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MULTINATIONAL
EASTERN NILE TECHNICAL REGIONAL OFFICE
OF THE NILE BASIN INITIATIVE

BARO-AKOBO-SOBAT MULTIPURPOSE WATER RESOURCES DEVELOPMENT STUDY PROJECT

Appraisal Report

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NEPAD-IPPF
AWF

April 2012

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List of Acronyms and Abbreviations

ADB	African Development Bank
AMCOW	African Ministers' Council on Water
AU	African Union
AWF	African Water Facility
DANIDA	Danish International Development Agency
DFID	Department For International Development (UK)
ENSAP	Eastern Nile Subsidiary Action Program
ENTRO	Eastern Nile Technical Regional Office
EN	Eastern Nile
ENCOM	Eastern Nile Council of Minister
ENSAPT	Eastern Nile Subsidiary Action Program Team
EU	European Union
FAU	Finance and Administration Unit
ICP	International Cooperating Partners
IDEN	Integrated development of the Eastern Nile
ISL	International Short-Listing (procedure)
JMP	Joint Monitoring Programme
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt FurWiederaufbau, Germany
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
NBI	Nile Basin Initiative
NEPAD-IPPF	New Partnership for Africa's Development – Infrastructure Project Preparation Facility
NCOM	Nile Council of Ministers
NGO	Non-Governmental Organisation
O&M	Operation and Maintenance
PIT	Project Implementation Team
PSC	Project Steering Committee
QCBS	Quality and Cost Based Selection Process (procurements)
REC	Regional Economic Community
RTC	Regional Technical Committee
SAP	Subsidiary Action Programme
SNNPR	Southern Nations, Nationalities, and People's Region
SSEA	Strategic Social and Environmental Assessment
ToR	Terms of Reference
UA	Unit of Account of the African Development Bank

UN-ECA	United Nations Economic Commission for Africa
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organisation
WSP	World Bank Water and Sanitation Program
WSS	Water Supply and Sanitation

LOGICAL FRAMEWORK (2012 - 2014):

HIERARCHY OF OBJECTIVES:	EXPECTED RESULTS:	REACH:	PERFORMANCE INDICATORS:	INDICATIVE TARGETS AND TIMEFRAME:	RISKS & MITIGATION MEASURES:
Goal: To promote socio-economic development, regional cooperation and understanding through sustainable water resources development in the Eastern Nile region.	Impact: - Improved cooperation among Sub-basin states in trans boundary water resources management. - increased access to drinking water and sanitation in the Sub-basin. - Increased access to electricity for the population in the sub-basin, in particular, and the rest of the EN states. - Enhanced Sub-basin food security. - Improved navigation on main. watercourses in the sub-basin. - Improved environmental sustainability in the Sub-basin.	Beneficiaries: Over 3.6 million living in the BAS Sub-basin.	Impact Indicators: # people potentially benefiting from projects identified and prepared	Target: 3.6 million people in the sub-basin	Assumption: Continued political stability in the region
Objectives: To increase investment in the water sector in the Sub-basin by setting the basis of a sustainable water resources management	Outcomes: The riparian countries agree on a proposal of institutional framework and on principles of sustainable water resources management	Beneficiaries: The governments of the Eastern Nile Countries. The 3.6 million people in the sub-basin, in particular, and the whole population in the EN region	Outcome indicators: Letters of endorsement of the Eastern Nile countries : - on the implementation of the proposed institutional framework - on the approval of the integrated water resource development plan	Medium term target: Letters of endorsement of the Eastern Nile countries by M+43	Risk: Stakeholders do not endorse the IWRDMP and/or the projects Donors do not get involved in the process Mitigation: Progressive consultation process with step-by-step endorsement Early face-to-face consultation of the donors and National Governments
	Donors and national Governments committed to funding or preparing projects		Potential Funds leveraged	60 M euros of funds leveraged by M+50 estimated through letters of intention of Donors and the national Governments (funding of projects or of project preparation)	

Activities:	Outputs:	Beneficiaries:	Output indicator:	Short term target:	Risk:
Component 1: Integrated Water Resources Management and Development Plan • Baseline study and water resources assessment • Comprehensive assessment of options through a Strategic Social and Environmental Assessment (SSEA) as well as through a technical, economic, financial and institutional assessment . • Formulate Integrated Water Resource Management and Development Plan for the BAS Sub-basin.	- Baseline information established across entire BAS sub-basin - Participatory SSEA of water resources development options over the BAS sub-basin - Integrated Water Resource Management and Development Plan for the BAS Sub-basin developed - Institutional Framework proposed	Government ministries of EN countries ENTRO	Baseline Report for the whole BAS sub-basin Assessment of options report. Integrated Water Resource Management and Development Plan for BAS Sub-basin including the institutional framework proposal	Baseline Report by M+20 Assessment of options report by M+27.5 Integrated Water Resource Management and Development Plan by M+32	Poor commitment of the riparian countries Mitigation: - Establishment of a steering committee gathering the main ministries. - National project coordinators will liaise with the ministries
Component 2: Preparation of priority Projects Preparation of selected priority Projects in the BAS-sub-basin	2 short-term development projects and 1 Long-term infrastructure project are identified and prepared at feasibility level.	Governments of EN countries Population in the BAS sub-basin	Feasibility Study Reports approved by stakeholders in the sub-basin	3 Feasibility Study Reports approved by M+24	
Component 3: Identification of Medium to Long term Projects Identification and profiling of medium and long term investment projects.	3 medium and long term infrastructure projects are identified	Governments of EN countries Population in the BAS sub-basin	Terms of Reference and Roadmaps for 3 medium and long term projects approved.	3 Project Identification Report approved by M+36	
Component 4: Project Management and Implementation Support 4.1 Project Management – procurement of consultancy services; work planning; supervision; facilitate stakeholder consultations; monitoring implementation; reporting. 4.2 Stakeholder Consultations – develop and implement consultation plan and stakeholder engagement. 4.3 Resource Mobilization – Prepare financing strategy; organize donor's round table.	• Project Management Team established (PMT). • Study consultants procured • Monitoring system developed and used • Stakeholder consultation plan developed. • Stakeholder engagement throughout the project period • Financing strategy developed. • Donor's round table held	ENTRO All stakeholders Population in the BAS sub-basin	PMT in place at ENTRO Consultants contracted Project Monitoring System approved by ENTRO and AWF/NEPAD-IPPF Approved Consultation Plan Effective stakeholders consultation throughout the project Donor's Roundtable	PMT established by M+3 Study is commenced by M+9 Consultation Plan approved by M+15 7 consultation stages hold by M+37 Donor's Roundtable by M+37	
Project Financing:	AWF: €2,000,000 NEPAD – IPPF: €500,000 ENTRO: €290,000 GovTs: €260,000 TOTAL: €3,050,000				Project Duration: 36 months.

Executive Summary

Background: The Eastern Nile Technical Regional Office (ENTRO) of the Nile Basin Initiative (NBI) has submitted a funding application to the African Water Facility (AWF) and the NEPAD-Infrastructure Project Preparation Facility (NEPAD-IPPF), on behalf of the Eastern Nile countries of Egypt, Sudan, and Ethiopia for support in undertaking a study of the Baro-Akobo-Sobat (BAS) Multipurpose Water Resources Development Project. The BAS project targets an area emerging from conflict (on the South Sudanese part) and lagging behind other regions (even on the Ethiopian side) in all socio-economic development indicators. The sub-basin is characterized by poverty, rapidly growing population, vulnerability to floods and droughts, food and energy insecurity, environmental degradation, and lack of cooperative and coordinated development and management of land and water resources plans. However the region holds tremendous potential for cooperative development of water resources to meet socio-economic goals and poverty reduction. The BAS project has been formulated to address underdevelopment and to utilize water resources as an engine for socio-economic development of the region. Although the river basin is not strictly affected by the Horn of Africa drought crisis, this project will participate in fostering climate variability resilience in a neighboring region.

Goal and Objective: The **overall goal** of the project is "to promote socio-economic development, regional cooperation and understanding through basin-wide cooperation in sustainable water resources development and management in the Eastern Nile region". Its **objective**s are "to set the basis for a sustainable water resources management" and "to increase investment in the water sector in the Sub-basin"

Project Description: The project encompasses activities structured into four output areas, namely: (1) Development of an integrated water resources management and development plan for the BAS sub-basin based on a comprehensive assessment of options through a Strategic Social and Environmental Assessment (SSEA) as well as through a technical, economic, financial and institutional assessment; (2) Identification of investment packages and feasibility study of selected priority investment projects with win-win benefits and that build trust and confidence among the EN countries; (3) Project identification of medium and long-term multi-purpose development projects (water supply and sanitation, hydropower, irrigation, navigation, flood control); and (4) Stakeholder consultation and engagement including engagement of potential financing agencies as well as the private sector in resource mobilization for implementation of short-term projects and for project preparation of medium and long-term projects.

Project Costs, Financing and Duration: The total cost of the project is estimated at €3,050,000, made up mainly of consultancy services for undertaking the study. The project will be implemented over a period of 36 months from Grant Effectiveness. It is proposed that the project will be financed by an AWF grant of Euro 2,000,000, a NEPAD-IPPF grant of US$ 667,000 (equivalent Euro 500,000), an ENTRO contribution of Euro 290,000, and in-kind contribution amounting to Euro 260,000 from the EN countries.

Rationale for AWF and NEPAD-IPPF Support: The project will lead to the identification and preparation of potential investment projects in one or more of these areas: water supply and sanitation, irrigated agriculture, hydropower, navigation, flood control, water security through multi-purpose reservoirs, and sustainable management of wetlands and water resources. Given the availability of the water and soil resources, the investment potentials can represent a significant

amount. Therefore the project has high potential for leveraging investments in water resources development in the sub-basin. The water resources management and development plans provide a framework for effective cooperative governance of water resources in this trans-boundary basin, which will foster implementation of investments, promotes regional cooperation and environmental integrity. These aspects are highly consistent with both the AWF's new strategic priorities ("Leverage investments through project preparation" and "Enable governance for sustainable and effective investments") as well as the NEPAD-IPPF strategic objective - ("to prepare high quality, viable regional infrastructure projects in energy, water, transport and ICTs, which would be ready to solicit financing from public and private sources").

Recommendation: The project is eligible for AWF and NEPAD-IPPF support; it is consistent with EN countries' development objectives, as well as those of AWF and NEPAD-IPPF. It is recommended that a AWF grant not exceeding Euro 2,000,000 and a NEPAD-IPPF grant not exceeding US$ 667,000 be provided to ENTRO to implement the project as formulated herein.

1. BACKGROUND

1.1 Origin of the Project

1.1.1 The Nile Basin Initiative (NBI) is a partnership for regional cooperation initiated and led by the riparian states[1] of the Nile River through the Council of Ministers of Water Affairs of the Nile Basin states/countries (Nile Council of Ministers, or NCOM). The NBI started with a consultative and participatory process of dialogue among the riparian countries that resulted in their adoption in 2009 of a "Shared Vision" - to "achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources" through sustainable and equitable development; efficient water management and optimal use of resources; cooperation and joint action between the riparian countries, seeking win-win gains; and targeting poverty eradication, and promoting economic integration.

1.1.2 The NBI has developed two sets of complementary and mutually reinforcing programmes to translate the Vision into concrete actions that benefit all peoples in the basin. One programme is the basin-wide Shared Vision Programme aimed at creating and sustaining the enabling environment for cooperative management and development of water resources; the other is the Subsidiary Action Programme (SAP) aimed at identifying and cooperatively developing projects to realize physical investments that yield win-win gains to all riparian states. For operational purposes the SAP is divided into two sub-basin programmes, one covering the Eastern Nile sub-basin, consisting of three states Egypt, Ethiopia, Sudan and recently the Republic of South Sudan (see location map – Annex 1); and the other is the Nile Equatorial Lakes sub-basin covering Burundi, Democratic Republic of the Congo , Kenya, Rwanda, Tanzania and Uganda.

1.1.3 The Eastern Nile Technical Regional Office (ENTRO), established by the Eastern Nile Council of Ministers (ENCOM) of water affairs in the three Eastern Nile countries, is responsible for managing the Eastern Nile Subsidiary Action Program (ENSAP), whose overall objective is the cooperative development of the water resources of the Eastern Nile Basin, which include the Baro-Akobo-Sobat River Sub-Basin, in a sustainable and equitable manner to ensure prosperity, security, and peace for all its peoples. In pursuit of this objective, ENTRO has formulated the Integrated Development of the Eastern Nile (IDEN) as a suite of integrated development projects including hydropower, irrigation and drainage, flood control, watershed management, and water resources management. Because of the river basin water and land resources potentials and the role the project can play in regional development and understanding, the Baro-Akobo-Sobat Multipurpose Water Resources Development Study Project became one of the seven (7) projects identified in the IDEN (4 on-going, 1 completed, 2 beginning).

1.1.4 It is against this background that the Eastern Nile Technical Regional Office of the Nile Basin Initiative submitted a funding application to the African Water Facility (AWF) and the NEPAD-Infrastructure Project Preparation Facility (NEPAD-IPPF) in November 2009, on behalf of the Eastern Nile Countries of Egypt, Sudan, Ethiopia, for support in undertaking a study of the Baro-Akobo-Sobat (BAS) Multipurpose Water Resources Development Project. Following the screening by the AWF and NEPAD-IPPF, and further dialogue mission to clarify a number of issues, the project was accepted for appraisal in March 2011.

[1] Burundi, Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda

1.2 Problem Definition

1.2.1 The main problem in the sub-basin (see location in Annex 1 and detailed context in Annex 9) is underdevelopment and under exploitation of the water and natural resources to improve livelihoods of the population in the sub-basin in particular, and the rest of the population in the EN countries in general. The South Sudanese part of the sub-basin has recently emerged from a long period of civil conflict and is in greater need for development. The Ethiopian part of the sub-basin is also relatively underdeveloped in comparison with the rest of Ethiopia.

1.2.2 The predominantly rural population in the sub-basin experiences high levels of poverty; the *One System Inventory* (ENTRO, 2007) shows that the poverty indicator varies from 50 to 70% across the sub-basin. As much as 12-30% of the population in some parts of the sub-basin depends on food aid. The main cause of food insecurity is the reliance on rain-fed subsistence farming in a region of high spatial and temporal rainfall variability. Access to water supply and sanitation is also relatively low. Though there are wide variations in access from one state/region to another, and between Ethiopia and South Sudan, national statistics show that in the Ethiopian part of the sub-basin less than 25% of the population has access to safe water supply. In the South Sudanese part of the basin much less than 25% of the rural population has access to safe water supply and much less has access to proper sanitation. Access to electricity is reported to be less than 17[2]% (2009). Presently the region lacks energy in the form of hydropower or thermal sources and the reliance on wood fuel for domestic energy needs continues to exacerbate deforestation and land degradation. Transport infrastructure is very poor; in particular there are no all-weather land routes between the two countries. The potential river transport between the countries is barely developed.

1.2.3 The sub-basin experiences frequent flooding and droughts, which worsens the vulnerability of communities as well as their livestock. Hydrological and climate variability are high and are likely to be more affected by climate change. Population pressure (Ethiopia and Sudan both have annual growth rates exceeding 2.6%) is exacerbating deforestation and together with poor land use practices, it leads to significant land degradation. Furthermore the sub-basin has very important wetlands (the Machar Marshes) that are of international importance. The wetlands have very significant effects on the hydrology of the sub-basin; and they are an important habitat for wildlife as well as livestock. The Baro-Akobo-Sobat sub-basin is a highly sensitive environmental zone.

1.2.4 Despite the low levels of socio-economic development, the Baro-Akobo-Sobat sub-basin has tremendous potential for utilization of water and other natural resources. The hydropower potential in the highlands of the Ethiopian portion of the basin and in the southern tip in South Sudan has not been exploited sufficiently. Previous studies identified about 15 potential dam sites in the Ethiopian part of the river basin[3], one of them being already studied at feasibility level. Studies in the Ethiopian part of the basin indicate that no more than 3% of the estimated (480000 ha[4]; net area) irrigable land has been developed; in South Sudan more than 95% of cultivable land has not been developed. The basin area already has evidence of rapid commercial development of irrigated agriculture, particularly on the Ethiopian side where more than 22,000 ha is currently under

[2] Ethiopia renewable energy country profile; IRENA; without date

[3] Baro Akobo River Basin Development study; 1997; TAMS / ULG

[4] One system inventory ; ENTRO 2007

preparation for irrigation of rice and sugar cane. This development may have significant impacts on biodiversity (biological corridor breaks and forest clearing). Moreover, water resources availability in the dry season does not appear to allow a large irrigation development if not accompanied by upstream storage infrastructures. These infrastructures could also improve navigation and flood control; and foster fisheries development, fish resources are abundant but have not been exploited in full; and the wetlands and associated wildlife could bring substantial socio-economic benefits if exploited for tourism.

1.2.5 In light of the above, it is evident that water is a critical factor for livelihood and socio-economic development in the basin. The BAS project has been formulated to address the cooperative development and management of water resources to foster investments so as to facilitate socio-economic development of this part of the EN region.

1.3 Sector Strategies and Priorities

1.3.1 The BAS project is one of seven projects of ENTRO's Integrated Development of the Eastern Nile (IDEN) programme aimed at facilitating regional, integrated, multi-purpose infrastructural developments benefiting more than one country in the region and thus promoting cooperation and regional understanding. Other projects comprise:- (i) Eastern Nile Planning Model (just launched); (ii) Flood Preparedness and Early Warning (on going); (iii) Ethiopia-Sudan Transmission Interconnection (on going); (iv) Eastern Nile Power Trade Investment Programme (completed), (v) Irrigation and Drainage (on going); and (vi) Watershed Management (on going). All the EN countries (through the Ministers of water resources) have written to ENTRO in support of the BAS project.

1.3.2 Water is well prioritized in Ethiopia's development strategies, particularly the "agricultural led industrialization strategy" that emphasizes effective utilization of water resources to drive agricultural productivity through irrigation development. The water sector, especially the hydroelectricity generation aspect, is also prioritized in the Bank's Country Strategy for Ethiopia for 2011-2015. This is in addition to several electrification, agriculture and fisheries, flood mitigation and watershed projects in the country. IWRM is firmly anchored in the country's Water Resource Management Policy, and Water Resources Strategy. There is strong emphasis on utilizing the abundant endowment of water resources in the country. However, trans-boundary cooperation is well accepted and Ethiopia has strongly supported the proposed BAS project. The Bank's Regional Integration Strategy Paper for East Africa also emphasized inadequate and poor regional infrastructure network, water scarcity and difficulty in managing shared water resources as one of the key challenges in the region. This study will thus contribute to mitigating this challenge.

1.3.3 The Government of South Sudan developed a Water Policy in 2007 which covers the various sub-sectors of the water sector, such as Water Resources Management, Rural Water Supply and Sanitation, and Urban Water Supply and Sanitation. It also has recently developed a Strategic Framework for the Water, Sanitation and Hygiene Sector. The Water Policy puts priority on "Exploring the potential of trans-boundary water resources and identify existing opportunities for their exploitation". Thus the BAS project is consistent with policy direction of the Republic of South Sudan.

1.4 Rationale for AWF and NEPAD IPPF Support

1.4.1 The project is aimed primarily at project preparation for strategic capital investment in water infrastructures in the sub-basin thus improving livelihoods and alleviating poverty. The preliminary activities – technical, social and environmental, institutional and economic viability assessments – are all necessary prerequisites for identifying investment projects that offer tangible benefits to the people in the BAS sub-basin. They are required also to demonstrate that the planned investments will generate shared benefits between the Eastern Nile riparian countries. Thus the ultimate outputs are very much at the core of NEPAD-IPPF objectives ("to prepare high quality, viable regional infrastructure projects in energy, water, transport and ICTs, which would be ready to solicit financing from public and private sources"). It is also consistent with revised AWF's first strategic priority – "Leverage investments through project preparation". The possible leverage effect of this project is tremendous, since, due to land and water resources in the Sub-basin, the potential investments and could reach hundreds of millions of Euros.

1.4.2 The project sets out to develop the Integrated Water Resources Management and Development Plan of Baro-Akobo-Sobat Sub-basin. The project therefore would facilitate the development of an important instrument for the management and development of water resources in the EN states of South Sudan and Ethiopia. The plan is an important tool for leveraging investment as well since it sets the context within which water resources development will take place, and will lead to a shared agreement on an investment plan between the Eastern Nile riparian countries. This is very consistent with the revised AWF strategic priority n° 2: "Enable Governance for sustainable and effective investments".

1.5 Stakeholders and Donor Harmonisation

1.5.1 The key stakeholders consist of the government institutions in the EN countries, particularly central and local government agencies responsible for water resources, agriculture, environment, finance and economic development, national statistics, and international cooperation. Others are utility companies dealing with hydropower, water supply and sanitation, tourism and transport. Many of these stakeholders were consulted in the course of appraising the project and they offered their views on the expected developments. In the course of implementing the project their inputs and contributions will be sought as part of stakeholder consultations for purposes of furnishing information on their respective development plans, and critical review and validation of project outputs.

1.5.2 Stakeholders also include a number of international and local NGOs and faith based organizations, many of whom are involved in emergency programmes or relief services. They include Africare (domestic water supply and agriculture), Catholic Relief Services (health and agriculture), and Ethiopian Orthodox Church (rehabilitation of social infrastructure), Mekane Eyesus Protestant Church (education, health). These organizations welcome the BAS project as it heralds economic development in an impoverished and previously neglected region.

1.5.3 The other class of stakeholders consists of donors who are supporting various programmes through ENTRO. Currently support to ENTRO includes the World Bank, Norway, DFID, France, GEF, The Netherlands, Italy, JICA, and the African Development Bank. Most of these were consulted during the appraisal of the BAS project so as to harmonize interventions. The

development of water resources management and development plan would provide a sound framework for anchoring the support and assistance from the donors. They all confirmed their interest in the project and their willingness in supporting the NBI.

2. PROJECT DESCRIPTION

2.1 Project Objectives and Outcomes

2.1.1 The **overall goal** of the project is "to promote socio-economic development, regional cooperation and understanding through basin-wide cooperation in sustainable water resources development and management in the Eastern Nile region".

2.1.2 The **project objectives** are "to set the basis for a sustainable water resources management in the Sub-basin" and "to increase investment in the water sector in the Sub-basin".

2.1.3 The main development **impacts** of the project are (i) improved cooperation among sub-basin states in trans boundary water resources management; (ii) Increased access to drinking water and sanitation in the Sub-basin, (iii) Increased access to electricity for the population in the sub-basin, in particular, and the rest of the EN states; (iv) Enhanced Sub-basin food security; (v) Improved navigation on main watercourses in the sub-basin; (vi) Improved environmental sustainability in the Sub-basin. The project will lead to the identification and preparation of potential investment projects for water supply and sanitation, irrigated agriculture, hydropower, navigation, flood control, water security through multi-purpose reservoirs, and sustainable management of wetlands and water resources. In total these projects will significantly improve socio-economic conditions in the sub-basin and the region as a whole. A secondary impact is greater cooperation among the EN states in managing their shared water resources thus fostering cooperation in the region.

2.1.4 The expected potential **outcomes** of the project will consist of:

- Improved cooperation among Sub-basin states in trans-boundary water resources management through the endorsement of both an Integrated Water Resources Development and Management Plan and an enhanced institutional framework;
- Donors and national governments committed to funding or preparing projects for around € 60 million.

2.2 Project Components, Outputs and Activities

2.2.1 The project is structured under four components whose outputs and activities and cost estimates are presented below. These components are closely related and overlapping. The activities in the first component are aimed at defining a water resources investment and management plan taking into account environmental, social, institutional and economical issue. The second and third components then build upon this by identifying and selecting investment projects for further project preparation; while the fourth component, running throughout the duration of the project, provides support or facilitation for the implementation of the previous three components. These activities will be undertaken through consultancy services to ENTRO as described through the Terms of Reference (see Annex 3). Annex 2 present the sequence of the activities.

2.2.2 Component 1: Integrated Water Resources Development and management Plan based on a comprehensive Strategic Assessment

The Integrated Water Resources Development and Management Plan is aimed at promoting a shared vision of (i) the future development of the river basin (detailed in an investment plan); (ii) the principles of water resource management as well as water-linked ecosystems management and, (iii) the institutional framework required for the implementation of the plan, including proposal of new institutional framework

The Strategic Social and Environmental Assessment (SSEA) is a process that promotes the inclusion of environmental and social criteria in policy-making and planning. By assessing, social, economic, financial, environmental, and institutional impacts associated with potential development options, as well as their technical feasibility, it facilitates screening out inappropriate or unacceptable projects at an early stage, and minimizing the risk that projects would have encountered due to environmental and social considerations. The assessment is performed in close consultation, and in transparent manner, with key stakeholders in the region.

Both processes are intimately connected so as to ensure well informed and transparent decision making in the planning course.

The development plan may include projects in the field of hydropower, irrigation, navigation, flood mitigation, rain fed agriculture and fisheries development, as well as eco-tourism.

Activities:
The activities will include:

(i) Scoping: definition of the geographical coverage and thematic scope of the baseline completion, based on the type of investments as well as on their main impact.

(ii) Baseline completion and assessment of development potentials: building on existing studies[5] and existing databases (such as the One System Inventory) as well as additional necessary surveys, establish socio-economic and environmental baseline for the basin; assess development potentials and needs for water supply and sanitation, hydropower, irrigation, navigation, flood control, rain fed agriculture, livestock, fisheries and eco-tourism, with a particular focus on the South Sudanese part of the river basin where those potentialities are still not quantified. The level of data and information in the Ethiopian part of the sub-basin is relatively higher than that in the South Sudanese part. The Consultant will concentrate efforts on the South Sudanese side of the sub-basin, in order to upgrade the baseline information to a level similar to that on the Ethiopian part of the sub-basin.

(iii) Key issues and objectives definition: Determine the objectives of a sustainable water resources management in terms of water uses, water quality, wetland protection and preservation, fisheries, flood and drought management, morphodynamic evolution of the river; Propose water resources development options consistent with these objectives;

(iv) Development option assessment: Identify social and environmental impacts associated with each development option and propose mitigation measures; propose an institutional framework favorable to the implementation of the development options. Economically

[5] See Annex 4 References/Documents

compare the options, and select the option that best satisfy the development objectives, taking into account social, economic, institutional and environmental considerations;

(v) Integrated water resources development and management plan: prepare an Integrated Water Resources Management and Development Plan listing short, medium and long term investment and development projects; Estimate the investment costs, refine economic analysis and develop a benefit sharing framework to facilitate adoption of the development plan by all riparian states and stakeholders; Propose an institutional framework (including if relevant public-private-partnerships).

The process is anchored on participatory and inclusive consultations with key stakeholders in the three EN countries and will build upon relevant studies and documentation. While the focus area is the Baro-Akobo-Sobat sub-basin, assessment of impacts will necessarily consider areas beyond the confines of the sub-basin.

Outputs :

- Scoping report
- Baseline, key issues and objectives reports
- Development potentials and Options Report
- Assessment of Options Report
- Integrated Water Resources Management and Development Plan, with prioritized list of short, medium and long term development projects and indicative capital costs
- Project profiles for all projects in the plan
- Institutional framework for the implementation of the plan as well as for the integrated water resource management

2.2.3 Component 2 - Preparation of priority projects

The early selection and preparation of priority projects is aimed at building confidence among the stakeholders by demonstrating that concrete projects are being implemented on the ground.

Activities:

As early as possible during the baseline completion phase identify, screen and select, in a transparent, participatory and consultative manner, two short-term water resources development projects that can be prepared in relatively short time, are relatively less complex, and capable of bringing quick benefits to the community when implemented. A third long term project will be selected as soon as the Integrated Water Resource Development and Management Plan is advanced enough to allow the selection of one priority major infrastructure project. Carry out feasibility studies (infrastructure projects) or project design reports (development projects) including social, economic and financial analyses, environmental impact assessments, and institutional arrangements to prepare the projects for implementation. These projects may involve water supply and sanitation, adaptation to climate change, small scale irrigation, flood damages mitigation, navigation, watershed management, eco-tourism development, etc. The projects should be strategically located in the sub-basin to foster trust and build confidence of the riparian communities. The preparation should put the projects at the point of readiness for implementation subject to availability of financing, to be sourced from government and development partners.

Outputs:

- Feasibility Study Reports (infrastructure projects) or project design reports (development projects) for two selected Short Term Projects and one long term project, complete with detailed cost estimates, social, economic and financial analyses, environmental impact assessments, institutional arrangements and implementation schedule.

2.2.4 Component 3 - Identification of Medium to Long Term Projects

Two other medium to long term projects (infrastructure) will be identified; these projects shall be regional in nature and trans-boundary in scope offering win-win benefits to the EN countries.

Activities:
The activities will include (i) Based on analysis of economic development trends in the region, technical and economic comparison of the development options, as well as environmental and social considerations, develop a priority sequence of the projects; (ii) Elaborate roadmap for project preparation, and (iii) Prepare terms of reference and cost estimates for detailed preparation of the priority projects (feasibility studies, or preliminary/detailed design and construction supervision, depending on status of project).

Outputs
- Terms of Reference for project preparation for 2 medium and long term water resources development projects
- Roadmaps for project preparation

2.2.5 Component 4 - Project Management and Implementation Support

Project management

Activities:
Establish a Project Implementation Team (PIT) with necessary staff and facilities to be able to carry out day to day implementation of the project including general coordination, detailed work planning, procurement of consultancy services and supervision of consultancies, technical and financial management and reporting, supporting stakeholder consultations. The PIT will elaborate a results-based framework for monitoring the implementation of the project, and prepare the necessary progress (technical and financial) reports for ENTRO and submission to the AWF/NEPAD-IPPF.

Output:
- Project Implementation Team established in ENTRO
- Project monitoring and evaluation system established and implemented

Stakeholders consultation

Activities:
Multipurpose integrated water resources development requires inclusive, participatory and effective engagement of all stakeholders. For this purpose firstly carry out a stakeholder identification and analysis to provide sound basis for planning the engagement of stakeholders relevant to BAS sub-basin. Secondly, develop a consultation and communication plan (clear objectives of each

consultation event, target audience, time schedule, venue, organizational arrangements, and programme), and then develop relevant information and communication materials for the various stakeholders and target groups. The plan will build on the earlier ENTRO stakeholder analysis and related regional and international good practices on consultation and communication. Stakeholder consultations would then take place in accordance with the plan, throughout the life of the project, but particularly at key decision points.

Output:

- Stakeholder Consultation and Communication Plan
- Information and Communication (I&C) materials for the consultation process
- Stakeholder Workshops carried out according to plan

Resources Mobilization

Activities:

In order to facilitate resource mobilization to finance the investments identified for short term projects and for detailed project preparation, a number of activities will be carried out:- (i) develop a financing plan to guide resource mobilization, including an assessment of the potentials for public-private-partnerships; (ii) engage with donors and national governments early (regular consultations, face to face meeting aiming at promoting the project, participation in stakeholder meetings/workshops) so as to strengthen their support in funding potential investments; and (iii) prepare and conduct a donor's round table to promote the project to potential funders including private sector.

Output:

- Financing Plan for water resources development in the BAS sub-basin
- Donors successfully involved in the project

2.3 Beneficiaries, Target Areas and Populations

2.3.1 The project will provide immediate and long term benefits to various stakeholders at community, national, regional and external levels in the following manner:

i) Governments of the Eastern Nile, as well as the local government at regional/state levels, will have the Integrated Water Resources Management and Development Plan endorsed by key stakeholders in the sub-basin, to guide the development and management of water resources in the Baro-Akobo-Sobat sub-basin. This will be an important instrument for coordinated and cooperative development and management of water resources in the sub-basin; and this will enhance long term cooperation and understanding. The governments of the EN countries and of their regions/states will be closely involved, through systematic consultations, throughout the plan development process.

ii) ENTRO, a regional body with the mandate for fostering trans-boundary cooperation in water resources will also have an investment plan for short, medium and long term development of water resources in the Baro-Akobo-Sobat sub-basin. The plan will aid and inform resource mobilization necessary for water infrastructure investments in the basin. It will also legitimize this institution toward the EN states.

iii) Development partners supporting water development in the Eastern Nile region will find the Development Plan a useful instrument for decision making regarding the types of projects to be supported in the region.

iv) The 3.6 million people living in the Baro-Akobo-Sobat sub-basin are expected to be direct beneficiaries of the various multi-purpose water resources development projects that will be implemented as direct outputs of the planning process in which they will have participated. The projects, which may include water supply and sanitation, hydropower development, irrigation, flood control, drought management, navigation, fisheries, watershed management and tourism will bring direct socio-economic benefits and reduce poverty. The rest of the population living in the Eastern Nile region (estimated at 200 million people) will also benefit from the projects developed in BAS since many of the outputs, such as electricity, increased food production, navigation, and flood and drought management will have direct impact beyond BAS.

2.3.2 The target area for the project is the Baro-Akobo-Sobat sub-basin (see Annex 1) encompassing about 185,000 km^2 that stretches from southwestern Ethiopia to southeastern and central Sudan. In South Sudan the sub-basin covers the entire administrative units (states) of East Equatoria and Jonglei and a small portion of Upper Nile; while in Ethiopia the sub-basin covers the administrative units (regions) of Oromiya, Gambela and Southern Nations, Nationalities, and People's Region (SNNPR). The part in South Sudan has recently emerged from civil conflict which had precluded any sustainable socio-economic development. Even the Ethiopian part is geographically remote and has lagged behind other regions in development.

2.3.3 Based on UN Population Fund estimates as well as the estimates and projections by official Central Statistical Authorities in Ethiopia and Sudan, the year 2002 population in the sub-basin is 3.6 million people. About 2.7 million live in the Ethiopian part of the basin, 80% of whom live in rural areas. About 0.9 million people live in South Sudanese part of the basin, more than 90% of whom live in rural areas. The project-related outcomes for this target group include increased food and energy security, reduction in poverty, reduced vulnerability to floods and drought, sustainable management of natural resources and climate variability and change.

2.4 Project Costs and Financing Arrangements

2.4.1 The total cost of the project is estimated at €3,050,000. The cost estimates are based on unit rates for consultancy services on on-going projects in ENTRO. Table 2.1 summarises the costs by component; the details are given in Annex 5. The costs do not include taxes (as AWF and NEPAD-IPPF funds will not be used to pay Government taxes and duties), and ENTRO confirms that no taxes are levied on ENTRO expenditures in all the EN countries. A provision of 5% of the cost has been added to the costs to cover contingencies (primarily financial contingencies). The total cost of €3,050,000 will be financed by AWF grant of €2,000,000 (66% of total cost), a NEPAD-IPPF grant of US$667,000 (equivalent €500,000) (16% of total cost), ENTRO's participation to the management costs[6] for €290,000 (10% of total costs) and €260,000 in-kind contributions (9% of

[6] PIU salaries (except for the Project Coordinator, financed by both AWF and NEPAD-IPPF) and all operating costs (vehicles and vehicles running costs, consumables, electricity, internet, telephone, staff insurance, bank charges, offices including offices for the Consultant, etc.).

total cost) by the member states covering the costs of national project coordinators, national representatives on the Project Steering Committee and the Regional Technical Committee[7]. The AWF grant will cover all components including payment for the Project Implementation Team (the BAS Regional Project Coordinator); and NEPAD-IPPF grant also covers all components.

Table 2.1: Cost by financial sources (Euros)

Component	AWF	NEPAD	ENTRO	Governments	TOTAL COST
Component 1: Integrated Water Resources Development and Management Plan based on a SSEA - consultancy (1)	1 016 000	254 000			1 270 000
Component 2: Preparation of short term projects - consultancy	504 000	126 000			630 000
Component 3: Identification of medium to long term projects - consultancy	80 000	20 000			100 000
Component 4 - Project Management and stakeholders consultation	299 520	74 880	290 000	260 000	924 400
Consultancy	*80 000*	*20 000*			*100 000*
Stakeholders consultation	*104 000*	*26 000*			*130 000*
Project Implementation Team	*115 520*	*28 880*	*290 000*	*260 000*	*694 400*
Contingencies (5%)	100 480	25 120			125 600
Total	**2 000 000**	**500 000**	**290 000**	**260 000**	**3 050 000**
Share	**66%**	**16%**	**10%**	**9%**	**100%**

(1) including consultancy costs related to stakeholders consultation and resource mobilization
Note: NEPAD-IPPF contribution is US$667,000, equivalent Euro 500,000 at March 2011 average exchange rate.

[7] Including office costs and vehicle costs

2.4.2 Table 2.2 presents the costs by category.

Table 2.2: Project Cost by Category (Euros)

Item	AWF	NEPAD	ENTRO	Governments	TOTAL COST
Goods: operating costs			**90 000**	**50 000**	**140 000**
Services	**1 899 520**	**474 880**	**200 000**	**210 000**	**2 784 400**
Consultancy	1 680 000	420 000			2 100 000
Project Coordinator	115 520	28 880			144 400
Stakeholders consultation (workshops and seminars)	104 000	26 000			130 000
Project Implementation Team salaries			200 000		200 000
National coordinators and other countries costs				210 000	210 000
Contingencies	**100 480**	**25 120**			**125 600**
Grand total	**2 000 000**	**500 000**	**290 000**	**260 000**	**3 050 000**

2.4.3 Table 2.3 presents the breakdown between foreign and local costs

Table 2.3: Project Cost breakdown – local and foreign currencies (Euros)

Component	Foreign currency	Local Currency	Total
Component 1: Integrated Water Resources Development and Management Plan based on a SSEA - consultancy (1)	1 270 000		1 270 000
Component 2: Preparation of short term projects - consultancy	630 000		630 000
Component 3: Identification of medium to long term projects - consultancy	100 000		100 000
Component 4 - Project Management and stakeholders consultation	374 400	550 000	924 400
Contingencies (5%)	125 600		125 600
Total	**2 500 000**	**550 000**	**3 050 000**

2.5 Technical, Economic and Financial Viability

2.5.1 The project is aimed at cooperative approach and integrated management and development of water and related natural resources in the BAS sub-basin. Unilateral development, by each state, of a strategic resource in a region already facing water stress would heighten tension and instability among the EN states and endanger cooperation and development. By involving stakeholders, and

communicating and consulting them, the development process should lead to acceptance and ownership of the plans and projects to be developed. The EN countries are already cooperating, through the NBI framework, in exchanging data and information on water resources development in the region. This cooperation will be strengthened by participation of government officials from the cooperating countries in the Project Steering Committee as well as the Regional Technical Committee (see Section 3.2 below). Moreover, the national project coordinators (see section 3.2.5 below) will be in charge of ensuring a proper participation of their governments in the project. The studies do not involve complex technology; even the hydrological and hydraulic modeling envisaged will utilize standard packages that are readily available on the market. ENTRO should be able to engage consultants with adequate experience and expertise to carry out this work. In light of the above factors, it is technically viable to implement the project.

2.5.2 This project is not an investment project with easily quantifiable/tangible stream of benefits on which to base economic and financial analysis. This is a "preparation project"; the "direct benefits" include the integrated water resources development plan with short, medium and long term projects that have been assessed as environmentally and socially sound; improved baseline information on water and related natural resources in the sub-basin; and improved cooperation among stakeholders in the sub-basin through participation in the planning process and steering or supervisory/advisory committees. The long-term "associated benefits" include the infrastructural investments that flow from the planning process under the project. The cost of this project is therefore relatively small compared to the cost of infrastructural development that the project will engender (potentially hundreds of millions of Euros). Viewed in this light, the project is economically and financially viable.

2.6 Environmental and Social Impact

2.6.1 As part of the SSEA, potential environmental and social impacts of any future water resources development interventions in the sub-basin will be systematically assessed and mitigation measures incorporated in the projects identified through the planning process. The potential environmental impacts will depend on the nature of the projects and the scale of development. Some of the anticipated environmental impacts of water infrastructure development may include changes in the river flow regime including geomorphologic changes; degradation of water quality from decomposing vegetation in the areas of new impoundments as well as from river dredging; changes in sediment regime downstream of new dams; evolution in the location of the areas favorable to recession agriculture; loss of grazing/forest land as a result of inundation from new dams; reduction of fishes population due to interruptions of the aquatic corridor and reductions of flood plain extension linked to the new dams; and pollution from fertilizers and pesticides and herbicides on large scale irrigation farms. Social impacts on community livelihoods will be assessed and mitigation measures adopted in all projects.

2.6.2 Wetlands cover over 7 percent of the Sub-basin including the Machar Marshes and the Gambella marsh and swamps. These seasonal and permanent vegetation or wetlands are vital areas for fish spawning and fry rising for the local population and as grazing areas for livestock during the dry season. They also support the unique habitat for a mired variety of wildlife species. In some areas, where upslope erosion has been particularly severe, drained wetlands have become the major source of food production, leading to complete loss of wetlands in the highland areas. The driving forces for wetland drainage cultivation, especially on the Ethiopian side are food shortages, growing market opportunities for wetland plants such as tef, some vegetables and green maize, land tenure change due to expansion of commercial farms, new village resettlement programs aimed at settling

and converting traditionally pastoralist communities to agricultural communities. The study will take special note of the importance of the wetland in the sub-basin and will apply innovative best practices to minimize adverse impacts on the wetlands as a result of the proposed investment projects.

2.6.3 Gender and social equity considerations will be mainstreamed into the implementation of the project:

(i) Stakeholder involvement, consultation and communication are critical factors in the implementation of the project. Adequate measures will be taken to ensure effective involvement of women and their representatives in all decision making processes of the project – planning, project selection and impact assessment
(ii) All infrastructure projects will be design with the objective of ensuring equitable access to services (water supply and sanitation, irrigation, power supply, navigation, etc.);
(iii) The proposed institutional framework will ensure that voices of all concerned population groups are heard, in particular those of women;
(iv) The SSEA process will focus on assessing specific impacts on women and other vulnerable groups (relocation, migratory labor forces, etc.)

2.6.4 Climate change and variability have a significant influence on availability of water resources, operations of water infrastructure, and invariably, on droughts and floods in the sub-basin. The impact of climate change and variability will be taken into account in the definition of water resource management plan as well as in project identification, and project preparation. The whole investment plan will be climate proof. The opportunity of preparing short term projects in the field of climate change adaptation will be assessed in component 2 (preparation of short term projects). Moreover the impact of the identified projects on the climate will be assessed by carrying out carbon balances.

3. IMPLEMENTATION

3.1 Recipient

3.1.1 The recipient of the AWF and NEPAD-IPPF grants is the Eastern Nile Technical Regional Office (ENTRO) which was established by the Eastern Nile Council of Ministers pursuant to the ENCOM decision of the 9/12/2002 session. ENTRO is vested with a legal personality to perform all functions entrusted to it by ENCOM, including facilitating cooperative development and management of water resources in the Eastern Nile sub-basin. It has its registered offices in Addis Ababa, Ethiopia and enjoys privileges and immunities in the territory of each ENSAP State.

3.1.2 The Executive Director, ENTRO will sign the grant agreements with AWF and NEPAD-IPPF and be responsible for the implementation of the project including management of funds, procurement of associated works, goods and consulting services. ENTRO is a well-established institution with managerial and technical capacity to successfully implement this project. ENTRO has long experience in managing donor funds for a variety of regional water projects including two AfDB funded projects (see annex 10).

3.2 Project Organizational Setup

3.2.1 Considering the scope of the project, its multi-sectorial and trans-boundary nature, ENTRO agreed with the appraisal mission the implementation arrangements for the project. The organizational setup is shown in Annex 6 and described below.

3.2.2 **Project Implementation Team (PIT)**: ENTRO will establish a Project Implementation Team headed by a full time Project Coordinator (Integrated Water Resource Management Specialist) to be responsible for implementation of the project (position funded by AWF and NEPAD-IPPF). The other PIT members will be members of ENTRO's staff, and will provide part-time inputs. They consist of senior staff of ENTRO, namely:- Senior Regional Project Coordinator, Social Development (including gender) and Consultation Specialist, Environmental Specialist, Regional Financial and Administration Manager, Senior Accountant, Senior Procurement Expert and System Administrator (ENTRO's contribution). The Project Coordinator is to manage the day to day activities working with the team to ensure the quality of the deliverables and the smooth implementation of the project. The Terms of Reference of the Project Coordinator is presented in Annex 7.

3.2.5 **National Project Coordinators**. Each country will assign a national project coordinator from the ministry dealing with Water to serve as primary focal point for BAS activities at national level. He/She will be member of the PIT and provide overall coordination of national level activities, facilitate consultation and information exchange, including organizing meetings of stakeholders. This will strengthen participation of the governments of the EN countries and enhance project ownership.

3.2.3 **Regional Technical Committee (RTC)**, a regional, multi-sectorial advisory and consultative body, will consist of 5 members from each country from ministries of water, energy, agriculture/irrigation, finance/planning, and environment; and the ENTRO Senior Regional Project Coordinator. The RTC will be chaired by the Senior Regional project Coordinator, and responsible for providing technical guidance and oversight to ensure that the project technical activities are implemented as planned; reviewing study reports, and providing inputs and comments in line with Terms of References for the study as well as meeting overall objectives of the project. The RTC is free to invite guests on occasion to provide independent specialist advice or inputs.

3.2.4 **Project Steering Committee (PSC)** will be a high level committee comprising members of the ENSAPT, senior level national representative from ministry dealing with water resources in each country, and ENTRO Executive Director. The PSC is responsible for policy guidance and direction; it will ensure that the project objectives are achieved, and the project is executed within budget and on schedule; review and decide on the appropriateness of the recommendations made by various studies; provide recommendations on key policy and financial issues relating to the smooth implementation of the study; and report to ENSAPT/ENCOM on strategic issues requiring decisions.

3.3 Procurement Arrangements

3.3.1 All procurement of works, goods and acquisition of consultancy services financed by AWF and NEPAD-IPPF are summarised in Table 3.1 and shall be in accordance with the AWF's and

IPPF's *Operational Procedures*, the Bank's *Rules and Procedures for Procurement of Goods and Works*, or as appropriate, *Rules and Procedures for the Use of Consultants*, using the relevant Bank Standard Bidding Documents.

Table 3.1 - Summary of Procurement Arrangements

Item	Funded by	Amount €	Procurement mode
Goods: operating costs	**ENTRO /Governments**	**140 000**	**ENTRO/Governments' procedures**
Services		**2 784 400**	
Consultancy	AWF/NEPAD	2 100 000	Quality Cost Based Selection
Project Coordinator	AWF/NEPAD	144 400	Short List Individual Consultants
Stakeholders consultation (workshops and seminars)	AWF/NEPAD	130 000	Shopping/Direct purchase
Project Implementation Team salaries	ENTRO	200 000	ENTRO's procedures
National coordinators	Governments	210 000	Governments' Procedures
Contingencies		**125 600**	
Grand total		**3 050 000**	

Goods

3.3.3 All PIT operating costs (vehicles, furniture, internet access, offices – including the offices for the consultant, etc.) will be covered by ENTRO. Procurements will be made accordingly to ENTRO's procedures. Cars will be provided by ENTRO from its pool, based on the PIT operations requirements.

Consultancy Services

3.3.4 Consultancy services will be needed for the assessment of development options, development of the integrated water resources management and development plan, project preparation for short, medium and long term projects, stakeholder consultations, and resource mobilization. These activities are closely related and interlinked. Therefore to optimise use of resources, information sharing, and to improve coordination, the procurement is packed under a single consultancy contract. The procurement will be through competition following Short-Listing (SL) procedures and utilizing the quality- and cost-based selection (QCBS) method. The contract is valued at Euro 2 100 000.

3.3.5 The project will recruit a long-term consultant (35 months), including project completion phase) in ENTRO as BAS Project Coordinator. Procurement will be on the basis of Individual Consultant method. The contract value is Euro 144 600, including per diem for missions.

3.3.6 When the amount of a Consultancy contract is less than UA 200,000, the Borrower may limit the publication of the Specific Procurement Notice (SPN) requesting for expressions of interest to

national or regional newspapers. However, any eligible consultant, being regional or not, may express his desire to be short-listed. For contract valued at more than UA 200,000, advertisement of the procurement must be placed on the UNDB online and the Bank's website.

3.3.7 The Executing agency will take advanced procurement measures in the selection of the consulting firm and the individual consultant to ensure a fast track implementation of the project activities.

Workshops / Seminars

3.3.8 In addition, the project will support logistics and travel expenses for stakeholder consultations including workshops and meetings of the Project Steering Committee and the Regional Technical Committee for a total cost of Euro 130,000. These services will be carried out based on an approved annual work program including the nature of the activities and the estimated cost subject to prior review by the Bank. Hotels and food services will be purchased according to the shopping procedure. Air plane tickets, Per Diem and miscellaneous expenses will be purchased directly.

3.3.9 ***Assessment of the Executing Agencies:*** The mission assessed the capacity of ENTRO to implement the procurement activities and was satisfied that the procurement section of ENTRO consisting of a Senior Procurement Expert, Procurement Officer and assistants is capable of implementing procurements under the project. They have sufficient experience with the Bank's rules and procedures and have carried out procurements on the African Development Bank projects or those of the Word Bank.

3.3.10 ***General Procurement Notice:*** The text of a General Procurement Notice (GPN) will be agreed with ENTRO and it will be issued for publication in UN Development Business online, on the Bank's web site, and on ENTRO's website upon approval by the Board of Directors of the financing agreement.

3.3.11 **Procurement plan:** The Executing Agency shall prepare and submit to the Bank a Procurement Plan based on Bank's template, before the negotiations of the project. The Bank shall review the procurement arrangements proposed by the Grant Recipient in the Procurement Plan for its conformity with the financing Agreement and its Rules. The Procurement Plan shall cover an initial period of at least 18 months. The Grant Recipient shall update the Procurement Plan on an annual basis or as needed always covering the next 18 months period of project implementation. Any revisions proposed to the Procurement Plan shall be submitted to the Bank's prior no objection. The Grant Recipient shall implement the Procurement Plan in the manner in which it has been agreed with the Bank.

3.3.12 ***Prior Review:*** All the acquisitions of Consultancy services under this project are subject to prior review. The following documents are subject to review and approval by the Bank before promulgation: ❍ General Procurement Notice, ❍Request for Expression of Interest, ❍ Shortlisting report, ❍ Requests for Proposals from Consultants❍ Reports on Evaluation of Consultants' Technical Proposals ❍ Reports on Evaluation of Consultants' Financial Proposals including recommendations for Contract award, minutes of negotiations and duly initialed contracts documents.

3.3.13 ***Post review***: Contracts of goods and services valued up to Euro 5.000 shall be approved by the Executing agency and will be subject to post review by the Bank. Procurement documents including solicitations of price quotations, evaluation sheets and contract awards will be kept by the EA for periodic review by Bank's supervision missions. The procurement post review audit to review the correctness of the procurement activities will be carried out during the first supervision mission after the procurement activities are completed.

3.4 Disbursement Arrangements

3.4.1 The consultancy services fees (firm), estimated at € 2 205 000 (including related contingencies), shall be paid through the Direct Payment Method upon verification and certification of invoices by the PIT, in accordance with the Bank's disbursement rules and procedures.

3.4.1 All other expenses, estimated at € 295 000 (including related contingencies), will be disbursed through the Special Account method in two tranches. The Recipient will open one Special Account for the AWF grant, denominated in Euros in a bank in Addis Ababa on terms and conditions acceptable to AWF; and another Special Account for NEPAD-IPPF grant, denominated in US Dollars on terms and conditions acceptable to NEPAD-IPPF. Expenditures for activities in each of the Member States will be paid for directly from the Special Accounts in Addis Ababa.

3.4.2 The disbursement of the AWF and NEPAD-IPPF grants will be made in two tranches. The Special Accounts will be replenished on the condition that the first advances have been utilized and justified up to at least 50 per cent, and that a work plan acceptable to the Bank is submitted. A disbursement schedule based on the activity implementation schedule is presented in Table 3.2 below. The Executing Agency shall prepare and submit to the Bank an overall project disbursement schedule based on the final Consultancy schedule of payment.

Table 3.2: Disbursement Schedule for special account (Euro)

	1st Tranche	2nd Tranche	Total
AWF	118 000	118 000	236 000
NEPAD-IPPF	29 500	29 500	59 000
Total	147 500	147 500	295 000
% of Total	50%	50%	100%

3.4.3 The mission assessed the capacity of ENTRO to operate a Special Account and found out that ENTRO is completely familiar with this disbursement procedure having operated special accounts on previous projects financed by the African Development Bank and by the World Bank. The Bank Country Office in Ethiopia is expected to provide its support for managing the project Special Accounts.

3.5 Financial Management and Auditing

3.5.1 The mission assessed with ENTRO their capacity for financial management of the project and concluded that the Finance and Administration Unit (FAU) has qualified and well experienced staff and accounting systems and control measures to be able to manage the project. ENTRO uses Microsoft Dynamic Solomon accounting software which has adequate capacity to produce financial statements of the project. The FAU is presently managing project funds coming from a number of cooperating partners such as the World Bank, the African Development Bank, Norway and Finland.

3.5.2 The FAU will be responsible for financial management of project funds; they will keep accounts and prepare financial reports as required by AWF and NEPAD-IPPF. The AWF and the NEPAD-IPPF will require that a statement of expenditure and supporting documents review be performed and certified by an independent auditor at mid-term and at the end of the project or at any time the AWF judges appropriate, to ensure that funds have been utilized in line with the grant agreement. The costs of such audit shall be charged to AWF and are not included in the Grant.

3.6 Risk Management

3.6.1 The success and implementation of the project will face a number of risks. One important risk is poor cooperation and commitment from the EN countries – in decision making, submitting baseline data and information, allowing consultants easy access to the project area, and facilitating the participation of national staff and stakeholders in project meetings. Poor cooperation will not only bring delays but could frustrate project implementation. As mitigating measures, the establishment of a Project Steering Committee and national project coordinators provides a framework for addressing implementation issues. Furthermore, the ministers of water in each of the EN countries had provided letters of support and commitment to the project during project formulation in 2009. The South Sudan part of the sub-basin is now under new Republic of South Sudan. The South Sudanese Vice President and the Minister for Water Resources and Irrigation both verbally confirmed the support for the project during the appraisal mission consultations. A letter of support from the South Sudan will be required. Furthermore, the consultations with the EN countries by the ENTRO Executive Director in March 2011 have indicated strong support for this project.

3.6.2 The South Sudanese side of the sub-basin still has security concerns, and the consultants may not be able to visit these areas to collect data and hold meetings with stakeholders. This will have an impact on the accuracy and reliability of the study outcomes. However, it is expected that with the recent independence of the South Sudan and the signature in September 2011 of an agreement on the Abyei Region with Sudan the security situation will stabilize and improve. Moreover, the Republic of South Sudan is committed to facilitate the field missions of the consultant through the support of the national project coordinator.

3.6.3 Inadequate mobilization of funding for capital investments is another risk facing this project. AWF and NEPAD-IPFF are providing the resources for the project preparation studies. However, financing the implementation of the identified projects will require mobilization of funds from other development partners, the private sector, and governments of the three countries. Interest in participation in development of the BAS sub-basin has been expressed by the Bank (through OSAN) and the Kuwait Fund for Development; other cooperating partners supporting NBI could be also be

mobilized to support the implementation of investment projects prepared under this project. A resource mobilization component is included in the project in order to foster the donors' support.

3.6.4 Another risk is the long-term sustainability of the implementing agency, ENTRO. The institution currently is financed by several donors and the EN governments. It is expected that this support will continue for the foreseeable future. Other development partners have informally indicated their willingness to continue with their support to ENTRO.

3.6.5 The availability of reliable baseline data for the BAS sub-basin area is also a critical risk. This is worse in South Sudan part of the sub-basin. This risk will be addressed during the SSEA study by allocating more resources to upgrade the baseline information to a level necessary commensurate with the required planning studies.

3.6.6 South Sudan presently faces severe human resource capacities constraints, especially in technical fields required for implementing large scale water resources development. This risk will continue to impact socio-economic development in South Sudan. The solution will involve long term plans for capacity building. It is envisaged that some of the development options resulting from the planning exercise, including SSEA, will yield specific activities for institutional strengthening including training of whole range of cadres of required personnel.

3.7 Project Implementation Schedule

3.7.1 The project will be implemented over a period of 36 months from Grant Effectiveness. This will consist of 4 months for project start-up activities (recruitment of project coordinator, procurement of consultants for the main study), 24 months for the studies and 2 months for project completion. Details are given in Annex 8.

3.7.2 Based on the implementation schedule, the key outputs and their timing are presented in Table 3.3 below. The Executing agency will take advanced procurement measures in the selection of the consulting firm and the individual consultant to ensure a fast track implementation of the project activities. This will allow a fast launch of the project as soon as the Grant is effective.

Table 3.3: Performance Plan

Event	Timing from the grant effectiveness (Months)
General schedule	
General Procurement Notice, Request for Expression of Interest for Consultancy firm and project manager (anticipated actions)	M-3
Grant effectiveness	**M**
Recruitment of project coordinator	M+1
Contracting of Study Consultants	M+4
Consultancy schedule	

Event	Timing from the grant effectiveness (Months)
Components 1,3 and 4	
Draft Consultation and Communication Plan	M+6
Draft Scoping report	M+6
Draft Baseline, Key issues and objective report	M+12
Draft Development potentialities & options report	M+15
Draft Assessment of options report	M+19
Draft IWRDMP	M+24
Final IWRDMP report	M+27
Final Resource mobilization plan	M+28
Final ToR of Feasibility studies and Roadmaps of medium to long term projects	M+31
Donors round table	M+35
Project completion report	M+36
Component 2 (a)	
Draft Screening of short term projects	M+12
Final Short term project preparation reports	M+21
Final long term project feasibility report	M+30

3.8 Monitoring and Reporting

3.8.1 Overall monitoring and reporting of project activities will be undertaken by ENTRO through the BAS Regional Project Coordinator. The foundation for project monitoring and evaluation systems will be the logical framework. At the commencement of the Project ENTRO's Monitoring and Evaluation (M&E) Expert will elaborate a Results-Based Monitoring system to provide for smooth implementation of the M&E exercise.

3.8.2 **Project reports:** During implementation of the project, ENTRO will report progress of project implementation to the PSC at its semi-annual and annual meetings, and also submit for approval study reports on the identified consultancy activities. The following reports will be required from ENTRO:

- **Quarterly progress report:** The quarterly progress report will cover technical and financial progress, administrative issues and constraints affecting the project and suggested solutions to enable the PSC take decisions towards smooth implementation of the project. Procurement and disbursement information will also be consolidated in the quarterly report. The format of the quarterly progress report will be cleared with AWF and NEPAD-IPPF. It will contain a specific section related to the monitoring of the project. The first quarterly progress report will be submitted 3 month after the beginning of the main consultancy.

- **Technical Reports**, by consultants, will be prepared in accordance with the ToR for the specific consultancy, and submitted as and when stated in the consultancy contract.

- **Project Completion Report (PCR),** formatted according the AWF and NEPAD-IPPF operational rules, will be prepared in the last month of the project duration.

3.8.3 The AWF and NEPAD-IPPF will undertake implementation supervision through regular correspondence with ENTRO, reviewing progress reports submitted to the PSC, disbursement requests, work plans, procurement documents, and technical reports from all the consulting assignments. Supervision missions to ENTRO and the project area/region will be carried out by AWF and NEPAD-IPPF, or the Bank's field office (Ethiopia and South Sudan) as need arises.

4. SUSTAINABILITY

4.1 Benefits

4.1.1 The immediate benefits of the project, therefore, involve (i) the development of a knowledge base that will serve the needs for effective decision making in the sub-basin; (ii) development of an integrated water resources management and development plan for the sub-basin with short, medium and long term projects that respect economic, social and environmental integrity; (iii) feasibility studies or design of three short-term projects, ready for implementation; (iv) identification, terms of reference and roadmap of three long term projects; and (iv) identification and confirmation of funding for implementing the projects. The project outcomes, relating to livelihood improvement, water, energy and food security will be achieved only when the identified projects have actually been implemented.

4.1.2 The immediate benefits, as highlighted above, accrue primarily to governments of the EN countries and the development partners, including private sector and NGOs, as they will have the necessary tools for undertaking necessary investments in the management and development of water and related land resources. The benefits to the 3.6 million people living in the BAS sub-basin will accrue once the identified projects have been successfully implemented.

4.2 Sustainability

4.2.1 The commitment of the EN countries in establishing and maintaining ENTRO, and the expressed support for the project by Ministers responsible for water in each of the EN countries, and by the Vice President in the case of South Sudan provide evidence that the outputs and outcomes of the project will be implementable or sustained. In each of the EN countries the project is consistent with national policy and sectorial strategies.

4.2.2 The project is anchored on systematic and inclusive stakeholder consultations. The involvement of local, national and regional stakeholders throughout all stages of the study, from the SSEA and assessment of development options, the formulation of management and development plans, to detailed project preparation will ensure greater ownership and acceptance of the project results. This will facilitate sustainability of the project outputs and outcomes.

4.2.3 The strategic integrated assessment (technical, environmental, social, economic, financial and institutional assessment) is the basis of selection of development options that eventually yield investment projects that bring tangible benefits to the people. The SSEA ensures that environmental and social impacts of potential development options have been addressed and only those options that ensure social and environmental integrity can proceed up to investment stage. This facilitates social and environmental sustainability of project outcomes.

4.2.4 Donors will be involved in the consultation process from its earliest stages and all along the project. This principle will foster their commitments in the funding of the planned investments.

4.3 Knowledge Building

4.3.1 The project's first activity is the construction of data and information base for the whole BAS sub-basin. On the South Sudanese side, where baseline is lacking, this will be a very critical output that will be a foundation for planning development in this part of BAS sub-basin. On the Ethiopian side, with relatively better database, this will be updated and thus leading to a more comprehensive knowledge base. Though ENTRO will be the repository of this knowledge base, it will be readily available for the use of all EN countries and beyond in accordance with the data and information sharing protocols that exist already in the Nile Basin.

4.3.2 As part of the stakeholder consultation process, a communication plan will be developed and implemented throughout the project period. This will ensure that all stakeholders are regularly informed and information (on water resources, socio-economics, technical and environmental) shared across the whole range of stakeholders.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

5.1.1 The BAS project is consistent with the South Sudanese and Ethiopian national policies as well as with the AWF and NEPAD-IPPF strategies. It potentially presents a tremendous leverage effect linked to the huge potential in natural resources of the river basin.

5.1.2 The project addresses critical issues in a deprived catchment area, partially in post conflict situation. It fosters regional cooperation in a region where tensions on the water resource allocation may threaten regional cooperation and understanding.

5.1.3 The sustainability of the project is underpinned by (i) the commitment of the EN countries in its favor (ii) the donors' support to ENTRO as well as its unique institutional positioning.

5.2 Conditions Associated with the AWF and NEPAD-IPPF Interventions

5.2.1 The Grant Agreements shall enter into force upon their signature by the authorized representatives of ENTRO on one hand and AWF and NEPAD-IPPF respectively on the other hand.

5.2.2 The conditions precedent to the first disbursement are:

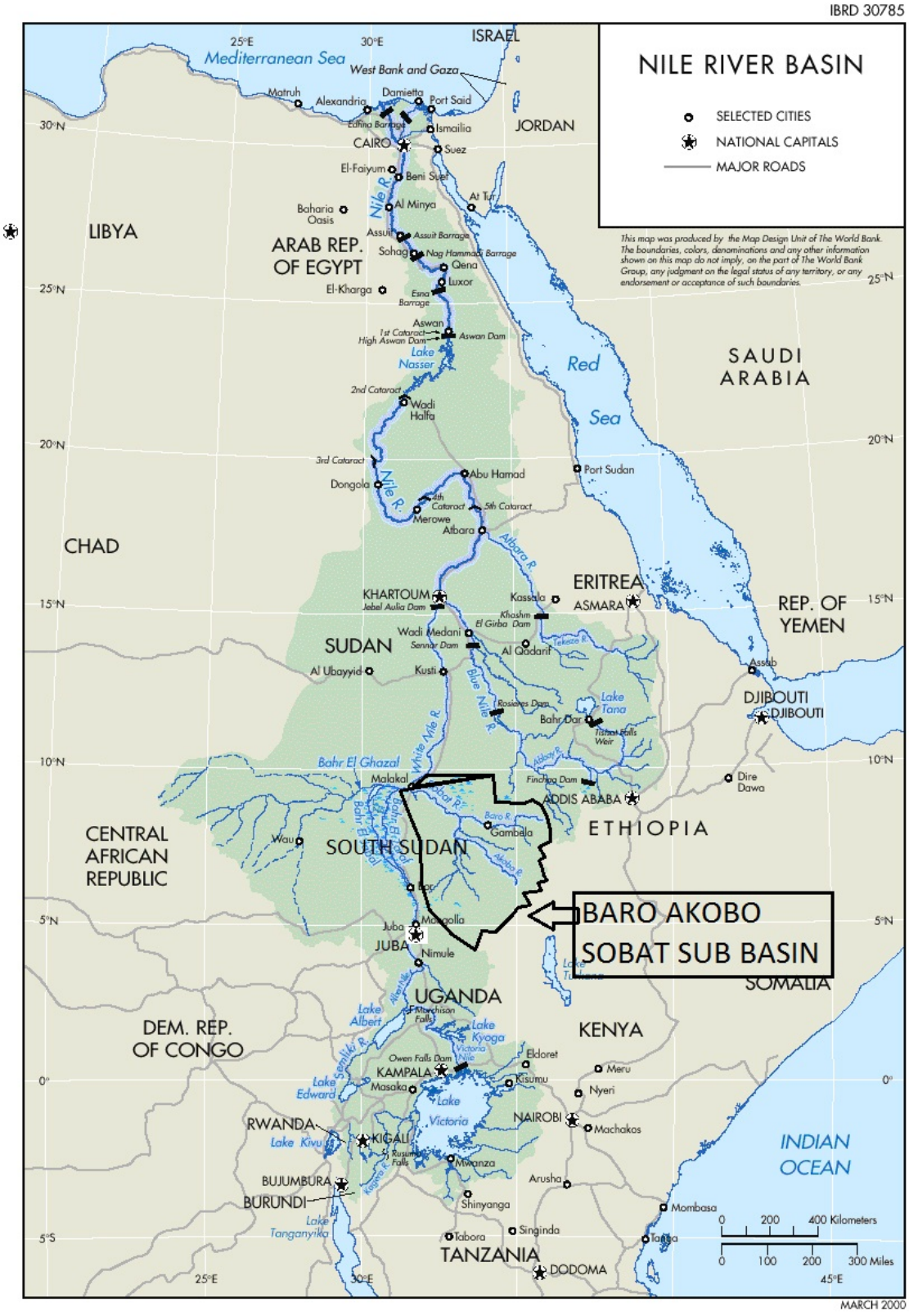
(i) The furnishing of a letter of support and commitment to the project by the Republic of South Sudan, similar to what has already been provided by the Governments of the other EN countries;
(ii) The appointment of a BAS Regional Project Coordinator, acceptable to the AWF and NEPAD-IPPF;
(iii) The opening of one special account, denominated in Euros for the disbursement of the AWF grant, and of another special account, denominated in US Dollars, for the disbursement of NEPAD-IPPF grant, and the designation of signatories to the accounts acceptable to AWF and NEPAD-IPPF.

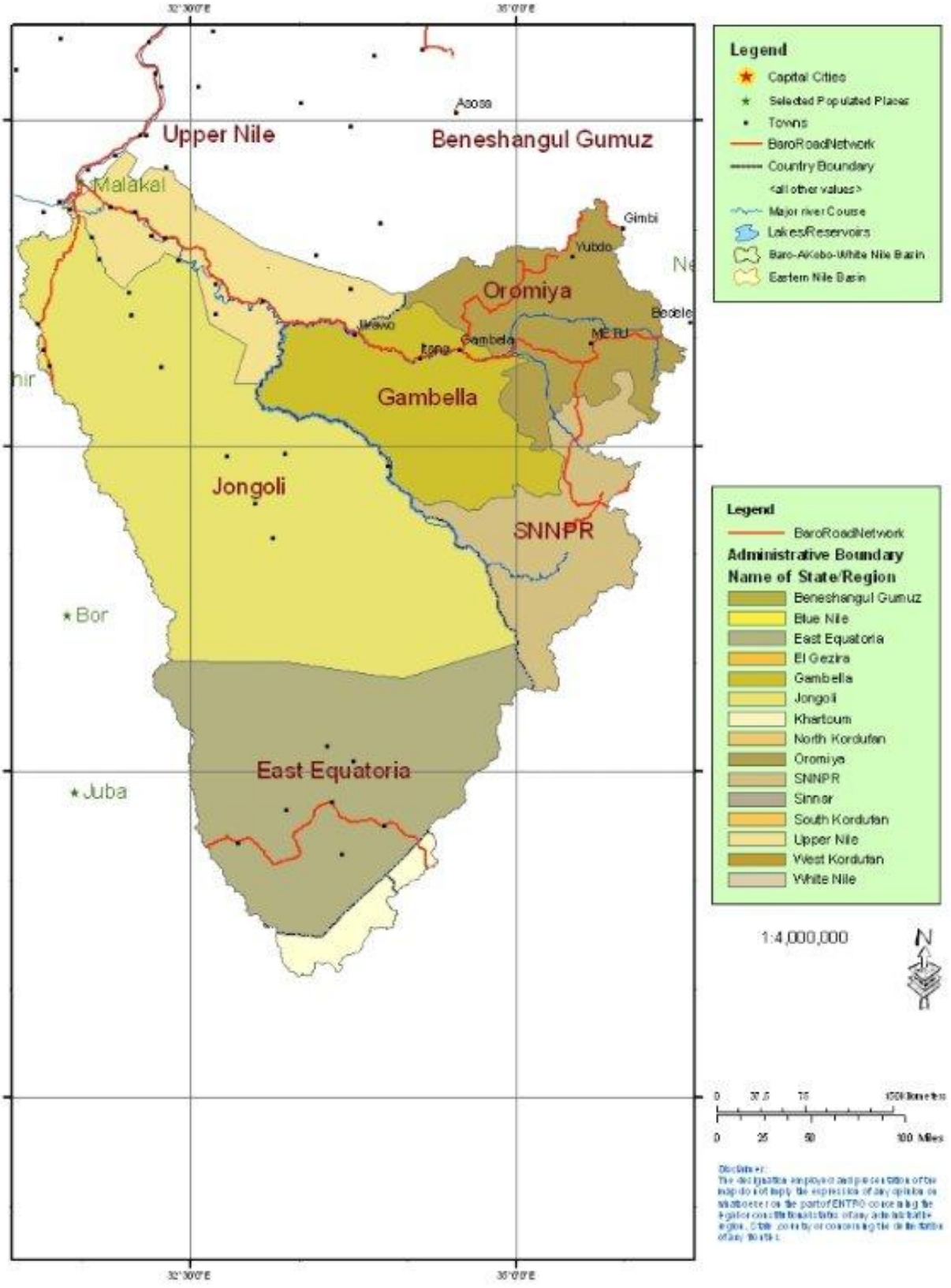
5.2.3 The condition precedent to disbursement of the other tranches of the Grant are :
(i) The submission of the quarterly progress reports to the Bank;
(ii) The justification of expenditure for a minimum of 50% of the previous disbursement.

5.3 Recommendations

5.3.1 Based upon a critical assessment of the justification for the project, its relevance, technical, economic and financial viability, as well as its social and environmental impacts, and sustainability; as well as the eligibility and capacity of the Recipient, it is recommended that a grant not exceeding €2,000,000 from the AWF and US$667,000 from the NEPAD-IPPF be extended to the Eastern Nile Regional Technical Office (ENTRO) of the Nile Basin Initiative for the purpose of implementing the project as described in this report.

ANNEX 1: Location Maps of Baro-Akobo-Sobat Sub-basin




Upper Nile
Beneshangul Gumuz
Malakal
Asosa
Gimbi
Yubdo
Oromiya
Beddele
Gambella
Jongoli
SNNPR
Bor
Juba
East Equatoria
Legend
Capital Cities
Selected Populated Places
Towns
BaroRoadNetwork
Country Boundary
<all other values>
Major river Course
Lakes/Reservoirs
Baro-Akobo-White Nile Basin
Eastern Nile Basin
Legend
BaroRoadNetwork
Administrative Boundary
Name of State/Region
Beneshangul Gumuz
Blue Nile
East Equatoria
El Gezira
Gambella
Jongoli
Khartoum
North Kordufan
Oromiya
SNNPR
Sinnar
South Kordufan
Upper Nile
West Kordufan
White Nile
1:4,000,000
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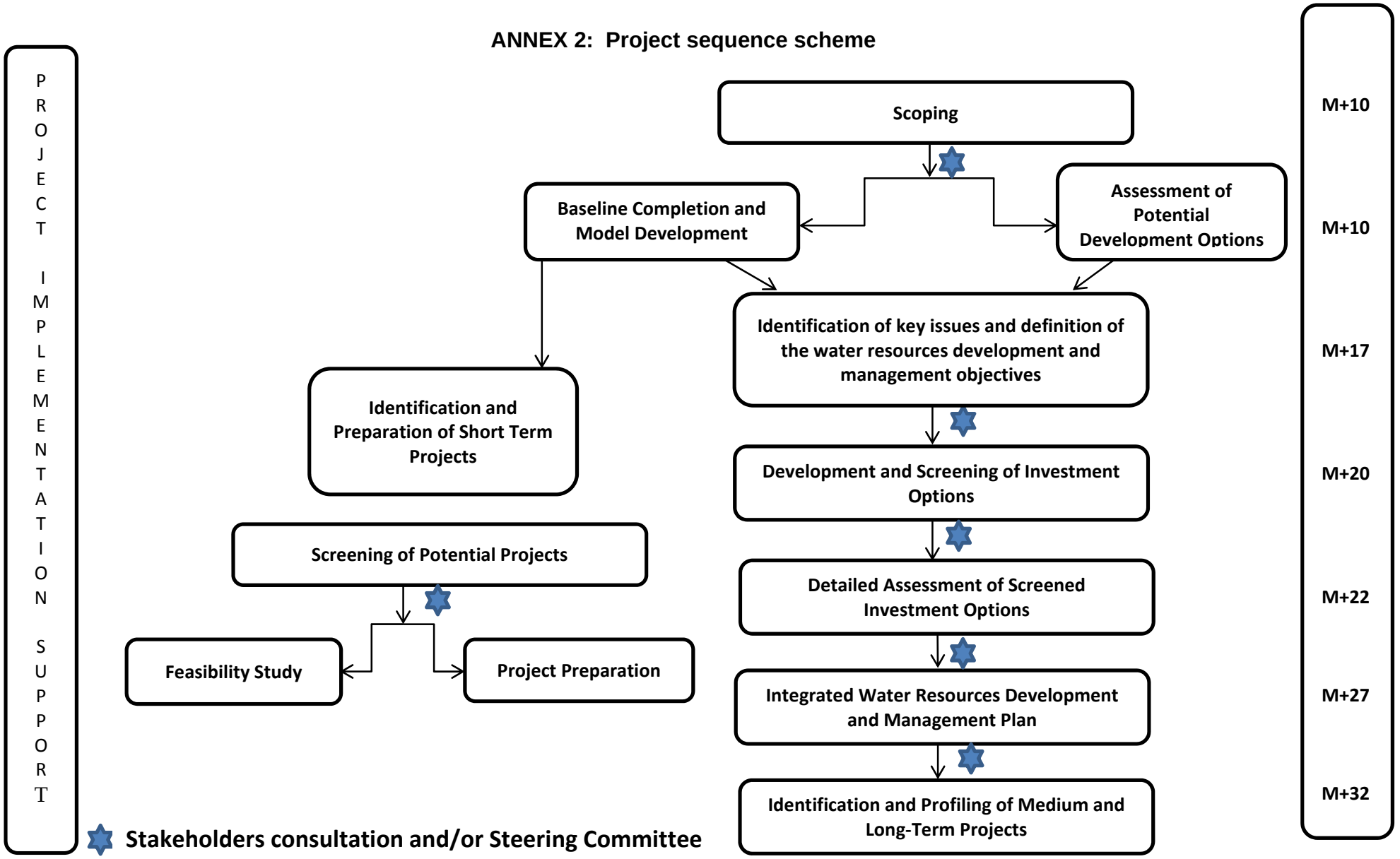
100 Miles

ANNEX 2: Project sequence scheme



ANNEX 3: Terms of Reference of the study

Baro-Akobo-Sobat (BAS) Multipurpose Water Resource Development Study Project

Outlines of the Study Terms of Reference (ToR)

Table of contents

1. INTRODUCTION

1.1 Background

1. The Nile Basin Initiative (NBI) is a partnership for regional cooperation initiated and led by the riparian states[1] of the Nile River through the Council of Ministers of Water Affairs of the Nile Basin states/countries (Nile Council of Ministers, or NCOM). The NBI started with a consultative and participatory process of dialogue among the riparian countries that resulted in their adoption of a "Shared Vision" - to "achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources" through sustainable and equitable development; efficient water management and optimal use of resources; cooperation and joint action between the riparian countries, seeking win-win gains; and targeting poverty eradication, and promoting economic integration.

2. The NBI has developed two sets of complementary and mutually reinforcing programmes to translate the Vision into concrete actions that benefit all peoples in the basin. One programme is the basin-wide Shared Vision Programme (SVP) aimed at creating and sustaining the enabling environment for cooperative management and development of water resources; the other is the Subsidiary Action Programmes (SAPs) aimed at identifying and cooperatively developing projects to realize physical investments that yield win-win gains to all riparian states. For operational purposes the SAP is divided into two sub-basin programmes, one covering the Eastern Nile sub-basin, consisting of three states Egypt, Ethiopia and Sudan (see location map – Annex 1); and the other is the Nile Equatorial Lakes sub-basin covering Burundi, Democratic Republic of the Congo (DRC), Kenya, Rwanda, Tanzania and Uganda.

3. The Eastern Nile Technical Regional Office (ENTRO), established by the Eastern Nile Council of Ministers (ENCOM) of water affairs in the three Eastern Nile countries, is responsible for managing the Eastern Nile Subsidiary Action Program (ENSAP), whose overall objective is the cooperative development of the water resources of the Eastern Nile Basin, which include the Baro-Akobo-Sobat River Basin, in a sustainable and equitable manner to ensure prosperity, security, and peace for all its peoples. In pursuit of this objective, ENTRO has formulated the Integrated Development of the Eastern Nile (IDEN) as a suite of integrated development projects including hydropower, irrigation and drainage, flood control, watershed management, and water resources management. Because of its regional water and land resources potentials and the role it can play in regional peace, stability and security, the Baro-Akobo-Sobat Multipurpose Water Resources Development Study Project became one of the seven (7) projects identified in the IDEN.

[1] Burundi, Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda

1.2 Development Problem

4. The Baro-Akobo-Sobat sub-basin (see Annex 1) encompasses about 186,275 km2 that stretches from southwestern Ethiopia to southeastern and central Sudan. In South Sudan the sub-basin covers the entire administrative units (states) of East Equatoria and Jonglei and a small portion of Upper Nile; while in Ethiopia the sub-basin covers the administrative units (regions) of Oromiya, Gambela and SNNP. The sub-basin is home to about 3.6 million people; about 2.7 million live in the Ethiopian part of the basin, 80% of whom live in rural areas. About 0.9 million people live in South Sudanese part of the basin, more than 90% of whom live in rural areas. The part in South Sudan has recently emerged from five decades of civil conflict which had precluded any sustainable socio-economic development over the region. Even the Ethiopian part is geographically remote and has lagged behind other regions in development.

5. The main problem in the sub-basin (see Annex 1) is underdevelopment and lack of exploitation of the water and natural resources to improve livelihoods of the population in the sub-basin in particular, and in general, the rest of the population in the EN countries. The South Sudanese part of the sub-basin has recently emerged from a long period of civil conflict and in greater need for development. The Ethiopian part of the sub-basin is also relatively underdeveloped in comparison with the rest of Ethiopia.

6. The predominantly rural population in the sub-basin experiences high levels of poverty; the *One System Inventory* (ENTRO, 2007) shows that the poverty indicator varies from 50 to 70% across the sub-basin. As much as 12-30% of the population in some parts of the sub-basin depend on food aid. The main cause of food insecurity is the reliance on rain-fed subsistence farming in a region of high spatial and temporal rainfall variability Access to water supply and sanitation is relatively low. Though there are wide variations in access from one state/region to another, and between Ethiopia and South Sudan, national statistics show that in the Ethiopian part of the sub-basin less than 25% of the population has access to safe water supply. In the South Sudan part of the basin, much less than 25% of the rural population has access to safe water supply and much less have access to proper sanitation. Access to electricity is reported to be less than 20%. Presently the region lacks renewable energy in the form of hydropower, and the reliance on wood fuel for domestic energy requirements has continued to exacerbate deforestation and land degradation. Transport infrastructure is very limited; in particular there are no all-weather land routes between the two countries. The potential river transport between the countries is barely developed.

7. The sub-basin experiences frequent flooding and droughts, which worsens the vulnerability of communities as well as livestock. Hydrological and climate variability is high in the sub-basin and is likely to be affected by climate change. Population pressure (Ethiopia and Sudan both have annual growth rates exceeding 2.6%) is exacerbating deforestation and together with poor land use practices lead to significant land degradation.

8. Furthermore the sub-basin has very important wetlands (the Machar Marshes) that are of international importance. The wetlands have very significant effects on the hydrology of the sub-basin; and they are an important habitat for wildlife as well as livestock. The Baro-Akobo-Sobat sub-basin is a highly sensitive environmental zone.

9. Despite the low levels of socio-economic development, the Baro-Akobo-Sobat sub-basin has tremendous potential for exploitation of water and other natural resources. The hydropower potential in the basin in the highlands in the Ethiopian portion of the basin and in the southern tip in South Sudan has not been exploited. Studies in the Ethiopian part of the basin indicate that no more 3% of the irrigable land has been developed; in South Sudan more than 95% of cultivable land has not been developed. The basin area already has evidence of rapid commercial development of irrigated agriculture, particularly on the Ethiopian side where more than 22,000 ha is currently under preparation for irrigation of rice and sugar cane. There are opportunities for river regulation to improve navigation and flood control; water infrastructure can be built to improve water storage and to provide for flood control; fisheries are abundant but have not been exploited in full; and the wetlands and associated wildlife could bring substantial socio-economic benefits if exploited for tourism.

10. Water resources development and management is key to socio-economic development of the Baro-Akobo-Sobat sub-basin. Recognizing the potentials for integrated water resources development and management, and particularly as it relates to poverty reduction, through increased food and energy security, reduction of vulnerability from floods and droughts, and for fostering cooperation and peacefully co-existence of the basin countries, ENTRO has formulated the Baro-Akobo-Sobat (BAS) Multipurpose Water Resource Development Study Project. The overall goal of the project is to promote socio-economic development, regional cooperation and peace through sub-basin wide cooperation in integrated water resource development and management. The ultimate objective is project preparation for strategic capital investment in multi-purpose water resources infrastructure to facilitate livelihood improvement and poverty reduction, and socio-economic development of this part of the EN region.

11. ENTRO, on behalf of the Eastern Nile countries, requires consultancy services to undertake studies and investigations to facilitate the development of multi-purpose water resources infrastructure in the Baro-Akobo-Sobat sub-basin.

2. OBJECTIVES OF THE CONSULTANCY SERVICES

12. The ultimate objective of consultancy services is to assist ENTRO prepare a water resources development and management plan based on a strategic social and environmental assessment, and further develop investment packages for cooperative development in the Baro-Akobo-Sobat sub-basin.

13. The specific objectives of consultancy services consist of the following:

i) **To formulate an integrated water resources development and management plan** (IWRDMP) for the sub-basin to identify sustainable investments and provide a sound framework for long term cooperative development and management of water resources in the sub-basin. This IWRDMP shall be developed based on a participatory strategic social and environmental assessment (SSEA) to facilitate identification of investment options that take into account social, environmental, economic and institutional values in the basin. It will also comprise an institutional assessment.

ii) **To identify, in a participatory and consultative manner with relevant basin stakeholders, the most appropriate priority investment packages** for the sub-basin and to undertake feasibility studies including environmental impact assessment (infrastructure type projects) or project preparation ("soft" type projects) as basis for resource mobilization.

iii) **To identify, with participation and engagement of all stakeholders in the sub-basin, medium and long-term projects** and initiate project preparation (terms of reference of feasibility study and roadmap).

iv) **To provide an objective and effective framework for stakeholder consultation** and engagement in cooperative development and management of water resources of the Baro-Akobo-Sobat sub-basin, and to mobilize funds for the prepared projects.

3. SCOPE OF WORKS AND STUDY AREA

14. **Scope of work:** The key activities required are elaborated in the following sections, grouped together in four components. These are closely related and complementary to each other. The stakeholder consultation is developed in the last section, but shall be accompany the whole study.

15. The general scope of works involves:

Component 1: Integrated Water Resources Management Plan

- Collect and analyze data to establish the environmental and socio-economic baseline for the sub-basin;
- Do a strategic social and environmental assessment of development options, including institutional and economic assessment, leading to identification of environmentally sound investments for water resources development;
- Develop integrated water resources management and development plans (IWRDMP) for the sub-basin;

Component 2: Selection of priority investment projects for multi-purpose water resources development and detailed feasibility studies for selected projects

Component 3: identification and selection of medium and long-term investment projects for further preparation

Component 4: Stakeholder consultation and engagement during the above planning and analytical work.

16. **Study area:** The study area is mainly limited to the BAS river basin. However, when relevant, it may encompass a broad impact assessment on parts of the Nile Basin between the Sobat confluent and the Aswan Reservoir. **The Machar Marshes[2] are considered included in the BAS river basin.**

3.1 COMPONENT 1: INTEGRATED WATER RESOURCES DEVELOPMENT AND MANAGEMENT PLAN AND SSEA

17. The IWRDMP is aimed at (i) promoting a shared vision of the future development of the river basin (detailed in an investment plan); (ii) Establishing principles of water resource management as well as water-linked ecosystems management for the basin and, (iii) Identifying the institutional framework required for the implementation of the plan.

18. The Strategic Social and Environmental Assessment (SSEA) is a process that promotes the inclusion of environmental and social criteria in policy-making and planning. By assessing, social, economic, environmental, and institutional impacts associated with potential development options, it facilitates screening out inappropriate or unacceptable projects at an early stage, and minimizing the risk that projects would have encountered due to environmental and social considerations. The assessment is performed in close consultation, and in transparent manner, with key stakeholders in the region.

19. Both processes are intimately connected to ensure a well informed and transparent decision making in the planning tool. The following subsections will describe the activities to be completed in Component 1.

3.1.1 Scoping

20. The scoping exercise is aimed at determining relevant information to be collected to complete the baseline in order to determine the key issues and potentials related to water resource development and management in the river basin; and to correctly assess the predictable effects of the development options identified. For this exercise, the consultant must first assess the information currently available from reports, maps, models etc. on the potential projects already identified by the Ethiopian and South Sudanese governments, ENTRO and other relevant stake holders. Based on this information, the consultant should do a preliminary assessment of the potential types of investment (hydropower, irrigation, flood control, navigation, rain fed agriculture, etc.) and narrow down the specific geographical areas where these investments can be implemented. Once this preliminary determination of type and location of investments is made, the Consultant will justify:

    (i) The specific geographical area to be covered to characterize the potential investments as well as their impacts.
    (ii) The social and environmental aspects to be examined for each potential investment (health, agro-pastoralism, recession agriculture, fisheries, biodiversity, etc.);
    (iii) The proposed methods to be used to assess and as far as possible quantify the impacts;

[2] The Machar Marshes are vast wetlands (around 6500 km^2) North from Baro and Sobat rivers, connected to both rivers, but with their own catchment area.

(iv) The data required to implement these proposed methods (type of data, time series, accuracy, etc.), their current availability, and the approaches proposed to bridge the gaps with the available data (surveys, estimates, etc.). The Consultant will gather socio-economic and environmental data and information from completed and ongoing studies as well as from national and regional databases, and identify any data/information gaps.

21. The consultant will give the justification for eliminating issues that had been identified for further consideration. Based on this scoping exercise, the Consultant will revise the study approach and work plan for the assignment as necessary.

22. The scoping as well as the revised study approach will be presented in an Inception Report which will be submitted to stakeholders' consultation;

3.1.2 Baseline completion and model development

23. Based on the conclusion of the scoping stage, the objective of this task is to enable comprehensive description of the baseline so as to facilitate decisions making on the development and management of water resources in the sub-basin. This task will be carried out in parallel and in close collaboration with the Assessment of Potential Development Options task described in Section 3.1.4.

24. Considerable amount of data and information is available from completed and ongoing studies and surveys done for/by ENTRO, World Bank, African Development Bank, bilateral donors, and national sector ministries of the EN countries; for example *One System Inventory*, the AFD supported knowledge base study, and Ethiopia's Baro-Akobo Master Plan studies (see Annex 1 for list of available studies and data). The level of data and information in the Ethiopian part of the sub-basin is relatively higher than that in the South Sudanese part. The Consultant will concentrate efforts on the South Sudanese side of the sub-basin, in order to upgrade the baseline information to a level similar to that on the Ethiopian part of the sub-basin. However, according to the conclusions of the scoping, the geographical coverage of the baseline data and information may extend to cover downstream areas where BAS water resource development may have potential impacts.

25. **The baseline data/information will include**, but will not be limited to the themes listed below, according to the conclusion of the scoping. Data collection and surveys will be done through field visits, remote sensing, existing databases in ENTRO and from the EN countries, or from online global databases.

- **Hydro-meteorology**- The Consultant will collect and analyze relevant hydro metrological data that will serve as a basis for designing the identified potential investments. As needed, the Consultant should spatially characterize flow regime in terms of monthly or decades distribution, as well as flood and drought occurrence and intensity, assess current water balance (resources – uses) all along the main rivers of the basin with a probabilistic approach (probability of satisfaction/ non satisfaction), assess irrigation requirements for main crops taking into account the climatic gradient, collect and analyses any data required for designing water infrastructures. When hydrological series are not sufficient to assess the potential water infrastructure developement, the

Consultant will make estimate based on methods using other data (regional approaches, rain–flow models, remote sensing, etc.).

- **Groundwater resources-** Based on secondary data and studies, the Consultant will map and characterize groundwater resources in terms of potential for the uses.

- **Water quality** – The Consultant will collect secondary data regarding ground and surface water quality to assess pollution resulting from current development and also suitability for irrigation and domestic water requirements. The Consultant will propose and implement complementary focused analysis when secondary data are not available.

- **Existing water infrastructures**- The Consultant will list, characterize and map existing infrastructures in the field of water supply and sanitation, irrigation, and dams. Secondary data will be completed by surveys, notably with regards to water supply and sanitation. In this particular theme the service access rates will be assessed by Woredas and Payams.

- **Flood and drought** – The Consultant will collect and analyse any data required to assess the current socio-economic impacts of flood and droughts, and identify the effects of the potential investments. The Consultant shall in particular broadly map the flooded areas as needed to assess the impacts of the investments; identify flood impacts: characterize flood risks and broadly assess potential damages in urban areas and rural areas, assess flood effects (positive and negative) on farming systems and biodiversity. In addition, characterize drought impacts based on past events.

- **Hydraulic characteristics of key river and River morph-dynamics** – The Consultant will collect and analyze relevant data that will serve as a basis for designing the identified potential investments and for assessing their morpho-dynamics impacts. In particular, the Consultant shall do a broad general characterization of the river dynamics (erosion, deposits, flood plain etc.). This may include assessing data on the channel's morphology (for example: bed forms, channel patterns) and topography; vegetation/erosion processes around potential water catchment areas; and rough estimate of sedimentation processes (bed load and suspended load) in the sectors where potential investments may be identified.

- **Fisheries** – The Consultant will collect and analyse any data required to characterize the main fishing systems, and identify the impacts of the potential investments. The Consultant shall in particular identify which fish species are present in the river (highlighting endemic species and migratory species), including migration patterns and extent along the river; possibly identify key large spawning areas for migratory and non-migratory species in the river system. And in general make estimates of fish production of the river system.

- **Land use and agriculture** – The Consultant will collect and analyse any data required to characterize the main farming systems along the rivers, as well as the main land uses, and identify the impacts of the potential investments. The Consultant will focus on gathering land use information along the river and its flood plains (woodlands, wetlands, farmlands, urban etc.); extent and characteristics of rain-fed and irrigated farming, both commercial and subsistence (size, location, present and future potential, farming systems, cropping systems, etc.); an estimate of water used for agricultural activities

including livestock, horticulture etc; wildlife sanctuaries and game parks; current infrastructure for tourism (lodges and parks), future potentials for tourism; residential, commercial/industrial, urban areas and level of dependence on the river (drinking, livelihood, recreation, industry);.

- **Livestock** -- The consultant will undertake a mapping of the main livestock systems throughout the basin, describe distribution, types of livestock systems and their relation with the flood plains, the rivers and the wetlands (grazing areas, grazing intensity, migration patterns as it relates to flooding and dry seasons, etc.), in order to (i) gather all information required to assess the impacts of the investments (SSEA); (ii) assess the needs in terms of livestock water supply.

- **Wetlands, wildlife and Biodiversity** – The consultant will collect and analyse any data required to characterize the main ecosystems of the river basin and identify the impacts of the potential investments. The Consultant shall in particular identify and broadly characterize the major ecosystems on the river basin and assess their general condition; characterize the ecosystem around the potential project areas and assess their current and future commercial and livelihood uses such as agroforestry; environmental benefits of the riparian flora and wetlands in terms of water quality protection, flood control and river regulation, sediment retention, and wildlife habitat.

- **Watershed and erosion processes–** The consultant will collect and analyse data to facilitate a comprehensive description and mapping of the watershed including size of major sub-basins, relief, vegetation, soil characteristics, land use, types and distribution of erosion, human settlements, and state of the environment. The Consultant will in particular focus on watersheds located upstream to the potential dam sites. The Consultant shall synthetize the information on a map classifying the watersheds according to the intensity of the erosion processes
  .
- **Navigation** – The consult will collect and analyze any data required to characterize navigation in the river basin and identify the impact of the potential investments. .The Consultant shall in particular assess the current river traffic (travelers and goods) and its limitations.

26. Moreover, the Consultant will review policies, legal and institutional arrangements for water management and other related topics (hydropower, irrigation, navigation) at national and sub-national levels within the EN countries, as well as at regional or basin level within the framework of the Nile Basin Initiative. The Consultant will broadly assess the institutional and human resource capacities of the related institutions, including ENTRO.

27. The baseline will be presented through a comprehensive Geographical Information System (GIS), compatible with Arc View, the software used by ENTRO[3]. Most of the thematic outputs listed above will be encompassed in the GIS. Furthermore, this GIS will be used as a tool to define development options and assess their impacts.

[3] The consultant will import the study GIS data into ENTRO's GIS and ensure compatibility so that there is no information or layout loss.

28. **Modeling the water resources allocation**: Parallel to the baseline development studies, the Consultant will develop a water balance model. This model will simulate the water balance[4] on at least a monthly basis all along the rivers of the basin and until the Aswan reservoir if relevant with the conclusions of the scoping exercise. It will also include the simulation of the reservoirs fluctuation as well as the power production. It will enable (i) Assessing the current water resources balance; (ii) Helping define the "business as usual" development option; and (iii) Assessing the impacts of the development options on the water resources balance;

29. The consultant will define with ENTRO on which of the various investment planned in the study area (apart from those which will be part of the development options to assess) are to be taken into account in the simulations. The Consultant will examine existing simulation and optimization models that are already in use on a number studies/projects at ENTRO, such as the EN Planning Model Project and EN Power Trade Program Study, and take these models in consideration in selecting appropriate models for use in the BAS studies.

3.1.3 Identification of key issues and definition of the water resources development and management objectives

30. Based on the baseline as well as on consultations with a broad range of stakeholders, the Consultant shall identify and define key social, environmental, economic, institutional and technical issues regarding water resources development and management in the BAS sub-basin. Particular attention will be paid to (i) the development of various water uses in the basin and downstream; (ii) critical social issues such as potential vulnerable groups, social institutions and community structures; (iii) major environmental benefits provided by the BAS sub-basin, most particularly the importance of annual floods on recession agriculture, pastoralism, fisheries, forestry, wetlands and biodiversity, as well as the interest of the forest for local communities and biodiversity; (iv) the revenue and livelihoods that depend on these environmental services; and (v) climate change and variability.

31. Once key issues are identified, the Consultant will propose a set of objectives related to (i) the sustainable management of the river basin and water resources; and (ii) the development of the river basin through the uses of these resources. These objectives shall take into account the following general goals: (i) poverty reduction; (ii) equitable use of the water resources between the riparian countries and between the users; and (iii) sustainable use of the natural resources and protection of wetlands.

32. The baseline[5], the key issues and the objectives will be presented in a report which will be submitted to stakeholders' consultation.

3.1.4 Assessment of Potential Development

33. Building on the preliminary assessment done during the scoping exercise and on available studies, which cover mainly the Ethiopian part of the river basin, the Consultant will further assess the development potentials in terms of hydropower, irrigation, navigation, flood control, rain fed

[4] Water resources, water uses, natural losses on Baro, Akobo, Sobat and if required White Nile till Aswan reservoir.
[5] Including the results of the simulations of the current water balance.

agriculture, fisheries and eco-tourism. This task will be carried out in parallel and in close collaboration with the baseline completion and model development task described in Section 3.1.2. The following are the major potential developments that should be considered in this stage:

34. **Hydropower:** Previous studies identified about 15 potential dam sites in the Ethiopian part of the river basin[6], one of them being already studied at feasibility level. No similar analysis is available on the South Sudanese part of the catchment area. The Consultant will update the existing studies when relevant[7], and bring the South Sudanese part of the river basin to the same level of knowledge: Identification of the dam sites, main technical characteristics of the dams, main environmental and social impacts, broad cost estimate (including the power transmission line), multi-criteria analysis. The interest of developing this potential will be assessed based on the national hydropower strategies, the local and national power balance forecasts and other power interconnections planned. A broad assessment should be done on the demand for power on the sub basin and the local communities; existing schemes on the sub-basin and their general condition; potential locations and storage needs; how the project will impact current and potential water uses and demands on the river. The technological options such as the interest of developing various small dams instead of one major investment will be assessed in terms of profitability, impacts, and sustainability.

35. **Navigation:** The Consultant will assess the potential river transport demand (public and freight transport) notably taking into account (i) the planned development of alternative transportation means in the region; and (ii) economic development scenarios. The analysis will cover the Khartoum-Gambela section. The Consultant will analyze the current physical and non physical (water hyacinth infestation, security issues, etc.) limitations to river transport. The river sections which require specific works will be identified, as well as the main infrastructures (and related broad investment costs) needed to develop the traffic (river harbors);

36. **Irrigable area:** As for the hydropower thematic, previous studies[8] assessed in detail the irrigable potential in the Ethiopian part of the river basin, however the South Sudanese portion remains unknown. The consultant will validate or revise the assessment of the irrigable potential in Ethiopia and broadly assess the potential in the uncovered part of the river basin. The assessment of the irrigable area will be based on soils aptitude, availability of water resource (current or potential) as well as topographical broad analysis. In addition, the Consultant will identify the crops adapted to the main type of irrigable soils as well as the demand potential for these crops based on (i) local and national demands, (ii) export opportunities. Finally, the Consultant will analyze the socio-economic constraints to the development of irrigation (agricultural credit, technical capacities and sociological interest of the populations, etc…). Small schemes development will be compared to investment in a few large infrastructures in terms of sustainability, profitability, and adaptation to the socio-economics context.

37. **Rain fed agriculture:** Rainfed agriculture is largely practiced in the upper part of the river basin, while farming systems are more commonly based on recession agriculture downstream. Both cropping systems are poorly intensive. The Consultant will assess the potential of intensification of these cropping systems, in order to evaluate whether they could be an alternative to the development of irrigated agriculture. The current cropping systems will be characterized, and the

[6] Baro akobo River Basin Development study; 1997; TAMS / ULG
[7] The Consultant will validate the previous analysis and update it when the availability of longer hydrological data series make it relevant
[8] Op.cit.

constraints of intensification analyzed (land tenure, man power, agricultural credit, input supply, etc…). The potential area of development for each cropping systems will be broadly estimated.

38. **Livestock:** Livestock production is a key economic feature of most pastoral communities throughout the sub-basin. The production and productivity of livestock is seriously affected by the seasonality of pastures, as influenced by availability of water supplies, the wide spread prevalence of endemic diseases and parasites coupled with poorly developed veterinary services, and socio-cultural values. The consultant will examine the development potentials for livestock production, focusing in particular on the needs in terms of water supply/harvesting infrastructures.

39. **Fisheries:** Fishing is an important component of livelihoods for numerous Ethnic groups, and often represents a major source of protein supply for households. The consultant will assess the current potential of sustainable fishing in the basin, and assess the development potential of fishing and fish farming taking into account local and national demands.

40. **Eco-tourism:** The river basin encompasses two national parks (Gambela and Boma) as well as large wetland areas, and a wide diversity of eco-systems, from the escarpments to the lowlands. The Consultant will assess the opportunities and constraints for eco-tourism development in the river basin, and, in order to support the definition of development options, will propose scenarios of developments. For each scenario, the linked management measures and infrastructure requirements shall be broadly described.

41. The Consultant will specify in its technical proposal the surveys it will carry out for each of the above themes. The results of the analysis will be synthesized on appropriate GIS mapping.

3.1.5 Screening of Development and Investment Options

42. A development option[9] can be defined as a scenario that combines various investments and measures and aims at meeting the management and development objectives. These investments and measures will be multi-purpose water resources development projects, combining hydropower, irrigation, navigation, flood control, rain fed agriculture development, eco-tourism, etc.

43. Building on the previous stages of the study, the Consultant will propose 5 development options. These options can be alternatives sets of investments and measures, all meeting the objectives, or alternative elements within the same set of investments and measures. They all shall be realistic, consistent with national policies, and may include a “do minimum” or “do business as usual” scenario if relevant. The Consultant will also take into account development options/projects already identified by ENTRO through national stakeholder workshops held in preparation for the BAS project. The consultant will take into account for the definition of the options the development of various small scale infrastructures instead of a few major ones (dams and irrigation schemes).

[9] or « alternative »

44. The consultant will map the elements of the options in order to make them easily understandable by the stakeholders. The 5 alternatives will qualitatively be screened in terms of impacts and economic benefits and costs, so as to allow to the Steering Committee[10] to select only 3 more relevant options for further detailed assessment.

45. The report submitted to consultation will contain the assessment of development opportunities as well as the proposed development options screened.

3.1.6 Detailed Assessment of screened Investment Options

46. The Consultant will review national and international social and environmental safeguard policies, including those of the African Development Bank, related to development projects.

47. The Consultant will identify the social and environmental impacts of each development option, including secondary, cumulative and synergetic impacts and quantify them as much as possible as data permits. Impacts shall be characterized in the short, medium and long term. The economic tradeoffs associated with each development option shall be identified and costs and benefits estimated. The Consultant will undertake assessments and analysis by applying selected relevant SSEA methodologies from the international best practice.

48. The consultant will notably assess the following impacts:
    (i) Change in the river system: river hydrodynamic, sedimentation, floods, flow regime, etc., and their secondary impact on the ecosystems and water uses downstream;
    (ii) Socio-economic impacts related to recession agriculture, livestock, fisheries, food security, livelihood diversification, transport, access to electricity, etc. with a particular focus on gender issues;
    (iii) Ecological impacts related to loss of or damage to ecosystems, biological corridor break, loss of biodiversity, etc.
    (iv) Economic impacts: food and power production, jobs, reduction of transportation costs, environmental benefits losses, etc.
    (v) Health impacts, in particular related to water-linked diseases;
    (vi) Climate change: impact quantified on the long term through a broad carbon balance and sensitivity to climate change
    (vii) Landscape impacts;
    (viii) Impact on wetlands and related activities: Wetlands cover over 7 percent of the Sub-basin. These seasonal and permanent vegetation or wetlands are vital areas for fish spawning and fry rising for the local population. They also support the unique habitat for a mired variety of wildlife species. The study will focus on the impacts on the wetlands and will apply innovative best practices to minimize adverse impacts on the wetlands as a result of the proposed investment projects.

49. The Consultant will specifically assess the impacts on the climate change through a broad long term carbon balance. He will compare the options in terms of adaptability to climate change (ability to climate proofing).

50. The Consultant shall also assess the institutional and policy framework for the management of the planned invests as well as of the environmental and social issues and highlight the capacity, strengths and weaknesses of national structures as well as that of ENTRO. The Consultant will

[10] See §4

define the institutional framework and measures to ensure sufficient capacity within national institutions and ENTRO to manage the environmental and social impacts that might arise from future investments. If relevant, the Consultant may as well propose the creation of a new institution in charge of managing investments projects, ensuring the completion of the water resource management objectives, and/or mitigating impacts.

51. Analysis of options shall include trend analysis (baseline trends vs. impact analysis) with and without the proposed water resources development plan using appropriate set of indicators. The analysis will be undertaken in close consultation with key stakeholders; the Consultant will listen and analyze any concerns that come up during the consultation process;

52. The methods used to assess the impacts will be explained, and their limits stressed (in particular their accuracy). The assessment will make an extensive use of the GIS, and may call for use of modeling and forecasting techniques (when and where appropriate) to be able to quantify the impacts on livelihoods and the environment. In particular, the water balance model will be used to assess impacts on water uses downstream. All the impacts will be mapped at a relevant scale.

53. Building on the identification of the impacts for each option, the Consultant will define the mitigation measures envisaged to prevent, reduce and offset any significant adverse effect. The cost of these mitigation measures will be broadly estimated.

54. The Consultant will produce a broad cost-benefit analysis, taking into account as much as possible the quantified impacts listed above as well as the mitigation measures. At this stage, investments costs estimate will be based on broad ratios from similar projects.

55. Finally, the Consultant will produce a multi-criteria analysis in order to comprehensively compare the effects of the development options.

56. Based on the preceding analyses, the Consultant will present the outcomes in an "Assessment of options" report. This report may also include draft TORs for specific studies required to fill major data and information gaps on social and environmental issues identified during this stage; it will also include rationale for such studies. The Consultant will assist ENTRO (i) to conduct consultative workshops of key stakeholders; (ii) to present the results of the assessment to the Steering Committee. The Steering Committee, in light of the report and the results of the stakeholders consultation, may validate the report and select an option to be detailed in the Integrated Water Resource Development and Management Plan, or ask to modify/refine options[11]. The revised assessment will then be submitted in the final report.

3.1.7 Integrated Water Resources Development and Management Plan

57. The planning will build on and closely follow the previous tasks of this study. The Consultant will:

    (i) Based on the objectives, **develop a water resources management[12] plan** for the sub-basin in terms of water uses, water quality, wetland protection, fisheries, flood and drought management, morphodynamic evolution of the river, as well as institutional requirements.

[11] Including by mixing elements from distinct options
[12] Part of the plan related to the protection and management of natural resources,(not to investments)

(ii) **Refine the selected option** according to the comments of the Steering Committee, and optimize the combination of the various type of investments[13;] List the related investments and measures, and specify whether these projects should be implemented in long, medium or short term. Based on analysis of economic development trends in the region, as well as environmental and social considerations, develop a priority sequence of the multipurpose water resources development projects.

(iii) **Broadly define technical characteristics of each component of the option,** e.g.:

- for water supply and sanitation: type of infrastructures, number and localization for rural water supply and sanitation, main characteristics for urban systems.
- for irrigation schemes: areas, type of diversion, main geometrical characteristics of the works, type of crops, type of farming systems, etc.;
- for hydropower schemes: dam site, reservoir volume and extension, power, main geometrical characteristics of the dam, type of spillway, etc.
- For navigation: water depth and standard river section required, river sections to be dragged and related volume of sediments, measure against water jacinth, docks and other specific works characteristics, etc.
- For "soft type measures" such as rain fed agriculture, watershed management or eco-tourism development: description of the main components.

(iv) Adapt the components in order to get climate proof investments.

(v) **Review Social and Environmental Impacts:** Based on existing information already collected as well as on the assessment of the development options impact carried out during the SSEA, the Consultant will analyze potential social and environmental impacts for the investments in the plan and propose possible mitigation measures.

(vi) **Estimate the investment costs, and carry out economic (cost/benefit) and financial analyses**, and develop a benefit sharing framework that illustrates simply and clearly how costs and benefits shall be shared in by beneficiaries in the sub-basin.

(vii) **Propose an appropriate Institutional framework**: The Consultant will consult closely with ENTRO, the Governments of the EN countries, other stakeholders, and with the Nile Basin Initiative so as to recommend an appropriate institutional framework for the implementation of the water management and development plan, taking into account each level of competences (building, operating and maintaining the investments, managing the water resources) and every type of investment (hydropower, irrigation, navigation, eco-tourism,etc.). Furthermore, the Consultant will prepare an Action Plan and detailed Terms of Reference for additional consultancies required for implementing the proposed institutional framework (legal arrangements, consultation process mainly).

58. The key outputs from this task consist of (i) Integrated Water Resources Management Plan establishing a framework for sustainable management of water resources in the BAS sub-basin; (ii) Water Resources Development Plan outlining an investment programme with prioritized list of short, medium and long term development projects in the BAS sub-basin; and (iii) the institutional

[13] e.g.: a hydropower dam can be used to modify the flow regime in order to allocate sufficient flows in the dry season to develop irrigation, extend navigable period, and reversely decrease floods in the wet season so as to reduce damages on urban areas.)

framework for implementation of water resource management and development in the BAS sub-basin. These elements will be presented in the "IWRDMP" report for consultation.

3.2 COMPONENT 2: IDENTIFICATION AND PREPARATION OF PRIORITY PROJECTS

3.2.1 Identification and preparation of two short term priority projects

59. **Definition and objectives (what is a short term project):** The short term projects refers to those projects yielding early benefits and impact, within national or regional water resource development plans, targeting poverty reduction and economic growth, have potentials for up-scaling/leveraging into trans boundary regional projects, and requiring minimum data in preparing them ready for implementation. The objectives of the short term projects are to establish sustainable framework for development and management of the water resources in the BAS Sub-basin, build trust and confidence among the communities and EN countries, and enhance regional cooperation. The average budget of these short term project should be around 5 to 10 million Euros.

60. **Screening and selection of the short term projects:** ENTRO has identified through a participatory approach a list of short term projects, of which only two are related to Water Resources Management. As early as possible during the first stages of component one (ideally during the baseline completion) the Consultant will propose 3 to 5 other Water management related short term projects (water supply and sanitation, climate change adaptation, watershed management, flood mitigation, small scale irrigation, small infrastructures for navigation, eco-tourism, etc.). Given the poor rate of access to drinking water and sanitation in South Sudan, the Consultant shall propose projects in this field in order to progress toward the achievements of the Millennium Development Goals. The 5 to 7 projects will be assessed in a concept note describing (i) the components of the projects and the implementation arrangements; (ii) the estimated costs and benefits; (iii) the social and environmental impacts. The concept note will includes mapping of the project sites, characteristics and impact.

61. The Consultant will develop criteria of prioritizing these projects for selection of two priority projects by stakeholders and Steering committee before proceeding into their detailed preparation ready for implementation.

62. **Project preparation of the selected projects:** Depending on the type of project selected (small infrastructure or "soft type" development project) the Consultant will:

    (i) for small infrastructure projects: Undertake feasibility studies including social, economic and financial analyses (including price setting if relevant), and environmental impact assessments to prepare the projects for implementation. Prepare request on the appropriate format for the donor identifies by ENTRO.
    (ii) for "soft type" development project: design the details of the projects components, estimate the costs, and assess benefits and impacts As for a small infrastructure project, prepare a request on the appropriate format for the donor identified by ENTRO.

63. In both cases, the project preparation will be carried out with a participatory approach that the Consultant will describe in its technical proposal.

64. The Consultant will ensure the climate proofing of the short term projects. This will be demonstrated through (i) the assessment of the risks that the impacts of climate change pose for the achievement of development objectives and; (ii) the adaptation of the projects to mitigate these risks.

65. **Outputs:** The key outputs or deliverables consist of comprehensive feasibility studies of the selected infrastructure projects, project design for the "soft type" development projects, and requests for the donors.

3.2.2 Identification and preparation of a long term priority project

66. Definition and objectives (what is a long term project): The long term project refers to infrastructure projects (hydropower, irrigation, WSS, navigation) that may be multipurpose, should ideally benefit to several countries and require significant soils and land surveys, as well as long preparatory studies. The amount of the project should be between Euros 30 and 50 million.

67. Screening and selection of the long term project: the process will be similar to the one developed for the short term projects (see § 60).

68. Feasibility study of the selected project: the selected project will be studied at feasibility level. The Consultant will propose and carry out all required surveys (land, soil, socio-economics, etc.), and will produce preliminary-design drawings. The scope of the study will include technical, economic, financial, socio-economic, environmental and institutional aspects. The Environmental Impact Assessment will not be part of the services, however, the consultant shall assess the main project impacts in order to mainstream environmental issues in the preliminary design, and to be able to broadly cost the required environmental and relocation action plans. The institutional and financial feasibility will assess the PPP potential of the project, and if relevant, propose and cost the technical assistance required to support the public institution that will be in charge of the project management.

69. The Consultant will ensure the climate proofing of the project. This will be demonstrated through (i) the assessment of the risks that the impacts of climate change pose for the achievement of project objectives and; (ii) the adaptation of the project to mitigate these risks.

70. Outputs: The key outputs or deliverables consist of a comprehensive feasibility study of the selected infrastructure project, the investigations reports, as well as a note on the environmental issues and climate proofing of the project.

3.3 COMPONENT 3: IDENTIFICATION AND PROFILING OF MEDIUM AND LONG-TERM PROJECTS

71. **Definition and objectives:** The medium to long term projects are mainly large infrastructure projects that will require substantial amount of data to undertake detailed study (pre-feasibility, feasibility and designs), the projects shall be regional in nature and trans-boundary in scope, and offering win-win benefits to the EN Countries. The overriding objective of the medium to long term investment projects are their significant contribution to ensure access to drinking water and

sanitation for all, enhanced food and energy security, reduce transportation duration and costs, poverty reduction, peace, stability, economic growth and regional integration of the EN region.

72. **Scope of activities**: The Consultant shall prepare the terms of reference of the feasibility studies and Environmental Impact Assessments (EIA) of two medium to long term projects as identified in the previous tasks of this study and detail a roadmap for project preparation. A roadmap includes (i) the list of tasks to be carried out to ensure the project preparation and its funding; (ii) the institutional arrangements; (iii) the organizational setup of the project management; (iv) the communication and consultation plan; (v) the resource mobilization plan; and (vi) the schedule.

73. **Outputs:** The main outputs will include for each project: (i) Terms of Reference of feasibility study and; (ii) Roadmap for project preparation.

3.4 COMPONENT 4: PROJECT IMPLEMENTATION SUPPORT

3.4.1 Stakeholder Consultations

74. **Develop Stakeholder Communication Plan**: Integrated water resources development and management requires inclusive, participatory and effective involvement of all stakeholders. The stakeholders need to be informed and provide inputs at key decision-making stages throughout the planning and development process. For this purpose, the Consultant will, at the start of the assignment, carry out a stakeholder identification and analysis to provide sound basis for a stakeholder consultation and engagement. Secondly, develop a consultation and communication plan in close collaboration with ENTRO (clear objectives of each consultation event, target audience, time schedule, venue, organizational arrangements, communication tools and programme); and thirdly, develop relevant information and communication materials (power point presentations, executive summaries, drawing of the projected infrastructures, etc…) for the various stakeholders and target groups. The plan will build on ENTRO's Stakeholders Consultation and Communication Strategy developed for IDEN projects and related regional and international good practices on consultation and communication.

75. **Consultations**: The Consultant will assist ENTRO in preparing and conducting the consultation process with stakeholders. The consultation will take place all along the IWRMDP and SSEA process at the following stages:

Table 1: consultation sequence

Stage	**Objective of the consultation**
Scoping	Launch the study and check that no major issues is left out
Baseline, key issues and development objectives	Provide the stakeholders' comments to the Steering Committee in order to facilitate well informed decisions
Definition of development options	
Assessment of options	
IWRDMP	
Screening of short term projects	Check the interest of the population for the projects
Preparation of short term projects	Make the population participate to the project preparation

76. ENTRO will take in charge the whole logistical organization of the consultation process. The consultant will: (i) propose the objectives and agenda of each event (mainly workshops and

meetings); (ii) prepare the communication tools required; (iii) present the result of the studies during the events; and (iv) support ENTRO in facilitating the events.

77. Each consultation stage will encompass a meeting of the Regional Technical Committee and Project Steering Committee (see § 4 for attributions). The Consultant will assist ENTRO in preparing these meetings (in particular with a specific power point presentation), will present the stage of advancement of the study, and assist in decisions making.

78. **Expectation and specific outputs:** Since BAS is still at an identification stage, it is important that the consultation plan shall not raise unrealistic expectations to stakeholders. The main *outputs* of this task are: (i) Stakeholder Consultation and Communication Plan; (ii) Information and Communication (I&C) materials for the consultation process; and (iii) Stakeholder consultation carried out according to plan.

3.4.2 Resource mobilization

79. The objective of this task is to ensure buy-in and support for the projects developed for BAS so as to facilitate financing the investments, by the Governments of the EN countries and by international cooperating partners. ENTRO has developed the resource mobilization strategy for the IDEN projects; but what is needed is to adopt and adapt the strategy for investments in the BAS sub-basin.

80. Analyze the financing requirements for the identified BAS projects, different types of costs, sources of financing (public, private, domestic and external), and associated policy and institutional issues. Building on the ENTRO financing strategy, develop a resource mobilization plan or strategy specifically for BAS. The Consultant will closely consult and engage with all stakeholders, including international cooperating partners, in carrying out this task.

81. The consultant will in particular assess the interest and feasibility of implementing Public-Private-Partnerships (PPP) for the main infrastructure projects, taking into account the national legal and institutional frameworks (investments protection, ability to repatriate assets and benefits, regulatory framework, institutional capacity of the administration to implement PPP, procurement procedures, etc.) and the level of risk acceptable by both private and public parties. A financial analysis of the main projects identified as potential PPP will be carried out in order to help assessing their feasibility. This analysis will compare the cost of a PPP with a traditional public sector project, and assess the optimal revenue and risk share between the country and the private sector.

82. International cooperating partners need to be involved early enough for ENTRO to know the development options they prefer to support. Towards this end, the Consultant will engage the partners in the stakeholder consultations right from the commencement of the project. The Consultant will support ENTRO promote the project through face-to-face meetings with the main donors. Subsequently, the Consultant will assist ENTRO organize a donor's round table to facilitate commitments for financing the implementation of identified short-term projects and for project preparation for medium and long-term projects.

83. There are two key Outputs from these activities: (i) Financing Plan for water resources development in the BAS sub-basin; and (ii) Donor's involvement in the consultation process carried out successfully.

4. IMPLEMENTATION ARRANGEMENTS

4.1 Steering of the study

84. A Project Steering Committee (PSC) comprising members of the ENSAPT, senior level national representative from ministry dealing with water resources in each country, and ENTRO Executive Director will be the higher authority of this study. The PSC will validate the various reports and select the projects and options.

85. A Regional Technical Committee (RTC) will advise the PSC and be responsible for providing technical guidance and oversight to ensure that the project technical activities are implemented as planned; The RTC will review study reports. The RTC is a regional, multi-sectorial advisory and consultative body, consisting of 5 members from each country from ministries of water, energy, agriculture/irrigation, finance/planning, and environment and the ENTRO Senior Regional Project Coordinator. This Committee is free to invite guests on occasion to provide independent specialist advice or inputs.

86. Each country will assign a national project coordinator from the ministry dealing with water to serve as primary focal point for BAS activities at national level. He/She will provide overall coordination of national level activities, facilitate consultation and information exchange, including organizing meetings of stakeholders. This will strengthen participation of the governments of the EN countries and enhance project ownership.

87. A project coordinator will be in charge of the day-to-day management of the project, and will be the main contact of the Consultant.

4.2 Duration of Consultancy Services and reports delivery schedule

88. The total duration of the assignment is estimated at 27 months. The project proposed schedule is detailed in annex 2. The Consultant is free to propose an optimized schedule. In case the consultant propose a revised schedule, it should match with the total duration of the assignment, and the dates of submission of the various reports will then contractually replace those detailed below.

89. The main draft reports and time of delivery are indicated in the table below. Every report will be submitted in final form one month after the reception of the comments on the draft report.

Table 2: reports delivery schedule

Draft Reports	Timing from the date of commencement of services (Months)
Components 1,3 and 4	
Scoping report	+1.5
Consultation and Communication Plan	+1.5
Baseline, Key issues and objective report	+ 8
Development potentialities & options	+11
Assessment of options	+15.5
IWRDMP	+20
Resource mobilization plan	+24
ToR of Feasibility studies and Roadmaps of medium to long term projects	+24.5
Component 2 (a)	
Screening of short term projects	8
Project preparation and donors requests of the short term projects	15
Feasibility study of the long term project	26

(a) For component 2, the timing is from the starting date of the component

90. Draft reports will be submitted in 6 copies and in soft format, and final reports in 15 copies and in soft format. The GIS will be integrated in ENTRO's GIS by the consultant on site.

4.3 Qualifications Requirements for Consultant's Key Personnel and indicative inputs duration

91. The BAS project involves integrated development and management of water and land resources; it is a multi-sectorial infrastructural development programme. Therefore the consultancy services require multi-disciplinary competencies including water resources engineering, environment, hydrology, hydraulics, irrigation, agronomy, economics, soils, sociology, navigation , land use and institutional aspects. The Consultant shall assemble personnel with suitable qualifications and experience for a successful implementation of all activities as described above. The majority of the international experts will be supported by national or regional specialists.

92. The Consultant's key team (international experts) will consist of, but not limited to the following (experts can cover several themes):

    1) **Team Leader/Water Resources Engineer**: The Team Leader will be responsible for the overall planning and implementation as well as coordination and management of the consulting team. He/she will undertake planning of multi-purpose water resources development in the BAS sub-basin, coordinate environmental and social impact assessment, institutional and economic analysis, and river basin modeling and simulation. He/She will be responsible for liaison with ENTRO, governments of the riparian states, and international cooperating partners, for supporting ENTRO during the consultation process, and for reporting. The Team Leader will be a water resources planer with minimum Master's Degree in water resources

engineering or related field and 20 years of relevant international experience in integrated water resources management, water resources investment plans and projects including work in Africa. He/She must have evident track record of leadership in managing donor-funded projects and leading multi-sectorial teams. He/She must have demonstrated ability to integrate multi-disciplinary issues.

2) **Environmental Expert**: He/she will be the task leader for all environmental and social assessment and analyses related to the water development projects as well as to eco-tourism. He/She will have a minimum Masters' degree in environmental science or related field with 15 years' experience. Substantial experience with Strategic Social and Environmental Assessments related to water projects, irrigation, hydropower, river hydraulics and land management. Experience of economics and water resources management, climate change, and policy and institutional analyses would be desirable. Knowledge of international environmental guidelines and safeguards would be an asset. Experience in working in multi-sectorial teams in developed and developing countries.

3) **Social Development Expert**: At least a Master's degree in social sciences or related field with 15 years post qualification experience. Experience with Social Assessments, especially related to water infrastructural development in developing nations. Experience of working in post-conflict environment, institutional setup and livelihood development. Stakeholder engagement in transboundary river basins is required and specific experience in Nile basin region is preferable. Experience in working in multi-sectorial teams in developed and developing countries.

4) **Economist**: Minimum Master's degree in Economics with 15 years experience in project/programme economic and financial analyses. Good knowledge of cost-benefit analysis, multiplier analysis, benefit-sharing, economic modeling. Experience with planning and analysis of water infrastructure development. Strong working experience in Africa. Experience in working in multi-sectorial teams.

5) **Water Resources Modeler**: At least Master's degree in Water Resources Planning/ Modeling or related field with 10 years relevant experience. He/She will have extensive experience with hydrology of large river systems. Good knowledge of water resources systems modeling – including the use of simulation and optimization models. Experience in working on large dam projects and strategic water resources assessments desirable.

6) **Hydrologist**: Minimum Masters' degree in hydrology or related field with 15 years relevant experience. Extensive experience on the hydrology and hydrodynamics of large river systems. Good knowledge of hydrological / hydraulic assessments, flood estimation, and drought analysis. He/She will be familiar with a range of software packages for water resources planning and hydrological analysis. Experience in Africa in general, and in the Nile Basin in particular would be preferable. Experience in working in multi-sectorial teams in developed and developing countries.

7) **Groundwater specialist:** Minimum Masters' degree in hydro geology or related field with 15 years relevant experience. Extensive experience in assessing groundwater resources in vast areas. Experience in Africa in general, and in the Nile Basin in particular would be preferable. Experience in working in multi-sectorial teams in developed and developing countries

8) Water supply and sanitation engineer: Minimum Masters' degree in hydraulics or related field with 15 years relevant experience in water supply and sanitation. Experience with planning and analysis of water infrastructure development. Strong working experience in Africa. Experience in working in multi-sectorial teams.

9) **Power economist**: At least a Master's Degree in economy or any relevant discipline, and 10 years of relevant experience. Demonstrated experience in power planning in developing countries.

10) **Dams Engineer**: Minimum Master's degree in civil engineering and at least 15 years' experience. Experience in water infrastructure (dams, weirs, power house, river diversions) planning, investigations, and design.

11) **River Engineer / hydrodynamics Expert**: Minimum Master's Degree in hydraulics with at least 15 years of relevant experience. Good knowledge of river hydraulics, flood control, and navigation development. Demonstrated experience on river sedimentation and hydrodynamics, for both torrential and fluvial flows.

12) **Watershed Management Expert:** Master's Degree in natural resources management or related field with at least 10 years relevant experience. Experience in land use planning, soil conservation, and rural development. Africa experience in multi-sectorial teams and particularly in the Nile Basin experience will be preferred

13) **Irrigation Engineer**: Minimum Master's Degree in Irrigation Engineering with at least 15 years of relevant experience in irrigation planning, design and implementation. He/She will be responsible for assessing the irrigable potential as well as for identification and feasibility of relevant irrigation schemes within the basin. Experience in Africa in multi-sectorial teams will be preferred.

14) **Agro-economist**: At least a Master's Degree in Agronomy/rural economy or equivalent and 15 years of relevant experience. Demonstrated experience in agricultural planning and marketing assessment. He/She will have extensive experience in Africa in multi-sectorial teams.

15) **Soil specialist:** At least a Master's Degree in agronomy or equivalent and 15 years of relevant experience. Demonstrated experience in soil mapping and soil suitability assessment on large areas. He/She will have extensive experience in developing countries in multi-sectorial teams.

16) **Fisheries expert:** At least a Master's Degree in any biology or any relevant discipline and 10 years of relevant experience. Demonstrated experience in planning and impact assessment of infrastructure projects. He/She will have extensive experience in Africa in multi-sectorial teams.

17) **River navigation expert:** At least a Master's Degree in any relevant discipline and 10 years of relevant experience. Demonstrated experience in transport assessment and transport economics on river transport in developing countries.

18) **Public-Private-Partnership (PPP) specialist**: At least a Master's Degree in economy or any relevant discipline and 10 years of relevant experience. Demonstrated experience in PPP in the water sector in developing countries.

19) **Institutional Expert**: At least a Master's Degree in any relevant thematic. with 10 years of relevant experience in institutional assessment and development. Experience in policy analysis, sector regulation, legal framework analysis, institutional arrangements in developing countries.

93. All national or regional experts will have at least a master's degree and demonstrate at least 10 years of relevant experience.

94. Table 3 below presents the indicative professional time input of each expert (excluding support staff).

Table 3: indicative time input (men month)

Expert	**International**	**National/Regional**
Team Leader/Water Resources Engineer	11	
Environmental Expert	7	6
Social Development Expert	1	10
Economist	2.5	
Water Resources Modeler	2.5	
Hydrologist	2.5	2
Power economist	1.5	
Groundwater specialist	1	2
WSS expert	1.5	3
Dams Engineer	2	
River Engineer / hydrodynamics Expert	2	
Watershed Management Expert	2	3
Irrigation Engineer	2	3
Agro-economist	1.5	3
Soil specialist		3
Fisheries expert		3
River navigation expert	1.5	2
Public-Private-Partnership (PPP) specialist	1	
Watershed management expert	2	3
Institutional Expert	1.5	
Total	**46**	**43**

5. DATA, SERVICES AND FACILITIES TO BE PROVIDED BY THE CLIENT

5.1 Data:

95. The Consultant will be responsible for assembling all the required data, documents, reports or studies from the relevant sources within the region. ENTRO will provide the necessary introductions to the national authorities or others to facilitate access to the required information. All data collected during the course of the assignment shall be listed, clearly marked and categorized according to source, and shall become property of ENTRO.

96. A list of data and relevant documents available for the implementation of this assignment is presented in Annex 2.

5.2 Services:

97. ENTRO will be responsible for all communication with the EN Member States on all matters relating to the project. For this purpose ENTRO will:

    - Provide introductory letters for the Consultant to enable them gain access to relevant authorities, whether at national or regional level, including international cooperating partners. However the Consultant will be responsible for field visits and meetings planning and for all logistics.
    - Process invitations and necessary contacts for the consultative workshops at national and regional levels. However, the Consultant is responsible for the technical planning and organization of the workshops. The Consultants shall liaise closely with ENTRO to ensure timely notification and invitation of all participants.
    - Meet all costs related to the workshops, including transportation, board and lodging of national and regional participants, venue, production of workshop reports, and incidentals (excluding transportation and accommodation costs of the Consultant experts).
    - Copying and dissemination of reports (national or regional) to all EN Members States.

98. ENTRO is responsible for all costs and support for conducting the donors' roundtable; however the Consultant will provide technical support for organizing and conducting the workshop.

5.3 Facilities:

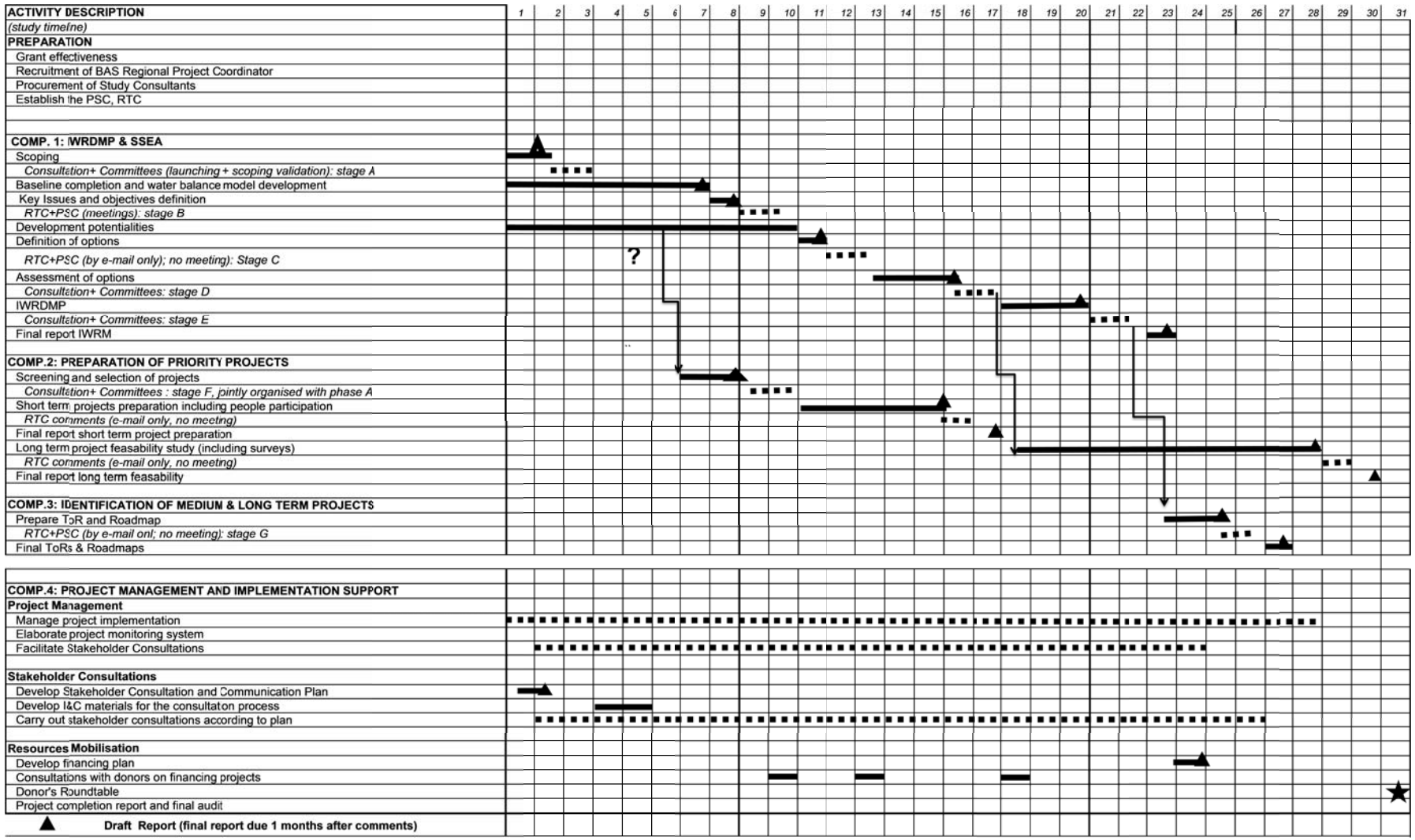
99. It is expected that the Consultant will set up office in Addis Ababa, Ethiopia at the ENTRO Secretariat to facilitate efficient implementation of the project. ENTRO will provide office space as shall be required for the project.

Annexes :

1. Location maps of Baro-Akobo-Sobat Sub-Basin (=annex 1 PAR)
2. Project sequence scheme (= annex 2 PAR)
3. Data and Reference Documents (= annex 4 PAR)
4. Proposed study schedule

Annex 4: Study schedule

Time in months



ANNEX 4: Reference Documents

A. DATA AND INFORMATION

1. Regional

- Eastern Nile One-System Inventory (hydrologic, environmental and socio-economic data); ENTRO; no date.
- Cooperative Regional Assessment (CRA) for Watershed Management. Eastern Nile Watershed Management Project. Techsult, Hydroconsult and al, January 2007.

2. Ethiopia

- Baro-Akobo River Basin Master Plan Study (Ethiopia 1997) (data annexes). Ministry of Water Resources.
- ENRAEMED **(**Ethiopian Natural Resources and Environmental Meta Database). Ministry of Water Resources.

3. South Sudan

- Census Priority Results (2009). SSCCSE
- Key Indicators for Southern Sudan. SSCCSE
- Poverty in Southern Sudan: Estimates from NBHS (2010). SSCCSE
- Southern Sudan Household Health Survey Report (2006). Southern Sudan Centre for Census, Statistics and Evaluation. SSCCSE
- Southern Sudan Livelihood Profiles (2008). SSCCSE
- Statistical Yearbook for Southern Sudan (2009). SSCCSE
- Statistical Yearbook for Southern Sudan (2010). SSCCSE

B. STUDY REPORTS AND OTHER DOCUMENTS

4. Ethiopia

- Baro-Akobo River Basin Master Plan Study (Ethiopia 1997). Ministry of Water Resources
- Ethiopia's Agricultural Sector Policy and Investment Framework (PIF), 2010-2020. Ministry of Agriculture and Rural Development, September 2010.
- Ethiopian Water Resources Management Policy. Ministry of Water Resources
- National Water Development Report for Ethiopia. United Nations Educational, Scientific, and Cultural Organization
- Rural Development Policy and Strategies, April 2003. Ministry of Finance and Economic Development
- Water Sector Development Program, Volume 1 and Volume 2, October 2002. Ministry of Water Resources

5. South Sudan

- Water, Sanitation & Hygiene (WASH) Strategic Framework, March 2011. Ministry of Water Resources & Irrigation, Government of Southern Sudan (GOSS).

6. Regional

- EN-Irrigation and Drainage Cooperative Regional Assessment. ENTRO
- EN-Regional Power Trade Study. ENTRO
- Mohamed Mustafa Abbas. Ministry of Irrigation and Water Resources, Sudan.
- NBI-Efficient Water Use For Agriculture (EWUAP) Project - Large Scale Irrigation Practices in the Nile Basin (best practices, weaknesses and opportunities). ENTRO
- NBI-Nile Trans-boundary Environmental Action Project – TEA. ENTRO
- Nile Decision Support System (Nile DSS). ENTRO
- The Sobat Basin and the Machar Marshes, in The Hydrology of the Nile by J. V. Sutcliffe & Y. P. Parks. IAHS Special Publication no. 5, 1999.
- Towards Hydropolitical Cooperation in the Nile Basin: Assessment of Joint Integrated Water Resources Projects between Sudan and Ethiopia to Transform Conflicts, 2006
- Watershed Management Fast Track Project: Lau Watershed Project Area, Maiwut County, Southern Sudan. ENTRO 2008

ANNEX 5: Detailed Cost Estimates

A- Costs covered by AWF

A.1 Consultancy costs

TOTAL consultancy cost(€)

Component 1: IWRDMP & SSEA	1 270 000
Component 2: Preparation of priority projects	630 000
Component 3: Identification of medium to long term projects	100 000
Component 4: Project implementation support	100 000
Grand Total	**2 100 000**

Detailed estimate

Component 1: Scoping, baseline, key issues, objectives, assessment of options

Item	Unit	Rates (€)	Qty	Total price (€)
Fees				**607 000**
Team leader	mm	20 000	6	120 000
International experts	mm	14 000	24.5	343 000
National experts	mm	4 000	30	120 000
Support personnel	mm	2 000	12	24 000
Transport and accommodation				**183 525**
International flight	U	1 500	21	31 500
Regional/National flight	U	600	39	23 400
Per Diem International	Day	150	547.5	82 125
Per Diem National/Regional	Day	70	450	31 500
Cars	Day	150	100	15 000
Data acquisition				120 000
Reports	lumpsum			60 000
Total				970 525

Component 1 : IWRMDP

Item	Unit	Rates (€)	Qty	Total price (€)
Fees				**204 000**
Team leader	mm	20 000	4	80 000
International experts	mm	14 000	6	84 000
National experts	mm	4 000	7	28 000
Support personnel	mm	2 000	6	12 000
Transport and accommodation				**69 150**
International flight	U	1 500	10	15 000
Regional/National flight	U	600	13	7 800
Per Diem International	Day	150	210	31 500
Per Diem National/Regional	Day	70	105	7 350
Cars	Day	150	50	7 500
Data acquisition				0
Reports	lumpsum			30 000
Total				303 150

Total component 1	**1 273 675**

Component 2: Preparation of priority projects
Cost estimate for 2 short term priority project preparation

Item	Unit	Rates (€)	Qty	Total price (€)
Fees				**136 000**
Team leader	mm	20 000	2	40 000
International experts	mm	14 000	4	56 000
National experts	mm	4 000	8	32 000
Support personnel	mm	2 000	4	8 000
Transport and accommodation				**32 550**
International flight	U	1 500	4	6 000
Regional/National flight	U	600	4	2 400
Per Diem International	Day	150	45	6 750
Per Diem National/Regional	Day	70	120	8 400
Cars	Day	150	60	9 000
Data acquisition				10 000
Reports	lumpsum			10 000
Total				188 550

Component 2: Preparation of priority projects
Cost estimate for one medium to long term priority project feasibility study (base: € 30 to 40 million investment)

Item	Unit	Rates (€)	Qty	Total price (€)
Fees				**210 000**
Team leader	mm	20 000	2.5	50 000
International experts	mm	14 000	6	84 000
National experts	mm	4 000	14	56 000
Support personnel	mm	2 000	10	20 000
Transport and accomodation				**43 050**
International flight	U	1 500	4	6 000
Regional/National flight	U	600	6	3 600
Per Diem International	Day	150	85	12 750
Per Diem National/Regional	Day	70	210	14 700
Cars	Day	150	40	6 000
Land, soil and geotechnical surveys				180 000
Reports	lumpsum			10 000
Total				443 050

Component 3: Identification of medium to long term projects
Cost estimate for 2 projects identification

Item	Unit	Rates (€)	Qty	Total price (€)
Fees				**68 000**
Team leader	mm	20 000	2	40 000
International experts	mm	14 000	2	28 000
National experts	mm	4 000	0	0
Support personnel	mm	2 000	0	0
Transport and accomodation				**18 000**
International flight	U	1 500	2	3 000
Per Diem International	Day	150	40	6 000
Cars	Day	150	60	9 000
Reports	lumpsum			10 000
Total				96 000

Component 4: Project implementation support

Item	Unit	Rates (€)	Qty	Total price (€)
Fees				**65 000**
Team leader	mm	20 000	1.25	25 000
International experts	mm	14 000	2	28 000
National experts	mm	4 000	3	12 000
Support personnel	mm	2 000	0	0
Transport and accomodation				**27 375**
International flight	U	1 500	0	0
Regional/National flight	U	600	16	9 600
Per Diem International	Day	150	97.5	14 625
Per Diem National/Regional	Day	70	45	3 150
Cars	Day	150	0	0
Data acquisition				0
Reports	lumpsum			10 000
Total				102 375

A.2 Project management and Stakeholders consultation costs

Project management costs

Item	Unit	Rates (€)	Qty	Total price (€)
Project Coordinator				
Salary	mm	3300	35	115 500
Per Diem				28 900
Total				144 400

Stakeholders Consultation costs

Item	Unit	Rates (€)	Qty	Total price (€)
1-Stakeholders + RTC + PSC:Kick Off workshop + scoping validation	Lumpsum			**35000**
2-RTC + PSC: Key issues & development objectives validation	Lumpsum			**15000**
3-RTC + PSC: screening of options & selection of options to be assessed	Lumpsum			**0**
4- Stakeholders + RTC + PSC: Assessment of options	Lumpsum			**35000**
5- RTC+PSC: Identification and screening of short term projects	Lumpsum			**0**
6- Stakeholders + RTC + PSC: Closing session: validation of the IWRDMP & selection of the long term project to be identified	Lumpsum			**35000**
Communication and information materials	Lumpsum			**10000**
Total				**130 000**

NB: stages 3 and 5 of the consultation to be organised jointly with other consultations or by e-mail

B- **ENTRO's Contribution**

BARO AKOBO SOBAT									
PROJECT MANAGEMENT COST COVERED BY ENTRO (SOURCE: ENTRO)									
			FIRST 12 MONTH	SECOND 12 MONTH	THIRD YEAR	IN EURO (rate: March 2012)			
	TIME	MONTHLY	ANNUAL			YEAR 1	YEAR 2	YEAR 3	TOTAL
		USD	USD	USD	USD				
PROJECT EMPLOYEES			**42 000.00**	**43 260.00**	**48 057.80**	**31 250**	**31 250**	**35 757**	**98 257**
PROGRAM ASSISTANT		680.00	8 160.00	8 404.80	9 336.94	6 071	6 254	6 947	19 272
ACCOUNTANT		750.00	9 000.00	9 270.00	10 298.10	6 696	6 897	7 662	21 256
PROCURMENT ASSISTANT		800.00	9 600.00	9 888.00	10 984.64	7 143	7 357	8 173	22 673
DRIVER		500.00	6 000.00	6 180.00	6 865.40	4 464	4 598	5 108	14 171
JANATOR		250.00	3 000.00	3 090.00	3 432.70	2 232	2 299	2 554	7 085
GENERAL SERVICE		250.00	3 000.00	3 090.00	3 432.70	2 232	2 299	2 554	7 085
GUARD		270.00	3 240.00	3 337.20	3 707.32	2 411	2 483	2 758	7 652
TIME OF SENIOR STAFF			**45 000.00**	**46 350.00**	**51 490.50**	**33 482**	**34 487**	**38 311**	**106 280**
EXECUTIVE DIRECTOR	5%	500.00	6 000.00	6 180.00	6 865.40	4 464	4 598	5 108	14 171
SENIOR REGIONAL PROJECT COORD	15%	1 125.00	13 500.00	13 905.00	15 447.15	10 045	10 346	11 493	31 884
SOCIAL DEVELOPMENT AND COMMI	10%	750.00	9 000.00	9 270.00	10 298.10	6 696	6 897	7 662	21 256
ENVIRONMENTAL SPECIALIST	10%	750.00	9 000.00	9 270.00	10 298.10	6 696	6 897	7 662	21 256
REGIONAL FINANCE & ADMINISTRA	5%	325.00	3 900.00	4 017.00	4 462.51	2 902	2 989	3 320	9 211
SENIOR ACCOUNTANT	10%	150.00	1 800.00	1 854.00	2 059.62	1 339	1 379	1 532	4 251
SYSTEM ADMINISTRATORS	10%	150.00	1 800.00	1 854.00	2 059.62	1 339	1 379	1 532	4 251
						-	-	-	-
OPERATING COSTS			**40 500.00**	**40 500.00**	**40 500.00**	**30 134**	**30 134**	**30 134**	**90 402**
Staff Insurance			1 500.00	1 500.00	1 500.00	1 116	1 116	1 116	3 348
Audit & professional fee			1 500.00	1 500.00	1 500.00	1 116	1 116	1 116	3 348
Casual Wages			500.00	500.00	500.00	372	372	372	1 116
Advertisement			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Subscription to Proffessional			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Equipment Repairs & Maintenanc			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Other Repair & Maintenance			500.00	500.00	500.00	372	372	372	1 116
Vehicle Insurance			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Electricity			700.00	700.00	700.00	521	521	521	1 563
Water			700.00	700.00	700.00	521	521	521	1 563
Generator Fuel			500.00	500.00	500.00	372	372	372	1 116
Vehicle Maintenance			1 500.00	1 500.00	1 500.00	1 116	1 116	1 116	3 348
Vehicle Parking			100.00	100.00	100.00	74	74	74	223
Vehicle Fuel			3 500.00	3 500.00	3 500.00	2 604	2 604	2 604	7 813
Vehicle Other Running Costs			500.00	500.00	500.00	372	372	372	1 116
Telephones/Faxes			6 000.00	6 000.00	6 000.00	4 464	4 464	4 464	13 393
Internet/Email			3 500.00	3 500.00	3 500.00	2 604	2 604	2 604	7 813
Postage/Courier Expenses			500.00	500.00	500.00	372	372	372	1 116
Stationery & Printing			4 500.00	4 500.00	4 500.00	3 348	3 348	3 348	10 045
Consumables for Office Equipme			500.00	500.00	500.00	372	372	372	1 116
News Papers & Periodicals			300.00	300.00	300.00	223	223	223	670
Office Tea/Coffee Expenses			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Uniforms & Other Protective We			700.00	700.00	700.00	521	521	521	1 563
Recruitment cost			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Miscellanoeus Expenses			1 500.00	1 500.00	1 500.00	1 116	1 116	1 116	3 348
Office cleaning & Compound Mai			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Hospitality			1 000.00	1 000.00	1 000.00	744	744	744	2 232
Bank Charges & Interest			3 500.00	3 500.00	3 500.00	2 604	2 604	2 604	7 813
						-	-	-	-
TOTAL PROJECT MANAGEMENT COST			**127 500.00**	**130 110.00**	**140 048.30**	**94 866**	**95 871**	**104 203**	**294 939**
OVER THE PROJECT LIFE					**397 658.30**				**294 939**

Source: ENTRO

C- Governments' contribution

In USD

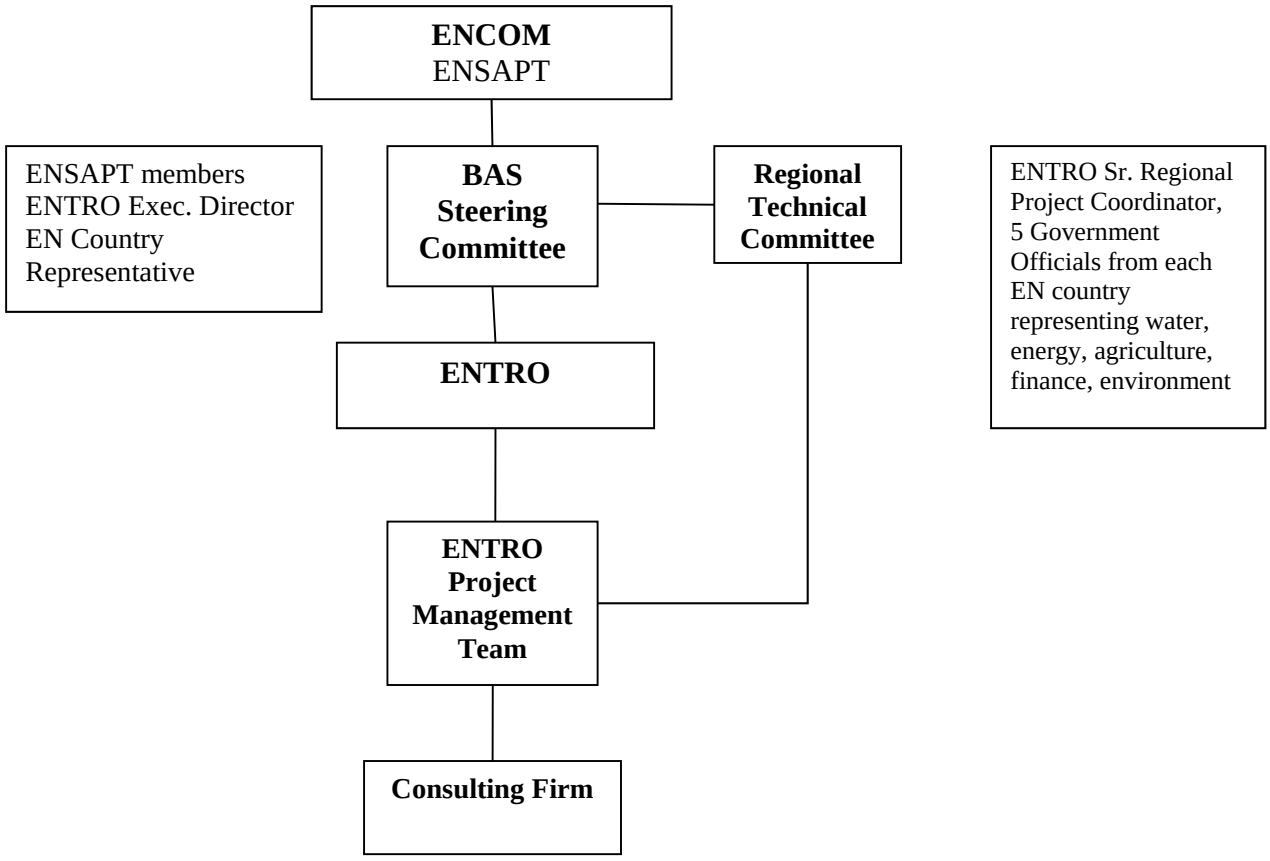
Description	Unit	Qty	Rate/Day/Month	One Year Cost	Total Cost up to End of Project
Capital Investment					**126 137**
Office Space (in ENTRO) (1)	Sq.m.	255	10	30 646	91 937
Office Space-Countries		20	10	7 200	21 600
Office furnishing-Countries			350	4 200	12 600
Recurrent Cost per annum					**223 295**
Vehicle depreciation - ENTRO's vehicle bought with countries funds				9 569	28 708
Vehicle depreciation-Countries providing cars for NC and other visitors		3	1 000	3 000	9 000
Staff time					
National Coordinators (NC)		3	500	18 000	54 000
Secretary		3	100	3 600	10 800
ENSAPT (one 3 days meeting per year on BAS)		9	67	1 800	5 400
ENCOM (one day per year on BAS)		3	500	1 500	4 500
ENTRO-Executive Director (2)		1	1 826	21 912	65 736
ENTRO-Regional Finance & Administration Head		1	1 254	15 050	45 151
Total US$					**349 432**

TOTAL EURO (march 2012 rate)					**259 994**

(1): Ethiopia provides some offices to ENTRO
(2): ED and 50% RFAH wages are covered by members' countries; a part time of the 2 positions is charged to the project

Source: ENTRO

ANNEX 6: Project Management Structure



ANNEX 7: Terms of Reverence for the BAS Project Coordinator

Functions

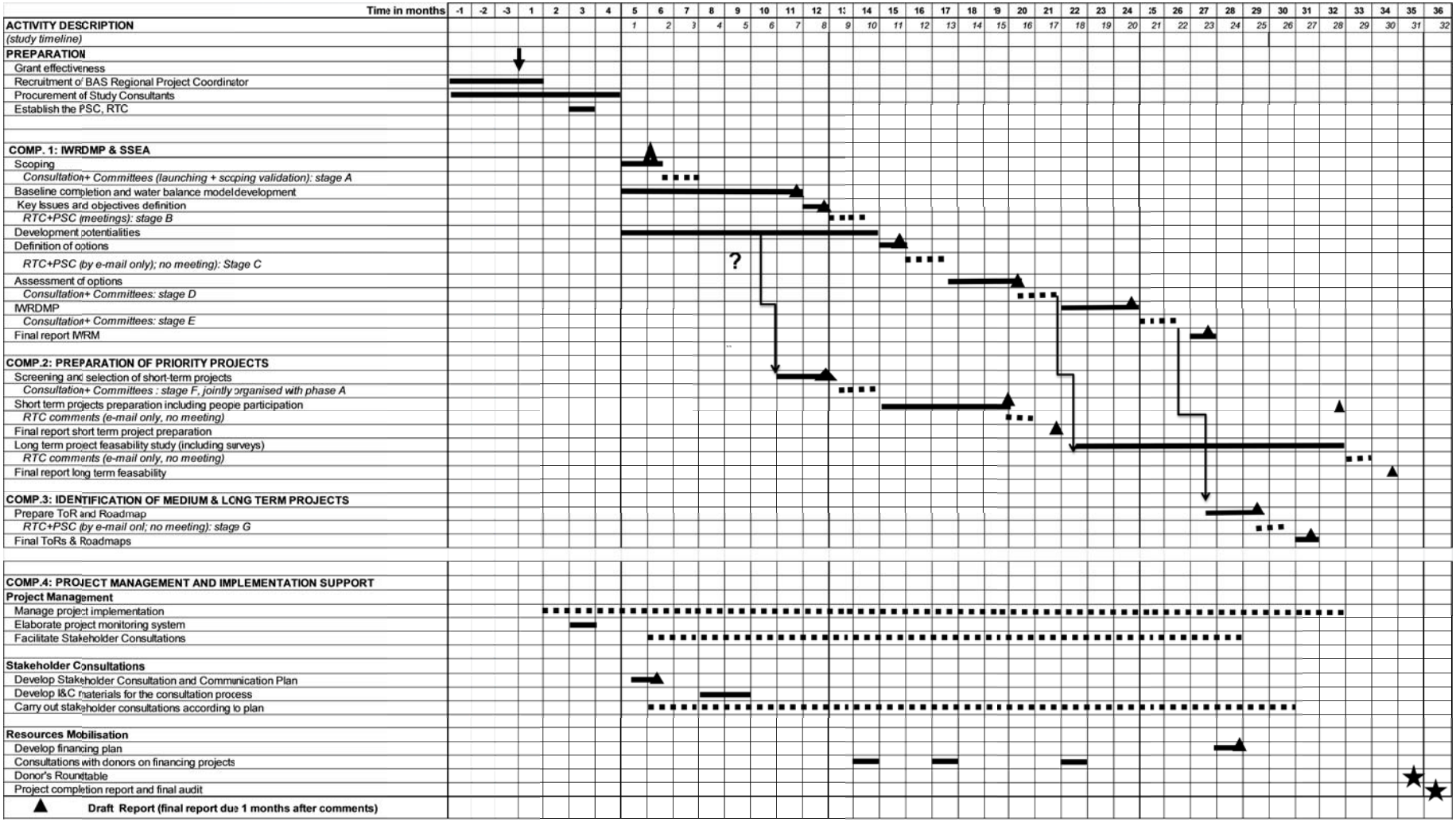
The Project Coordinator has overall responsibility for the day to day implementation of the project, and will have the following functions:

1. Overall technical management of the project.
2. Prepare, implement and manage the work plan as approved by the Project Steering Committee.
3. Procurement of consultants for the Project.
4. Management and oversight of the consultants engaged under the project.
5. Liaison with the EN Member States and other related projects and organizations.
6. In consultation with the consultants and ENTRO, organize the consultative workshops at national and regional levels to discuss various Project outputs.
7. Dissemination of Project outputs as approved by the ENTRO and the PSC.
8. Prepare and conduct donors' round table on resource mobilization.
9. Prepare and submit progress and financial reports to ENTRO and the PSC as agreed in the work plan.
10. Support AWF project supervision missions.

Qualifications

(i) At least a Master's Degree in Water Resources Management or Civil Engineering with a minimum of 15 years' experience in the management of river basin projects/programmes;
(ii) Familiarity with the procedures of Multinational Banks is a requirement;
(iii) Proven capabilities in handling multi-disciplinary donor funded projects of this nature;
(iv) Must have worked in Africa or other developing countries;
(v) Proven capabilities in and knowledge of River Basin organization;
(vi) Excellent communication skills and be fluent in English.

ANNEX 8: Detailed Project Implementation Schedule



ANNEX 9: Description of the Baro-Akobo-Sobat Sub-Basin

BARO-AKOBO-SOBAT SUB-BASIN[8]

1. GEOGRAPHICAL SETTING

1.1 The Eastern Nile Basin, located in the north-eastern part of Africa covers major parts of Ethiopia, parts of Sudan, South Sudan and Egypt and a very small portion of Eritrea. Geographically the basin may be divided into five Sub-basins:- Main Nile Sub-basin covering large parts of Egypt; the Tekeze-Atbara-Setit Sub-basin covering northern parts of Ethiopia and eastern corner of Sudan; Blue-Nile Sub-basin covering the north-western corner of Ethiopia and eastern parts of Sudan; White Nile Sub-basin covering the central part of Sudan; and Baro-Akobo-Sobat Sub-basin covering the western part of Ethiopia and the south-eastern part of Sudan.

1.2 The Baro-Akobo-Sobat Sub-basin is a trans-boundary sub-basin covering 186,275 km2 that stretches from southwestern Ethiopia to southeastern and central Sudan and South Sudan between latitude 5° 31′ N and 9° 54′ N, and longitude 31° E and 36° 17′ E. About 80% of the Sub-basin is in South Sudan with the remainder in Ethiopia. The river network within the Baro-Akobo River Basin is formed by four major rivers, namely, the Baro, Alwero, Gilo, and Akobo, and their associated tributaries. The Baro river with its tributaries, Birbir, Geba and Sor form the northernmost river system in the basin. The Akobo river with its tributary, Kashu, is the southernmost river system in the basin. The Akobo river is joined by the Pibor river forming the western basin border. It then flows northwards and confluence with the Baro from the north to form the Sobat river in South Sudan which eventually flows into the White Nile River upstream of the city of Malakal.

1.3 The Ethiopian part of the Sub-basin comprises high plateaux with elevations ranging from 1500 to 2000 m with peaks reaching 3,000 masl in the south western highland plateaus of Ethiopia. The high land plateaux then progressively drops to below 500 masl in the low-lying area of the Gambela flood plain in Ethiopia, the Machar flood plain in South Sudan, and the seasonal flood plains at the mouth of the Gilo, Akobo and Pibor watersheds. Plains with land slope of less than 3% covers nearly 60% of the Sub-basin. Other land forms in the Sub-basin include plateaus, valleys, deltas, dunes, and water bodies.

1.4 The predominant part of the basin has tropical climate with distinct dry and wet season from April/May to October/November. The mean annual rainfall has very high spatial variation, from as low as 600 mm in the lowlands to as much as 2,000 mm in the highlands in Ethiopia. The temperature range in the basin is from around 17°C at 2,500 masl in the highlands to about 27°C in the lowlands (below 500 masl). Maximum temperatures (occurring in April) in the highlands rarely exceed 25°C, whereas in the lowlands they generally exceed 36°C. The mean annual evaporation over a predominant part of the basin is in the range 1601 – 1900 mm; but in the plateau highlands in Ethiopia the range is 1051 – 1400 mm.

[8] Most of the material in this Annex is taken from ENTRO report *One System Inventory of the Baro-Akobo-Sobat-White Nile Sub-basin*, the *Baro-Akobo Water Master Plan*, and *Cooperative Regional Assessment for Watershed Management – Transboundary Analysis Baro-Sobat-White Nile Sub-basin*

2. SOCIO-ECONOMIC CHARACTERISTICS

2.1 **Population**: The Baro-Akobo-Sobat Sub-basin in South Sudan covers the entire administrative units (called states) of East Equatoria and Jonglei and a small portion of Upper Nile; while in Ethiopia the Sub-basin covers the administrative units (called regions) of Oromiya, Gambela and SNNP. The total population in the Sub-basin is about 3.6 million people; about 2.7 million live in the Ethiopian part of the basin, 80% of whom live in rural areas; about 0.9 million people live in South Sudanese part of the basin, more than 90% of whom live in rural areas. Population density over most of the South Sudanese part of the Sub-basin is only 5 persons/km2; in Ethiopian part of the basin it varies widely from 3 persons/km2 in the Gambela region to 127 persons/km2 in the SNNP region. Around 40-45% of the population in all the states in the Sub-basin is below the age of 15 years, while only a small proportion of around 4-5% are above 60.

2.2 **Poverty characteristics**: The basis for determining the poverty characteristics in Ethiopia and South Sudan are different and thus cannot be compared with each other. Nonetheless, in spite of the different measures, the scale of poverty over the Sub-basin varies from 50 to 70% across the Sub-basin. One indicator of the poverty situation of the basin population is the level of food aid dependency in the region. As much as 12-30% of the population in some parts of the Sub-basin depend on food aid. The main cause of food insecurity is the reliance on rain-fed agriculture.

2.3 **Education and Health**: The literacy rate for population above 15 years is 27% in the South Sudanese part of the basin, and around 24% in the Ethiopian part of the basin. In the Ethiopian side of the basin, more than half of the primary school age population (7 to 12 years) does not attend school while secondary school enrolment level is even lower. Over three-fourth of the population eligible for secondary education do not enroll, and are engaged in other livelihood activities instead, partly due to poverty, which prevents parents from sending their children to school. In the South Sudan part of the basin school enrolment is even lower and has been exacerbated by the past civil conflict that scattered the settlements and destroyed school infrastructure. With respect to health, access to hospitals and health services is reported to be low particularly in the South Sudanese part of the basin; for example, on the Ethiopian side, there are only two hospitals and 11 health centers for a population of more than 400,000. Infant mortality rates are higher on the South Sudanese side than on the Ethiopian side in general. One of the more serious problems amongst children of age 6 months to 4 years is the low nutritional levels. Other health risks reported in the basin area include malaria, bilharzias, diarrhea, and tuberculosis.

2.4 **Gender Issues**: Very little is documented about the gender roles, issues and constraints in the Baro-Akobo-Sobat Basin area. The limited information available suggests that, women are mainly involved in the agriculture sector, and face several social and economic constraints, such as: land tenure, inadequate extension and information services, agriculture inputs, markets and technology. Furthermore, gender issues in the area also invlove large disparities in education, appropriate measures for gender specific health risks, and low participation in decision making.

2.5 **Employment**: Farm employment (combining crop and livestock production) constitutes the primary source of occupation for the population. The economy is largely subsistence, mainly based on traditional methods of cultivation of maize, sorghum and other cereal crops. In semi-arid to arid conditions, pastoral livestock (cattle, sheep, and goats) is the predominant activity. However, there have been recent private sector investments in irrigated agriculture, with large scale commercial farming on the Ethiopian side of the Sub-basin around the Gambela area, mostly growing rice.

3. WATER RESOURCES

3.1 **Surface Water Resources**: The Baro-Akobo-Sobat Sub-basin derives most of its runoff from the high rainfall highlands in the Ethiopian part of the basin. The flow is concentrated in the rain season from April/May to October/November. River gauging stations are sparse in the Ethiopian part of the basin, but even fewer, and broken down due to lack of maintenance, in the South Sudanese part of the basin. The mean annual runoff of the Baro at Gambela is 12 billion cubic metres (Bm3), and just downstream of the confluence of the Baro and Pibor the mean annual runoff is estimated to be 23 Bm3; and the flows on the Sobat upstream of the confluence with the White Nile has been variously estimated at 13.5 Bm3. ENTRO estimates losses of 12 Bm3 annually from the Sobat as a result evaporation, evapo-transpiration and other loss-related processes from the extensive floodplains and mashes in the Sobat basin.

3.2 **Groundwater**: The *One System Inventory* points out that quantitative estimates of groundwater in the Baro-Akobo-Sobat Sub-basin are rather approximate and considerable effort is required to arrive at more accurate estimates. In the Baro-Akobo Sub-basin there basically two main types of aquifers, one associated with fracture and crush zones in the Basement Complex rocks, and the other in the Pliocene to Quaternary alluvium, an unconsolidated sedimentary porous medium. The alluvium usually consist of fine sand to silt and the yield is generally low varying from 0.01 to 1 litres per second. In the basement complex data is severely lacking but yields depend on fractures and amount of weathering. In the unconsolidated sediments that stretch from Sobat River down to the While Nile there is an upper aquifer underlain by a lower aquifer at depths of 240 – 310 m. More investigations and analyses are required to gain better description and characteristics of these aquifers.

3.3 **Floods**: The major rivers in the Baro-Akobo Sub-basin confluence within the Gambela plains. During peak flow period, July to October, the simultaneous peaking of these rivers subjects the Gambela plains to flooding due to overflows of river banks, backwater from the Pibor River and the Sobat River and poor drainage on low relief vertisoils. Further studies are needed to estimate areas of flooding, duration, intensity, impacts on human settlements, infrastructure, and other environmental effects.

3.4 **Sedimentation**: Most sheet erosion in the Sub-basin occurs in the Ethiopian Highlands; some sheet erosion also occurs within South Sudan, mainly on and around the rock hills (*Jebels*), which have become devoid of vegetative cover. Most of the erosion is deposited on the footslopes and does not enter the drainage system. The total soil eroded in the Baro-Akobo catchment is estimated to be 43.7 million tons per annum, and that from cultivated land 21.5 million tons per annum. Sediment transport data has not been systematically collected in the Baro-Akob-Sobat Sub-basin. On the Ethiopian side data was collected from 11 gauging stations over the period 1988 - 1990, and in 1996, and on seven additional stations in the course of the Master Plan studies for the Baro-Akobo. The data from these stations indicate sediment yields varying from 35 to 324 tons/km2/yr with an average of 125 tons/km2/yr. No data is available from South Sudan.

3.5 **River navigation**: The river network in the basin area presents opportunity for local and trans boundary transport. However this requires detailed knowledge of minimum drafts and channel widths during low flows, flood levels and secure landings. At present this information is lacking.

3.6 **Water Quality:** Results of water quality analyses conducted during past studies within the Baro-Akobo watershed have generally indicated the water to be of good to excellent quality for both drinking and irrigation purposes. The results reflect only the chemical characteristics (Total Dissolved Solids, pH, etc.) of the water; but there is no information relating to the bacteriological quality and hazardous constituents of the water.

4. AGRICULTURE, FISHERIES AND WILD LIFE

4.1 Agricultural land use: The main agricultural land use systems in the Baro-Akobo-Sobat Sub-basin in South Sudan and Ethiopia are relatively distinct except along the international border where the cultural affinities have given rise to very similar systems. Nevertheless, three broad systems can be identified: (i) rainfed cropping, (ii) irrigated cropping and (iii) extensive livestock production (with minor cropping). Differences in the scale of operations, tenure type and, to a lesser extent, cropping patterns give rise to a number of recognizable sub-categories. The table below presents the main agricultural land use systems in South Sudan and Ethiopia.

Agricultural Land Use Systems: Ethiopia and South Sudan

MAIN CATEGORY	SCALE OF OPERATIONS	TENURE TYPE	MAIN COMPONENTS	LOCATION
RAINFED CROPPING	Small-scale Traditional; Sedentary	State land: Individual and communal use rights	Cropping (cereals, pulses, oil seeds) Cropping (Enset, roots, cereals, pulses) Small livestock holdings (communal grazing)	Ethiopia highlands
	Small-scale traditional; shifting	State land: Individual and communal use rights	Cropping (cereals, pulses) No livestock holdings (Tsetse infestation)	Ethiopia and South Sudan (Anuak, Shilluk)
	Small-scale traditional: Flood retreat	State land: Individual and communal use rights	Cropping (cereals, pulses) Small livestock holdings (Communal grazing)	Ethiopia and South Sudan: Lowlands
	Large-scale: mechanized	State land; medium term leases; private sector	Cropping (sorghum, cotton, sesame)	Ethiopia (Gambela) South Sudan Lowlands
IRRIGATED CROPPING	Small schemes in valley bottoms: Small scale operations (< 1.0ha) Gravity controlled water tables	State land: individual use rights: additional to rain-fed land	Cropping (cereals, vegetables)	Ethiopian Lowlands
	Small-scale: (<20 ha) Pump	Individual freehold state land: lease	Cropping: Sorghum, wheat, alfalfa	White Nile
	Large scheme: small-scale operations (<40 ha feddans) Gravity	State land: Individual long-term leases	Cropping: Cotton, sorghum, wheat,, small livestock holdings	Sudan: Gezira and Rahad schemes
	Large scheme: Large scale operations	State land: long-term leases	Cropping: Sugar	Sudan: Kenana schemes
LIVESTOCK	Small-scale: Extensive pastoral transhumant	Communal use (grazing, water) rights	Cattle, small ruminants	South Sudan (Toposa)
	Small-scale Extensive Agro-pastoral transhumant sedentary	State land: communal use (grazing, water) rights	Cattle, small ruminants, small scale cropping	South Sudan (Nuer, Shilluk, Murle)

Source: One System Inventory Study Report, June 2009

4.2 **Livestock**: The Sub-basin contains about 1.2 million cattle, 0.4 million sheep, 0.24 million goats, 0.09 million equines and 1.1 million chickens. Cattle are of primary importance, representing about 90% of the total livestock unit. They are used for draught, milk, capital reserve, a source of cash, and for cultural purposes (status, bride price, etc.). Livestock densities are high in the Ethiopian Highlands, the Nuba Mountains and in the area just to the north of the Machar marshes; moderately high in the central area across the White Nile catchment; and relatively low in the southern areas. The production and productivity of livestock is seriously affected by tsetse fly infestations, seasonality of feed supply and limitations imposed by water supplies during the dry season, the wide spread prevalence of endemic diseases and parasites coupled with poorly developed veterinary services. The inundation of the natural grazing area for increasingly longer duration imposes high pressure of livestock on limited pastureland left out of swampy sites. This in turn leads to overstocking of the accessible grazing land beyond its carrying capacity. In the lower basin, livestock are managed on a migratory system in response to the availability of grazing and water in the plain.

4.3 **Fisheries**: Fishing occurs on the Baro, Sor, Weber, Yobi, Dibo and Uka rivers, and many of the floodplain lakes, but is purely on a subsistence basis using traditional methods. There is a rich diversity of fish fauna in these rivers, and so far 106 distinct types of species have been identified; but Nile perch, Nile Tilapia, Catfish, Bagrus, Barbus and Labeo species are the most important fish species. Potential production is estimated between 1,240 to 5,000 tons/year. There are few fishing cooperatives in the region at Pinudo, Pinkew and Itang who fish for their consumption and for sale to local market.

4.4 **Wildlife**: There are a number of game parks in the Ethiopian and South Sudanese parts of the Sub-basin, which in the past had considerable variety of wildlife; for example the 506,100 ha Gambela National Park in Ethiopia and the 2.28 million ha Boma National Park in South Sudan. The Gambela National Park in the upper course of the Sub-basin is an important habitat for 100 mammal species and 400 avifaunal species; the wetlands in the park are home to the White-eared Kob (*Kobus kob subspp.leucotis*) and to the Nile Lechwe (*Kobus megaceros*), both of which are listed by IUCN as threatened species. However most game parks have undergone severe degradation as a result uncontrolled hunting, civil unrest, and depletion of habitat as a result of encroachment of human settlements including large scale agriculture. With improvements in park management, including restocking and enforcement of existing statutes, the game parks may become viable enterprises. On the South Sudanese side, the Government of the Republic of South Sudan has recently issued concessions for game parks management.

5. INFRASTRUCTURE

5.1 **Water supply and sanitation**: Baseline information on water supply and sanitation in South Sudan part of the Sub-basin is not readily available as can be seen from the table below. The South Sudan Statistical yearbook of 2010 indicates summaries of baseline data, but not disaggregated into the country's administrative units (states). However, according to the 2010 Sudan Household and Health Survey, the overall water supply and sanitation coverage in South Sudan is 55% and 14.6% respectively; while availability of water and sanitation facilities in schools is reported to be 49% and 51.7% respectively. Considering that in rural South Sudan safe water sources consist only of deep well/pump and possibly dug well/pump, it is evident that only 25.6% of the population have access to safe water supply. In the Ethiopian part of the basin, the proportion of the population using safe water sources (taps, and protected well or spring) is only 22.4% in Oromiya, 26.5% in Gambela, and

only 18.8% in SNNP. The overall conclusion is that within the Sub-basin only about 25% of the population has access to safe water supply. Access to proper sanitation is correspondingly lower.

Baro-Akobo-Sobat Sub-basin – Access to Drinking Water

STATE	Main Source of Water							
	Piped into dwelling	Public Tap	Deep Well/ Pump	Dug Well/ Bucket	River Canal	Rain Water	Others	Not Stated
SOUTH SUDAN	50.8	4.3	15.8	9.8	12.8	0	6.4	0.1
Upper Nile	na							
Jonglei	na							
Equatoria	na							
Malakal	3.6	1.8		0.2	94.1		0.3	
ETHIOPIA	**Tap**	**Protected well/ spring**	**Unprotected well/ spring**	**River lake pond**				**Not Stated**
Oromiya	11.2	*11.2*	*34.2*	*43.1*				*0.3*
Gambela	16.7	9.8	16.5	56.2				0.8
SNNP	7.6	11.2	30.5	50.1				0.2
Sources: Sudan: UN Population Fund & Sudan Central Bureau of Statistics; Ethiopia: World Bank								

5.2 Roads and Railways: There are no major road linkages between Ethiopia and South Sudan within the Baro-Akobo-Sobat Sub-basin. A dry weather track crosses the Ethiopia-South Sudan border at one point at Kurmuk. On the South Sudanese side a secondary road from Malakal approaches the border towards Gambela but there is no connection yet with the secondary road from the town of Gambela. More than half of the Sub-basin population does not have access to all-weather roads. The absence/lack of all-weather roads is a major obstacle to efforts to promote basin-wide development such as fishing and irrigation. With respect to railway transport, there are no railways in the entire Sub-basin. In the Ethiopian part of the basin land transport faces challenging terrain; while in the South Sudanese part land transport is virtually undeveloped.

5.3 Air transport: Within Ethiopia there are six operational airports in the Baro-Akobo basin connected to Addis Ababa by schedule air services. Gambela is the largest and the only airport with paved runway and navigation aids. In the South Sudanese part of the basin there are operational airports in each of the state capitals.

5.4 Existing Dams and Reservoirs: Alewero reservoir in the upper course of the Baro watershed in Ethiopia, and the Jebel Aulia reservoir at the mouth of the White Nile in the Sudan are the two dams/reservoirs existing in the Sub-basin. The Alewero reservoir was initially built for irrigation and is currently used for both irrigation and hydropower. The Jebel Aulia reservoir is used for both hydropower and irrigation (the state owned Assalaya and Kenana sugar schemes with a total command area of 80,144 ha, and 300 ha of small scale farms). Potential development of dams is high, especially in the Ethiopian part of the basin. Some 14 dams and reservoirs, five for irrigated agriculture development, one for multi-purpose development and eight for hydropower development purposes, have been identified in the upper course of the Sub-basin by the Integrated Master Plan Studies conducted in 1997 by the Ethiopian Government for the Baro-Akobo Sub-basin

6. ENVIRONMENTAL ISSUES

6.1 According to *System One Inventory* soil erosion, deforestation in the Ethiopian Highlands, lack of sustainable management of wetlands and low-lying flood plains, and wild life preservation and management are the key environmental issues related to water resources development in the Sub-basin. Water quality in the Baro-Akobo-Sobat Sub-basin is not yet under significant threat.

6.2 **Soil Erosion**: Sheet erosion is the predominant form of soil loss in the Sub-basin, particularly in the highlands of Ethiopia as well as from the steep slopes prevailing in parts of the Nuba and the Imatong Mountains in Sudan. Other forms of soil erosion include gulley erosion and river bank erosion. With loss of forest cover which is most marked in the southern and eastern part of the upper Sub-basin, soil erosion will attain greater significance. The main cause of loss of forest cover is clearance for expanding agriculture or shifting cultivation, and over grazing. Soil erosion impacts sedimentation in rivers and streams and reservoirs. Erosion also affects soil fertility thus setting a vicious cycle of abandonment of that land from cultivation, its conversion to grazing and accelerating soil erosion.

6.3 **Deforestation**: Deforestation and loss of vegetation cover is occurring with greater intensity in the highlands as well in the low-lands in the basin. The expanding population and its need for agricultural crop land and for grazing, and fuel wood collection (and charcoal production) for the villages and towns in the Sub-basin combine to accelerate loss of woodlands and grasslands in the basin.

6.4 **Wetlands management**: Currently there are no plans for sound management of the wetlands and flood plains in the Sub-basin. The wetlands are very critical to livelihoods of the pastoral communities who depend on them to sustain their livestock. There is also potential for wetland cultivation (recession agriculture).

6.5 **Wildlife management**: The are no management plans for the two main national parks in the Sub-basin, the Gambela Regional Park in Ethiopia and the Boma National Park in South Sudan. The Gambela Regional Park is not legally gazetted, it has no management plan, and no visitor facilities. There is also a critical problem of illegal hunting (with a large number of arms made available because of the Sudanese Civil War). Equally the Boma National Park has been neglected as indeed has the area generally, partly due to its remoteness and in part due to the insecurity in the decades long civil war. With the exception of population estimates for reedbuck, ostrich and eland populations, there has been a massive decline in nearly all animal species, especially the white-eared kob and the Mongalla gazelle, and the big increase in hunting has caused the migratory routes of white-eared kob and elephant to change over the last 20 years.

ANNEX 10: List of projects funded by international donors and managed by ENTRO

- Eastern Nile Irrigation and Drainage Project (ADB),
- Eastern Nile Regional Power Trade Investment Program (ADB),
- Eastern Nile Planning, Information and Knowledge Managment Project (World Bank)
- Eastern Nile First Joint Multipurpose Program Identification (World Bank)
- Ethiopia Sudan Transmission Interconnection (World Bank)
- Eastern Nile Watershed Management Project (World Bank)
- Baro-Akobo-Sobat Transboundary analysis (AFD)