance programme.

Intermediate equipment is required and the type and numbers will be discussed among all key stakeholders and appropriate fleet arrived at. A CBO will need to be formed in order to take charge of the feeder road maintenance. The CBO will require training on feeder road construction and maintenance as well as on the operation and maintenance of the road maintenance fleet that will be procured.

**8. Northern Bahr el-Ghazal State**

This State has perhaps the best set up in terms of road maintenance is concerned and there have been community based road construction under the WFP supported food-for-assets (FFA) programme. The officials at the State MoPI are also very enthusiastic and receptive of the community based road maintenance approach despite limitations in the available resources. The State MoPI has been working closely with the State ministry of agriculture and forestry (MoAF) to make the maximum use of the equipment available in both ministries as the State MoAF is responsible for the management of the vast Aweil rice project which received some equipment for the project.

The State MoPI received SSP14million (Fourteen Million South Sudanese Pounds) in the 2014 financial year and over SSP2million (Two Million South Sudanese Pounds) has also been disbursed for feeder roads maintenance. There are two trunk roads under construction/rehabilitation with funding from the national ministry of transport, roads and bridges (MTRB).

**8.1. Available resources**

The State MoPI has the following resources for feeder roads maintenance:

**Table 9: List of available resources and condition in NBG State:**

Equipment	Quantity	Condition
Grader	1	Serviceable
Front wheel loader	1	Serviceable
Tipper Trucks	2	Serviceable

**Table 10: Staffing list at MoPI in NBG**

Staff	Number
Civil Engineers	2
Road inspectors	34
Loader operators	1
Dozer operator	1
Grader operator	1
Roller operator	1
Drivers	3

Out of the 34 road inspectors listed above 4 of them have already received training on labour-based road maintenance and they are already utilizing that knowledge in the WFP – FFA programme. The role of the State MoPI is to train communities on road maintenance and to distribute the tools issued for the same purpose.

The State MoPI advised of the existence of a CBO in Aweil West County called Pan Aweil Development Organisation that has been trained on road construction and maintenance and it is already being engaged by WFP in some road maintenance activities.

## 8.2. Key findings

The State MoPI has shown great interest in carrying out community based road maintenance which it is already engaged and implementing with WFP and sees potential success given the funding challenges. The ministry has limited capacity in terms of machinery and given that the same equipment will be used for the maintenance of the other existing feeder roads in the State the pressure will certainly increase once more feeder roads are constructed.

The following has been identified as the key gaps to sustainable road maintenance:

- Lack of adequate machinery to cater for feeder roads maintenance,
- Further training on community based road maintenance,
- Adequate budgetary provisions for feeder roads maintenance, and
- Additional staffing, especially engineers.

## 8.3. Recommendations

Further assessment of the capacity of the existing CBO should be explored to see if it can handle the maintenance of the Gok Machar – Mayom Angok road and if there is not sufficient capacity a new CBO should be formed from the existing farmer groups along the road. The recommendation is to either use the existing CBO or set up a new one and support it with the necessary trainings and equipment. Some of the staff at the State MoPI have received training on labour-based road maintenance and it is recommended that more staff from the ministry receive additional training in community based road maintenance as part of their capacity building.

## 9. Community mobilisation and sensitisation

A reasonable level of awareness creation has been done to the government officials both at the State and county levels. However, this being a community-based approach to feeder roads maintenance the communities at the grassroots level will need to be sufficiently sensitized and mobilised the project to be successful.



Towards this objective UNOPS will engage the services of Non-Governmental Organisations (NGOs) to support the community mobilisation and sensitisation for the project. The NGOs will primarily carry out awareness creation to the local communities on the feeder roads construction and maintenance approaches. The targeted NGOs are the ones already working on the EU funded SORUDEV project in the project areas where the roads will be built and are already working with farmer groups.

Community mobilisation and sensitisation will start before or at the design stage so that the inputs from the communities are factored into the design of the road. This will be particularly important where the road passes through existing settlements either in the village centres or community farms. The communities will provide their inputs as to where they would prefer to have the road pass considering the geometric design provisions.

The right of way for the feeder road is part of the community contribution as well as allowing the contractor unreserved access to construction materials e.g. murram and fill materials as well as water among others. The community will require to be sensitised about these provisions and have them consent to it during the awareness creation meetings.

The communities will also be required to deliberate issues regarding the resettlement action plan for all affected properties that will be affected by the feeder road construction. The purpose for this is that UNOPS has not factored in any compensation for any property that will be affected by the feeder road construction hence it will be important to have this subject discussed during the community sensitisation and mobilisation meetings. The community will be responsible for the resettlement of members of their communities who will be affected by the development of the feeder road.

### 9.1. Group formation and training

This concept envisages the empowerment of the communities in order to carry out the maintenance of feeder roads. As such the NGOs will be responsible for the group formation and organisation in addition to the basic trainings. The NGOs are already working with farmer groups that are living along the proposed routes; the farmers have been supported to form the village savings and loans associations (VSLAs). These farmer groups are some of the potential avenues for the formation of a community based organisation as they already exist and have gelled together.

Some of the trainings envisaged for the CBOs are;

- Leadership skills training for CBO leaders,
- Group dynamics,
- Road safety awareness,
- Conflict resolution and peace building,
- Gender protection and mainstreaming in road construction and maintenance,
- Environmental conservation awareness,
- Basic business management and book-keeping,
- HIV/AIDS awareness,
- Office administration and elementary book keeping,
- Basic road construction techniques to be provided by UNOPS,
- Calculation of earthworks quantities to be provided by UNOPS,
- Estimation and pricing of works to be provided by UNOPS,
- Preparation of bid documents to be provided by UNOPS, and
- Procurement of materials, spare parts, works supervision and contracts management.

The above training components will be carried out throughout the construction and into the maintenance period and sections of the trainings will involve actual field visits for demonstration purposes especially during the construction phase. To achieve this UNOPS will hire a training and capacity development (TCD) expert in order to produce detailed curriculum and conduct the technical aspects of the trainings as listed above. The NGOs will provide the “soft” skills trainings and be responsible for the general organisation for the trainings including provision of the training venues and materials and the UNOPS TCD expert will provide the technical aspects of the trainings.

## **9.2. Intermediate equipment**

Given that the ZEAT BEAD programme will establish feeder roads to gravel standards only, it means periodic maintenance will be required and with the limited financial resources and competing demands it is often that low volume feeder roads are normally placed at the bottom of the priority list and hence receive little or no funding at all. The current situation with available resources at the State MoPIs this routine maintenance cannot be assured. It is therefore important to develop appropriate and affordable strategies for the maintenance of these vital transport networks of gravel roads that serve the rural farming communities in order to realise maximum benefits.

Traditional methods of road maintenance by the use of motorised graders are usually very expensive and suffer from operational constraints due to limitations in funding. Given the locations of the roads there are also challenges in maintaining the fleet of road maintenance machinery as there are no parts dealers in the regions and all parts must be sourced from Juba or outside the country mainly from Uganda and Kenya.

It is against this background that appropriate alternative technology needs to be sought in order to provide maintenance solutions that are cost effective and within the limited financial capacities of the local governments and communities.

The proposed approach is to use intermediate equipment that is tractor drawn and that can be used to do tow grading of gravel roads. The agricultural tractors can be used with a wide variety of attachments and complimenting different activities on road maintenance and agriculture. It is hoped that the introduction of the new technology and with careful preparation through training and demonstration will have a positive effect on the community and local government uptake.

Some of the tasks that tractor drawn equipment can perform include the following:

### **9.2.1. Road maintenance;**

1. Gravel haulage using tractor drawn tipper,
2. Water collection using tractor drawn water bowser,
3. Tow grading for light and heavy grading,
4. Towed compaction using a tractor drawn compactor,
5. Earth excavation,
6. Materials loading using front tractor loader, and
7. Grass and bush control.



### 9.2.2. Agricultural works;

1. Ploughing,
2. Harrowing,
3. Rotovating,
4. Planting,
5. Seed drilling, and
6. Fertilizer and herbicide application.

### 9.2.3. Other uses;

1. Garbage collection and disposal,
2. Stone crushing (from PTO),
3. Winching, loading, hauling and poling of forestry products,
4. Pipeline excavation and pipe laying, and
5. Dam constructions.

The appropriate type of equipment and the numbers will be determined jointly with the State MoPI officials, County authorities and the CBOs after trainings have been carried out and understanding of how the tractor drawn road maintenance equipment work. The additional implements/attachments will largely depend on what other activities the CBOs envisage they could do with the tractors in order to generate incomes for the road maintenance.

For instance during the low peak maintenance period the CBOs could use the tractors to transport materials for construction contractors and where there are forests CBOs could request to have logging and sawing attachments. The basic implements for road maintenance could be standard across the different States but the additional implements will vary from State to State depending on what economic activities exist.

It is imperative that the CBOs receive substantial training not only on road maintenance but also on the operation and maintenance of the equipment to be provided to them. It is therefore important that trainings be tailored to the specific needs of the different States.

**Picture 1: A tractor towed grader working on a gravel road**



**Picture 2: Tractor drawn water bowser**



**Picture 3: Tractor drawn grader and front end loader**



**Picture 4: Tractor drawn compactor**



### 9.3. Cost of equipment and maintenance

The conventional road maintenance equipment is both expensive to purchase and costly to maintain. Below is an example of the cost of a motorised grader as compared to a tractor drawn grader including the fuel consumption. The motorised graders can only be used for a single purpose as opposed to tractor towed equipment where the tractor can be attached to a variety of implements depending on the task to be undertaken which makes the tractor towed equipment more valuable overall.

**Table 11: Comparison between the costs of a motorized grader compared to tractor drawn**

No.	Item description	Motorized Grader	Tractor drawn Grader
1	Capital cost for purchase	US\$250,000.00	US\$35,000.00
2	5 year repayment interest at 15%	US\$112,500.00	US\$16,000.00
3	Maximum daily output (light grading)	10km	10km
4	Use	Single	Multiple with different implements
5	Recommended length of road per maintenance unit	200km	200km
6	Fuel consumption per day (8hours)	160ltrs	40ltrs

Source: Kingstone Gongera & Robert Petts (AFCAP Project ref: EMUK10636A) – May 2015

The table 11 above indicates that there is no difference in the output on both type of machines despite the significant difference in the capital cost, depreciation and fuel consumption and maintenance. However the level of accuracy, machine capacity and other factor have not been provided in this example. The maintenance cost (not listed above) normally ranges from 30-50%



from year 1 to year 5 of the machine use. It is therefore evident that the tractor drawn equipment costs much less but can be used for diverse activities hence more value for an agricultural project.

In order to work out the cost of operating and maintaining the tractor drawn equipment it is important to factor in all the costs of operation and maintenance across a five year period and then work out funding possibilities. The table below shows approximate cost of operation and maintenance for the tractor across a five year period:

**Table 12: Estimated annual maintenance costs for a tractor**

		Cost in US Dollars				
No.	Item description	Year 1	Year 2	Year 3	Year 4	Year 5
1	Spare parts	10,500	12,250	14,000	15,750	17,500
2	Oils and Lubes	3,500	3,500	3,500	4,200	4,200
3	Fuel	20,800	20,800	20,800	20,800	20,800
4	Labour	15,000	15,000	18,000	18,000	18,000
5	Contingencies (10%)	4,980	5,515	5,630	5,875	6,050
	<b>Total</b>	<b>54,780.00</b>	<b>57,065.00</b>	<b>61,930.00</b>	<b>64,625.00</b>	<b>66,550.00</b>

*The cost above is for one tractor only and does not even cover the cost of depreciation*

For the community based organisations to be able to run financially independently they will have to identify tasks that can be undertaken in the course of the year in order to raise enough funds as stipulated above to keep the equipment properly maintained. The tasks have been listed below as follows:

1. Ploughing of farms, low priority and dependent on feasibility given the risks earlier outlined
2. Transportation of building materials and farm produce, and
3. Other road works.

The above are the tasks that maybe possible in all States, however, there will be other tasks that will be identified by communities that can be undertaken as additional income generating activities will influence the type and quantity of implements to be purchased in each State. For planning purposes it is important to identify the community calendar and identify which periods of the year the equipment can be used for what purposes. The table below shows the community calendar with the proposed tasks that the equipment could be used to undertake:

**Table 13: Community calendar**

Month	Key activity	Subsidiary activity	Remarks
January	Road maintenance	Transportation	
February	Road maintenance	Transportation	
March	Road maintenance	Transportation	
April	Ploughing	None	Rainy season
May	Ploughing	None	Rainy season
June	Ploughing	None	Rainy season
July	Road maintenance	Transportation	Rainy season
August	Road maintenance	Transportation	
September	Road maintenance	Transportation	
October	Transportation	Road maintenance	
November	Transportation	Road maintenance	
December	Transportation	Road maintenance	

The above community calendar shows that during the rainy season (April – July) farming communities will be busy working on the farms hence the equipment will be best utilized to support the farmers with plough and other farm preparation activities. As mentioned earlier, there is a significant risk on the use of the equipment for farming activities as most of the farms in the project areas have not been properly prepared and thoroughly de-stumped and the use of tractors on fields that have stumps could lead to extensive damage of the tractor tyres and other body parts hence this option should not be considered unless there is evidence of commercial viability having taken the above risks into consideration.

Road maintenance is best done just before and after the rains and besides this the equipment could be used for transportation of materials and farm produce intermittently. Equipment could also be used to carry out other contracted activities if available.

For the CBOs to be able to operate profitably they will need to learn how to run their businesses, therefore basic book keeping and office management including how to tender or quote for works trainings will be essential.

#### 9.4. Maintenance strategy and cycle

The maintenance concept envisages that the NGOs will be engaged at around the same time as the beginning of the design activities so that the community sensitisation and mobilisation can also kick off at the same time. The purpose is to ensure that the community is brought on board from as early as the design stage.

During the design stage the NGOs are expected to carry out the following tasks in coordination with the UNOPS TCD expert:

- Conduct a detailed baseline study to collect background information in relation with the core objectives and outcomes of the community participation, needs assessments and level of commitment. The baseline study will support the development of a results based framework to monitor and evaluate progress and relevant changes.
- Develop a community action plan and carry out community mapping.
- Discuss and agree on the role and responsibilities of the local and traditional leadership on the community mobilisation and sensitisation process.
- Together with the local and traditional leadership conduct general awareness creation and community mobilisation meetings to sensitize the local communities on the road and identify benefits and discuss issues that the community requires to know including (but not limited to) their contribution to the road construction.
- Discuss and agree on the final road alignment once the design team has finalized their work and have signed agreements with the communities accepting the design alignment
- In collaboration with the design team support the development of the relocation action plan.
- Develop a management structure for the maintenance entity with clearly outlined roles and responsibilities for each actor.
- Form community groups (if none exist) and use them to form a road maintenance community-based organisation.
- Together with the TCD expert carry out training needs assessment for the local communities as well as for the State MoPI officials and develop the training needs and strategies.
- Carry out specified trainings as per the agreed terms of reference.

- Discuss, agree and document the type and quantity of intermediate equipment required for the road maintenance, support to agricultural production as well as income generating activities in support of the feeder road maintenance.
- Discuss, agree and document the management of the intermediate equipment and to which entity the same will be handed over at the end of the training.

It is anticipated the resettlement action plan (RAP) developed during the design stage will be implemented during the time that UNOPS will be tendering for the works so that when the actual construction begins all the properties affected by the road will have been vacated to clear the way for the construction contractor.

The actual technical trainings for the communities will be rolled out when the actual construction begins as there will be an opportunity to do field visits and demonstrate road construction techniques. The communities will commence some aspects of maintenance during the defects liability period and additional trainings offered on the maintenance aspects as the contractor carries out the defects rectification. The communities will also have their part of maintenance to carry out in form of cleaning up and unblocking culverts as well as keeping the vegetation on the extents of the right of way low.

It is expected that the contractor will only be able to construct about a half of the package during the first half of the year in 2016 and the other half to be completed at the end of the wet season and into the dry season in 2017.

It is intended that UNOPS would accept partial hand over of the works satisfactorily completed in 2016 in order to allow the defects liability to commence on that section of road by the contractor. However, upon completion of the second package contractors usually demobilize all equipment from site and there is an opportunity whereby the established CBOs could enter into an agreement with the contractors to carry out the defects rectification instead of the contractors having to re-mobilize equipment. This will be an opportunity for the CBOs to carry out some works and utilize all the knowledge imparted on road maintenance as well as gain some income from the work done for the contractor.










The CBOs will start full maintenance at the end of the twelve month defects liability period (DLP) which will only begin around the middle of 2017 for the first completed sections handed over. For planning proposes all intermediary equipment will require to have been procured and delivered to site by the beginning of 2017 in order to provide ample time for the CBOs to be trained on the operation and maintenance of the equipment before starting to use them.

It is planned that the maintenance package that will be supported by UNOPS will run from the middle of 2017 to the same time in 2018 and during this time it is expected that the CBOs will have gained sufficient knowledge and skills to carry out routine maintenance on the feeder roads. The NGOs will only be engaged for a period of one year ending in the second half of 2016 and the UNOPS TCD expert will continue with the technical trainings for the CBOs to ensure that they are capable of carrying out the tasks by themselves.

The aspects of ownership of the equipment will be discussed early, preferably during the design stage. Due to lack of funding for road maintenance the best option is to develop a model that does not entirely rely on State funding and instead encourages the use of the intermediate equipment for income generating activities (IGA).

UNOPS built the Warrap – Musharar road (see details under Warrap State below) under the SSRF funding and handed over some intermediate equipment for maintenance. However, two years down the line the equipment has remained unused due to lack of funding. If the same model is applied there is no evidence to suggest that a different result will be obtained. In this regard UNOPS would strongly recommend that the equipment is owned by the county and managed by the CBOs and the State MoPIs come in only for the technical oversight.

**Table 14: Typical 5 year road construction and maintenance cycle in one State.**

A TYPICAL SAMPLE OF A FIVE YEAR ROAD CYCLE																						
		YEAR 1 (2016)				YEAR 2 (2017)				YEAR 3 (2018)				YEAR 4 (2019)				YEAR 5 (2020)				
ACTIVITY	Resources required	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
SECTION 1 - 15KM																						
CONSTRUCTION	Contractor																					
DEFECTS LIABILITY PERIOD	Contractor																					
TRAINING OF CBOs	NGO and technical trainer + materials																					
ROUTINE MAINTENANCE BY CBO	CBO, tools and labour, budget for salaries																					
PERIODIC MAINTENANCE BY CBO	and budget for salaries and operational costs																					
SECTION 2 - 15KM																						
CONSTRUCTION	Contractor																					
DEFECTS LIABILITY PERIOD	Contractor																					
ROUTINE MAINTENANCE BY CBO	CBO, tools																					
PERIODIC MAINTENANCE BY CBO	CBO, intermediate equipment																					



## **10. Way forward:**

### **10.1. Outline:**

In order to effectively implement the proposed maintenance concept it is important to have a baseline line survey conducted in each State to establish the training needs as well as gauge the commitment of the local communities to participate in the feeder roads maintenance. There is also need to have further discussions with the State MoPIs and other actors in order to establish their training needs as well as discuss further the organizational relationship between the State MoPI, MoAF, the County authorities and the CBO. These discussions will culminate in the signing of an MoU between the different parties and the establishment of clear roles and responsibilities for each actor.

Further discussions also need to be made with the different actors to establish the actual machinery requirements per State. UNOPS and the State MoPIs will lead the discussion on the requirements for the actual maintenance while the State MoAF will facilitate the discussions on the required implements to support agricultural production and the local community will provide inputs on the implements required for IGAs to fund feeder roads maintenance.

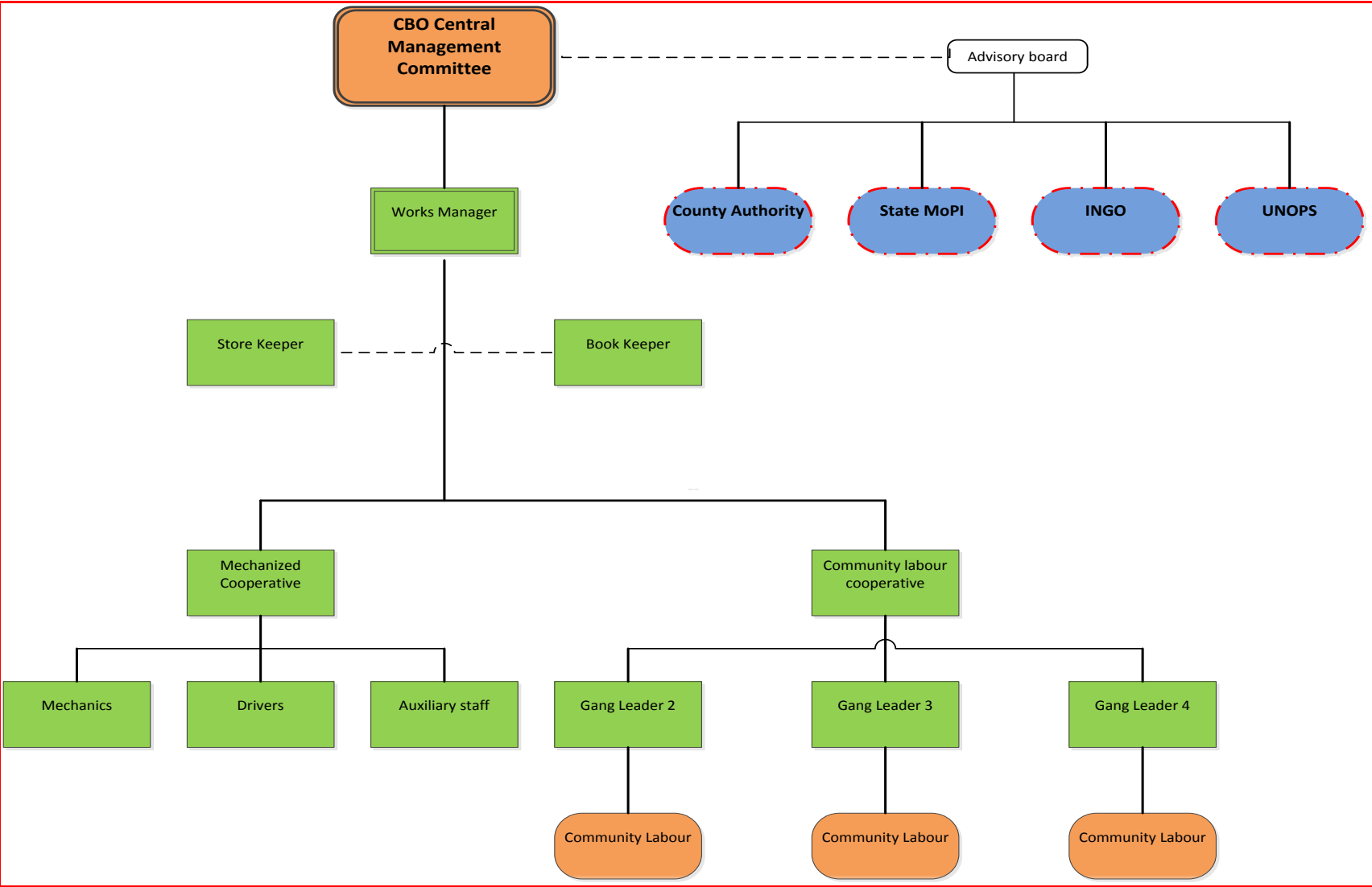
The NGOs will therefore develop an action plan detailing what activities/trainings will be carried out during what period of the 12 months engagement. The design consultant will work closely with the NGOs and the TCD expert to develop the RAP and the NGOs in collaboration with the TCD expert and the local and traditional leadership will be responsible for the roll out of the RAP as soon as the design consultants submit the RAP.

UNOPS conducted a workshop on 20/21 November 2015 in Wau where the representatives of the State MoPIs, County authorities and NGOs in all the three States of Warrap, Western and Northern Bahr el-Ghazal and the organizational structure shown below was agreed on and endorsed with clear roles and responsibilities for the various actors being outlined. The workshop brought in resource persons from the stakeholders who will play critical roles in ensuring that the feeder road maintenance concept is operationalized.

From the roles and responsibilities discussed it was evident that the persons elected to form the CBO central management committee (CMC) will be key to the success of the programme hence the NGOs were asked to be careful when forming the groups and CBOs to ensure that the CMC is comprised of person with sufficient capacity and integrity to achieve the CBO objectives.

### **10.2. CBO Budget:**

The CBO budget was also discussed during the workshop and though not in so much detail, however, the key items like the allowances for committee members was discussed and agreed. The budget presented is on assumption that the transfers will be made on foreign currencies.



### **10.3. Roles and responsibilities of the different actors in the maintenance programme:**

Roles and responsibilities of the key stakeholders in the community-based feeder road maintenance programme

#### **1. State Ministry of Physical Infrastructure:**

- To provide technical oversight and supervision to the CBO during the maintenance period
- Lobby for funds to support road maintenance through the CBO
- Provide additional and refresher trainings to the CBOs
- Provide oversight on management and maintenance of the construction equipment provided to the CBO.
- Support the registration of the CBO
- Recommend the CBO for additional works as part of resource mobilization

#### **2. County Authorities:**

- Provide security for the CBO construction team
- Facilitate the access to the locally available materials for road construction and maintenance
- Support community mobilisation and sensitisation
- Provide land for the establishment of CBO compounds
- Handle dispute resolution among community members
- Overall responsible for the equipment handed over to the CBO
- Support in the external mobilization of funds
- Coordinates with other line ministries on other benefits arising out of the feeder road construction

#### **3. Local Community:**

- Provide labour for feeder road maintenance
- Provide unreserved access to locally available construction materials
- Participate in the community mobilization and sensitization meetings
- Participate in all the participatory planning meetings for the CBO operations
- Management of the tools provided for feeder road maintenance
- Election of the CMC members
- Management of the rehabilitated borrow pits
- Support the resettlement of affected community members
- Ensure the security of all road assets

**4. Non-Governmental Organization (NGO):**

- CBO formation
- Community mobilization and sensitization
- Capacity building for the CBOs
- Facilitate the registration of CBOs
- Development of ToRs for the CBOs
- Provision of leadership, business management and other cross-cutting trainings
- Integration of the different programs and actors

**5. UNOPS:**

- Recruitment of the construction contractor
- Provide technical trainings to both the SMOPIs and CBO staff and CMC
- Supervise the feeder road construction and maintenance
- Procure the maintenance equipment
- Capacity building for the CBO and State MoPI
- Provide funds for the community mobilization and sensitization
- Participate in the development of the ToR for the CBOs
- Facilitate the community-based participatory planning
- Overall coordination of the feeder road construction and maintenance
- Overall administration of the financial resources during the project period

**10.4. Roles and responsibilities for the CMC and key CBO staff:**

Below are the roles and responsibilities of the Central Management Committee members and key employees:

**1. Chairperson:**

- Chairs all CMC meetings
- Presides over central management committee meetings
- Represents the CBO in other forums
- Overall responsible for the smooth and efficient operation of the CBO
- Signatory to the CBO account
- Helps to build consensus during CMC meetings
- Resource mobilization
- Reports to the advisory board
- Making key decisions in the CMC
- Liaises with external stakeholders
- Validates CBO documents before being sent externally

**2. Vice-chairperson:**

- Chairs management meetings in the absence of the chairperson
- Perform any other duties delegated by the chairperson
- Contributes to decision and policy making

**3. Secretary:**

- Responsible for the safe keeping of all CBO official records
- Take minutes of all CMC meetings
- Disseminates information among the CMC and CBO members
- Circulate invitations for CMC meetings
- Signatory to the CBO account
- Organizes CMC meeting venues
- Responsible for all external documentation and communication

**4. Vice-Secretary:**

- Performs all duties of the secretary in his/her absence

**5. Treasurer**

- Keeping of all financial records
- Provision of financial reports to the CMC
- Prepares CBO budgets
- Ensures compliance of CBO financial rules and regulations among CBO staff and CMC members
- Reads the financial reports during the CBO annual general meetings
- Financial advisor to the CMC
- Signatory to the CBO account
- Conducts internal audits for the CBO funds

**6. Committee members:**

- Participate in the CMC decision making process
- Participate in voting or elections
- Follow up any CMC issues or activities as delegated by the CMC

**7. Works Manager:**

- Oversee the day-to-day activities of the CBO
- Overall responsible for planning of all CBO activities
- Responsible for allocation of tasks to the CBO staff
- Lobby for funding through proposal writing
- Prepares weekly and monthly reports to the CMC

- Participate in the staff recruitment and conducts staff performance appraisals
- Overall management of the CBO resources
- Attend CMC meetings and takes key decisions by the CMC for implementation
- Advises the CMC on key technical matters
- Liaison with other technical arms e.g. the SMOPI
- Ensures proper and timely maintenance of CBO equipment
- Overall supervision of all CBO staff and activities
- Settles disputes among CBO staff

**8. Book Keeper:**

- Generates all financial records and documents
- Keeps all the financial records of the CBO
- Payment for all works and services rendered to the CBO
- Processes and pays out allowances to the CMC members
- Custodian of the petty cash
- Prepares financial reports to the CMC
- Ensure transparent disbursement of CBO funds
- Coordination of the procurement of goods and services according to the CBO financial rules and regulations

**9. Store Keeper:**

- Responsible for the issuance of all tools to workers
- Responsible for the safe keeping of all CBO tools and other inventories in the stores
- Keep accurate inventory of CBO assets
- Prepares procurement requests
- Manages the store(s) and maintains accurate and up-to-date stock records
- Maintains an accurate and up-to-date assets register
- Receives new stocks and fills in goods received notes
- Coordinates the stock taking exercise

**10. Gang Leaders:**

- Responsible for the management of labour in a given sectional group
- Daily task allocation to the labourers
- Responsible for taking instructions from the works manager and implements
- Keeps records of all labour and tools used on every day

### 10.5. Budget for purchase of intermediate equipment per State

S/No.	Item Description	Unit	Qty	Price	Total
1	90HP 4CYL 4WD farm tractors complete with rops, canopy and service kit	No.	3	\$ 35,619.52	\$ 106,858.55
2	Heavy duty towed grader with blade cutting width of 3m complete with parts kit suitable for 90HP tractors	No.	1	\$ 42,714.92	\$ 42,714.92
3	Tractor powered front end loader complete with parts kit	No.	1	\$ 12,307.73	\$ 12,307.73
4	Tractor powered excavator	No.	1	\$ 12,307.73	\$ 12,307.73
5	Towed water bowser 4,500ltrs capacity complete with parts kit	No.	1	\$ 13,899.92	\$ 13,899.92
6	5Ton self-tipping trailer complete with parts kit	No.	2	\$ 13,465.36	\$ 26,930.72
7	5Ton towed rolling compactor complete with parts kit	No.	1	\$ 19,459.89	\$ 19,459.89
8	Self-propelled plate compactor	No.	1	\$ 5,000.00	\$ 5,000.00
	<b>Total</b>				<b>\$ 239,479.46</b>

## 10.6. Proposed budget for the CBO operations

S/No	Item Description	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Total
<b>1</b>	<b>Management costs</b>													
1.1	Committee monthly sitting allowance	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	4,800.00
1.2	Works Manager (1)	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	7,200.00
1.3	Book Keeper (1)	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	5,040.00
1.4	Store Keeper (1)	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	5,040.00
1.5	Security guards (3)	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00	15,120.00
1.6	Compound generator costs	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	3,000.00
1.7	Compound maintenance costs	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	1,200.00
	<b>Sub-Totals</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>3,450.00</b>	<b>41,400.00</b>
<b>2</b>	<b>Mecanized Cooperative</b>													
2.1	Gang Leaders (1)							505.00	505.00	505.00	505.00	505.00		2,525.00
2.2	Drivers and Plant Operators (5)							2,520.00	2,520.00	2,520.00	2,520.00	2,520.00		12,600.00
2.3	Mechanics (1)							505.00	505.00	505.00	505.00	505.00		2,525.00
2.4	Community labour (5)							2,100.00	2,100.00	2,100.00	2,100.00	2,100.00		10,500.00
	<b>Sub-Totals</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>5,630.00</b>	<b>5,630.00</b>	<b>5,630.00</b>	<b>5,630.00</b>	<b>5,630.00</b>	<b>-</b>	<b>28,150.00</b>
<b>3</b>	<b>Machinery Costs</b>													
3.1	Fuel							4,500.00	4,500.00	4,500.00	4,500.00	4,500.00		22,500.00
3.2	Spare Parts & minor repairs							2,000.00	2,000.00	2,000.00	2,000.00	2,000.00		10,000.00
3.3	Oils and Lubricants							500.00	500.00	500.00	500.00	500.00		2,500.00
	<b>Sub-Totals</b>				<b>-</b>	<b>-</b>	<b>-</b>	<b>7,000.00</b>	<b>7,000.00</b>	<b>7,000.00</b>	<b>7,000.00</b>	<b>7,000.00</b>		<b>35,000.00</b>
<b>4</b>	<b>Labour Cooperative</b>													
4.1	Gang Leaders (02)	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	1,010.00	12,120.00
4.2	Community labour (10)	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00	50,400.00
	<b>Sub-Totals</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>5,210.00</b>	<b>62,520.00</b>
<b>5</b>	<b>Office Supplies and Consumables</b>													
5.1	Office Supplies	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	1,800.00
	<b>Sub-Totals</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>150.00</b>	<b>1,800.00</b>
	<b>Totals</b>	<b>8,810.00</b>	<b>8,810.00</b>	<b>8,810.00</b>	<b>8,810.00</b>	<b>8,810.00</b>	<b>8,810.00</b>	<b>21,440.00</b>	<b>21,440.00</b>	<b>21,440.00</b>	<b>21,440.00</b>	<b>21,440.00</b>	<b>8,810.00</b>	<b>168,870.00</b>
	<b>Add 10% Contingencies</b>	<b>881.00</b>	<b>881.00</b>	<b>881.00</b>	<b>881.00</b>	<b>881.00</b>	<b>881.00</b>	<b>2,144.00</b>	<b>2,144.00</b>	<b>2,144.00</b>	<b>2,144.00</b>	<b>2,144.00</b>	<b>881.00</b>	<b>16,887.00</b>
	<b>Grand Totals</b>	<b>9,691.00</b>	<b>9,691.00</b>	<b>9,691.00</b>	<b>9,691.00</b>	<b>9,691.00</b>	<b>9,691.00</b>	<b>23,584.00</b>	<b>23,584.00</b>	<b>23,584.00</b>	<b>23,584.00</b>	<b>23,584.00</b>	<b>9,691.00</b>	<b>185,757.00</b>



## 10.7. **Trainings:**

### **Soft skill training for Community Based Organization**

#### **1. Leadership training**

By this training CBO will learn:

- What is Leadership?
- What involves Leadership?
- Characteristics/Qualities of Good Leadership
- Effective Leadership
  - a. Functional Leadership
  - b. Leading on purpose
  - c. Leaders should not make promise
  - d. Long term Leadership
  - e. Leaders should know what to do
  - f. Leading in specific direction
  - g. Leaders create leaders
  - h. Leading on purpose summary
- Leadership and Groups
- What is a group?
- Ground rules in the group:
- Benefits of being in a Group/Importance
- What is group dynamics?
- Importance of Group Dynamics
- Composition of Central Management Committee
- Roles and Responsibilities of Central Management Committee:
  - a. Chair Person
  - b. Deputy Chair Person
  - c. Treasurer
  - d. Secretary
  - e. Committee members
- Key Partners to Oversee work of village groups
- Group constitution

#### **2. Communication training**

By this training CBO will learn:

- What is communication
- The importance of communication
- Communication barriers
- Importance of removing barriers to effective communication

### **3. Community Conflict Management training**

By this training CBO will learn:

- By this training CBO will learn:
- What is a conflict?
- What are some of the causes of Conflict in community?
- Impacts of a conflict
- What are the Positive Impacts of Conflict and Negative Impacts?
- Conflict resolution
- Guidelines to Handle Conflicts
- Basic Skills Required in Conflict Mitigation
- Good Practice for Leaders in Conflict Mitigation

### **4. Small Scale Business Skill Training**

By this training CBO will learn:

- Introduction to business
- Business Concept
- The business environment
- Business planning (making decisions)
- Communication/ business language
- Marketing module

### **5. Monitoring and Evaluation training**

By this training CBO will learn:

- Introduction to monitoring and evaluation terms and concepts
- Difference between monitoring and evaluation
- The need for monitoring and evaluation in development projects
- Monitoring in all process of the project cycle
- What is an indicator?
- Types of indicators and Identifying outcome indicators for your project
- Importance of having indicators
- When are indicators established? For what purpose? And by whom?
- What do indicators show?

### **6. Community Conversation**

By this training CBO will learn:

- Introduction to community conversation
- What is a community conversation?
- Community conversations implementation steps
- Facilitated change process
- Community entry, Immersion and Planning
  - a) Conducting smooth community entry
  - b) Mapping the community

- c) Initiating attitude change
- Data gathering and situational analysis.
- Community Conversation practice

## 7. Road safety Awareness

By this training CBO will learn:

- Introduction
- Scale of road safety problem in the world.
- Understanding road safety and measures needed.
- Causes of road accidents in South Sudan/ Key Road Risk factors\_( Over-speeding, alcohol and drug use, distracted driving/cycling, helmets and seat-belts, safety road crossing)
- Human behavior
- Vehicle conditions
- Road infrastructure conditions
- Environmental factors
- Effects of road accident
- Changing the behavior of road users
  - a) Creating public awareness
  - b) Training young road users
- Reducing road accidents – ways involved.
  - a) Road crossing –measures to observe.
  - b) common signs used

## 8. FINANCIAL MANAGEMENT

By this training CBO will learn:

- Introduction to the concept of financial management
- How to calculate business profit & loss
- Managing business cash and accounts
- Methods of easing cash problems
- Principles of financial management
- Main functions of financial managers
- Sources of finances
- Budgeting ( elements of a good budget)
- Merits of budgeting

## 9. Business management

By this training CBO will learn:

- Introduction to practical models of business management (Self-Help Groups/SHGs and Village Saving and Loaning Associations /VSLAs)
- Business record/book keeping/accounting records

- Managerial skills
- Resource mobilization, lobbying and advocacy
- Preparation of schedule/ duty roaster
- The use of symbols in book keeping

## **10. Public Private and Partnership (PPP) training**

By this training CBO will learn:

- Introduction to the concept of PPP
- Benefits of PPP to the ZEAD BEAD Feeder Roads Project
- Challenges of PPP
- Stages/sequence of PPP in the feeder road projects (PPP agreements)
- Activities of PPP in relation to the ZEAD BEAD Feeder Roads Project
- PPP financing and accountability
- Monitoring of PPP in the feeder roads project

## **11. HIV/AIDS Awareness training**

By this training CBO will learn:

- Concept of HIV/AIDs
- HIV transmission and prevention
- Purposes and benefits of HIV testing and counseling
- Management of HIV/AIDs
- Strategies for addressing HIV/AIDs
- Stigma and discrimination

## **12. Gender equity**

By this training CBO will learn:

- Concept of gender equity
- Cultural aspects of gender
- Benefits of gender equity
- Inclusive decision making processes
- Principles of gender equity