Nile Basin Initiative

Nile Technical Regional Office (ENTRO)
Nile Basin Initiative Trust Fund / IDA

Eastern Nile Watershed Management Project

Cooperative Regional Assessment (CRA) for Watershed Management

PROJECT PROFILES

July 2007

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ACKNOWLEDGEMENTS

The Consultants wish to acknowledge with thanks the comments, recommendations and suggestions in the written comments received from the three National Committees and ENTRO. These have been immeasurably useful in revising the 1st draft of this report. The Consultants have made every endeavor to meet these comments.

CONTENTS

ACRONYMS AND ABBREVIATIONS

ADLI	Agricultural Development Led Industrialization
AHDA	Aswan High Dam Authority
CPA	Comprehensive Peace Agreement
CRA	Cooperative Regional Assessment
ENCOM	Eastern Nile Council of Ministers
ENPM	Eastern Nile Planning Model
ENSAP	Eastern Nile Subsidiary Action Programme
ENTRO	Eastern Nile Technical Regional Office
EN-WMP	Eastern Nile Watershed Management Project
EWDCD	Ethiopian Wildlife Development & Conservation Department
GEF	Global Environmental Facility
GoS	Government of Sudan
IDEN	Integrated Development of the Eastern Nile
IDP	Internally Displaced Person
JAM	Joint Assessment Mission
JMP	Joint Multi-Purpose Programme
km	Kilometre
km^2	Square kilometer
KwH	Kilowatt Hour
m	metre
m^3	cubic metre
masl	meters above sea level
MCM	Million Cubic Meters
MDG	Millennium Development Goals
MFED	Ministry of Finance & Economic Development
MIWR	Ministry of Irrigation and Water Resources
MWRI	Ministry of Water Resources and Irrigation
NBI	Nile Basin Initiative
Nile-COM	Nile Council of Ministers
NWRP	National Water Resources Plan
NBI	Nile Basin Initiative
NCS	Natiuonal Conservation Strategy
NFP	National Focal Point
NP	National Park
NTEAP	Nile Transboundary Environmental Assessment Programme
PASED	Plan for Accelerated and Sustainable Development to End Poverty
RBA	River Basin Authority
PRSP	Poverty Reduction Strategy Plan
SDO	Social Development Officer
SKAP	South Kassala Agricultural Project
SPLMA	Sudan Peoples Liberation Movement Army
SVP	Shared Vision Programme
SWC	Soil and Water Conservation
SDPRP	Sustainable Development & Poverty Reduction Programme
t	ton
UNESCO	United Nations Education, Scientific and Cultural Organization
US$	United States Dollar
USAID	United States Agency for International Development
WB	World Bank
WSM	Watershed Management

1. INTRODUCTION

1.1 Background

The objective of this component of the Watershed Management CRA is to provide recommendations for future watershed interventions that derive from the Transboundary and Distributive Analysis previously undertaken. In particular this report presents a number of project profiles each setting out objectives, background and rational, scope and extent, and a rough cost estimate. They identify the anticipated type of benefits to be expected and their distribution (mainly on local, district/state, sub-regional or watershed/regional level or beyond). Finally, the profiles identify any relations and benefits to likely interventions that are being identified through other IDEN studies.

These projects are located within the framework of the Long Term Watershed Management CRA where they comprise a set of first round watershed management projects that will be prepared in detail, funding sources identified and implemented within the long term Eastern Nile Subsidiary Action Programme (ENSAP).

This chapter firstly sets out the strategic policy and development context for the proposed projects at the national level and that of ENSAP. It then provides details of the criteria, rationale and justification why these projects were selected.

1.2 National Level Policy and Development Framework

This section outlines the national macro development policy frameworks of Ethiopia and Sudan and of Egypt (with particular respect to Lake Nasser and its environs). This is to set the proposed projects into the context of the broad national development policies and strategies.

1.2.1 Ethiopia

(i) Agricultural Development Led Industrialization

At the core of Ethiopia's macro development policy is the Agricultural-Development-Led-Industrialization (ADLI) strategy. This is a strategy "in which agriculture and industry are brought together in a single framework, wherein the development of agriculture is viewed as an important vehicle for industrialization by providing raw material, a market base, surplus labour and capital accumulation" (MFED, 2001). In addition there are number of other policy and strategy documents including:

- Rural Development Policies, Strategies and Instruments,
- Land Policy,
- Food Security Strategy,
- Productive Safety Net Programme, and
- Voluntary Resentment Programme

(ii) Sustainable Development and Poverty Reduction Programme

In terms of implementation the Governments Sustainable Development and Poverty Reduction Programme (SDPRP) of 2001 and its successor the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) of 2006 are the key strategy documents. Amiss Tahoma (2006) has summarized the main development thrusts of the two documents as follows:

Main thrusts of SDPRP

- ADLI
- Civil Service and Justice Reform
- Capacity Building
- Governance, decentralization and empowerment

Main thrusts of PASDEP

- Massive Push to Accelerate growth
- Geographically Differentiated Strategy
- Addressing the Population Challenge
- Strengthening Infrastructure
- Managing Risk and Volatility
- Scaling up to Reach the Millennium Development Goals (MDG's)
- Creating Jobs.

Four pathways for agriculture are identified in the PASDEP: (i) Smallholder Intensification, (ii) Commercialization, (iii) off-farm diversification and urbanization and (iv) resettlement and migration.

Intensification entails enhancing smallholders' access to inputs (improved seeds, fertilizers, oxen). It shifts its previous focus on food crops to ensure food self-sufficiency to the production of marketable farm products – both for domestic and export markets – by both large and small farmers. Elements of this strategy include a shift to higher valued crops, a focus on high-potential areas, facilitating the development of large-scale commercial agriculture, and better integrating farmers with markets.

For the first time in over 30 years commercialization of agriculture now receives considerable prominence. Elements include rural roads, irrigation development, a change in delivery for extension and research, selected government support for commercialization where there are gaps in private provision. Some 35 commodities have been identified that have potential for high growth.

Although ADLI strategy recognized the importance of linkages between agriculture and other sectors in fact there has been little development of these linkages (Amdissa Teshome, 2005, Berhanu Nega, 2004). In PASDEP diversification is targeted at the household and the national level. At the household level crop diversification will be facilitated through provision of seed, irrigation and improved marketing and support given to diversification into other farm enterprise (livestock fattening, honey production). Support would also be provided to encourage transfers into non-farm employment through skills training and education. It recognizes that the hundreds of small towns "represent tremendously important growth poles" and that the urban sector will be an important element. Rural-urban linkages will be strengthened through improved access roads, improved telecommunications, development of micro-credit markets and rural electrification.

(iii) Voluntary Resettlement

Linked to diversification are proposals for resettlement. Voluntary resettlement aims to relocate rural families to areas where there is sufficient land and rainfall as a way of ensuring food security. It is planned to resettle 2.2 million people (440,000 households and so reliving pressure in the land-stressed highlands.

(iv) Food Security Strategy

The Food Security Strategy focuses on chronically food insecure households and incorporates many of the elements of the PASDEP. The productive Safety Net Programme also targets chronically poor households and aims at preventing household asset depletion and creating community assets through public works. It is seen as an instrument for balancing pro-poor growth with the shift to commercialization and economic growth. PASDEP is thus an umbrella policy and strategy that brings all sectoral and cross-cutting policies and strategies under one umbrella.

1.2.2 Sudan

(i) Decentralization

In the past five years Sudan has embarked on a policy of administrartive decentralization. According to the Local Government Act of 2003, the Sudan has been divided into 26 States, some 16 located in the north and 10 in the south. Each State is divided into anumber of Localities (Mahaliyat). The aim of decentralization is to improve the delivery of basic social services and address the severe spatial disparitries in access to education, health, water, agricultural extension and other government services.

Decentralization and concommitant capacity building will be undertaken over two pahses: Phase I (2005 – 2007) and Phase II (2008 – 2011). Priorities in the local government will be:

- Enhancing managment capacity by empowering suitable structures to lead reform;
- A broad consultation on organizational structures;
- Developing a comprehensive strategy for institutional arranbgement, polices and guidleines for public services and training;
- Improving systems and practices of local publicprivate partnerships in service delivery;
- Support to Locality development planning;
- Improving Locality information systems;
- Establishing Locality monitoring systems;
- Promoting civil society participation in planning and organization of governmenbt activities;
- Mobilizing local revenue generation for State and Local Government.

(ii) National Comprehensive Strategy

Sudan's main objectives and priorities for sustainable development were spelt out in the National Comprehensive Strategy – (NCS) which provides policy directions to all economic and social sectors. The NCS incorporates the country's environmental strategy, which states clearly that environmental issues must be embodied in all development projects. Within the NCS, the government manages the economy through a series of three years rolling plans and annual budget processes. The NCS has also served as a key reference document and basis for sectoral policies and measures.

A weakness of the NCS is the lack of coherence as it was a result of work of different sectoral teams without emphasis on horizontal and vertical integration

(iii) Comprehensive Peace Agreement

The Comprehensive Peace Agreement (CPA), signed between GoS and SPLMA on 9 January 2005, represents a remarkable event in the history of Sudan and is a major opportunity for restoring peace and the social contract between the state and society in the country.

The CPA provides for a socially informed land tenure policy and legislation as it accords specific reference to ownership of land and natural resource. It calls for competency in land administration, provides for incorporation of customary laws and practices and establishes an independent Land Commission for the purposes of arbitration, rights of claims in respect to land, land compensation and the possibility of recommending land reform policies.

The CPA is expected to have many implication (institutional and administrative) - e.g. the establishment of a Land Commission for the south parallel to existing central institutions responsible for land and natural resources management.

There is now a counterpart ministry of Environment and Wildlife in Southern Sudan and it is expected that the post CPA developments will witness greater decentralization on all levels. This will necessitate the initiation of a dialogue on developments in the sub-basins in Sudan as a basic requirement for sustainable development in the sub-region. Of special concern also are issues related to conflict resolution, internally displaced refugees, good governance, and the rights of the socially, economically and politically marginalized groups in post conflict Sudan

(iv) Joint Assessment Mission

The Joint Assessment Mission Report (JAM) is the most recent document guiding the economic development in post peace period in Sudan. The reports have developed the policy guide lines and interventions in eight clusters, including the economic policy cluster. The issue of environment has been classified as one of the cross-cutting issues. The report identified many environmental challenges Sudan is facing and need to be addressed during the short and medium term to enable the country make an equitable and sustainable development in the foreseen future.

The JAM report has stated that the foremost challenge is to minimize the negative environmental impacts that returning refugees and Internally Displaced Populations (IDPs) may pose on the natural resources base through increased deforestation and destructive agricultural practices

Under the coordination and leadership of the Ministry of Finance and National Economy, Sudan is also in the process of formulating a national poverty reduction strategy. This strategy is expected part of the country's long-term strategic plan and seeks to involve all groups of Sudanese society.

(v) Poverty Reduction Strategy Plan

The preliminary draft of the Poverty Reduction Strategy Plan (PRSP) was prepared in January 2004 with participation and contribution of a number of highly qualified national experts, The PRSP is considered to be the main available document of the government of the Sudan for poverty reduction. It covers the sixteen States of North Sudan for the period 2005-2007.
PRSP main objectives are:

- Maintain Economic Stability.
- Ensure Political Stability
- Social Stability.

- Environmental integrity
- Improve standards of living
- Assist in the flow of financial resources.

1.2.3 Egypt (Lake Nasser and Environs)

(i) Master Land Use Plan 1987 - 2017

A Master Land Use Plan of Egypt was prepared in 1986. It concluded that the construction of the Aswan High Dam (AHD) not only made the intensification of agriculture feasible in the old lands but also it could be extended to new "reclaimed" areas. Some 650,000 fedddans (273,000 ha) out of 805,000 feddans (338,100 ha) of land reclaimed during 1960-70 was made possible due to the increased supply of water from AHD. The total land that can be reclaimed is subject to water availability.

The strategy for agricultural development up to 2017 has a number of aims.

a. To increase the annual rate of growth in agricultural production from 3.4% to 3.8% during the remaining period of the Fourth 5-Year Plan, and to 4.1% annually up to 2017. This goal is attainable only through vertical and horizontal expansion of plant and animal production, which will have positive impacts on job creation, producer incomes and the overall standard of living of the rural population.

b. To reclaim no less than 150,000 feddans (63,000 ha) annually. The Master Plan assesses the reclaimable and cultivable lands in the Delta, Southern Valley, East Owaynat, the area of and round Lake Nasser and East and West of Suez Canal by the year 2017 at about 3.4 million feddans (1.43 million ha). The inhabited area would reach 25% of the total area of Egypt.

c. To increase the agricultural production horizontally and vertically through the efficient allocation and use of soil and water resources. The maintenance and development of the natural resource base is an integral part of Egypt's sustainable agricultural development program.

d. To develop a national strategic reserve of the basis food commodities by focusing on the efficient use of the available resources and redirecting investments to such areas that help fulfill the increasing food needs of the population. This shall be accompanied with rationalization of food consumption levels, reduction of post-harvest losses.

The Master Land Use Plan indicates that around Lake Nasser and in the Tushka Depression there are about 2.88 million feddans (1.21 million ha) of land reclaimable using Nile water and 0.55 million feddans (0.23 million ha) reclaimable by ground water. The main reclaimable areas around Lake

Nasser are located in the East bank of the Lake in Wadi El-Allaqi and Wadi El-Targi. Those in the west bank are found in Wadi Kurker, Kalabsha, Dekka, Marwa, Tushka, Abu Simbal, Khor Sara, Tomas and Affia (Desert Research Center, 2005).

However, there are a number of conflicting estimates regarding the actual potential for land reclamation around Lake Nasser. Aerial photos show that 1.5 million feddans (0.63 million ha) are reclaimable in the elevated area of and around Lake Nasser (Encyclopedia of Southern valley and Tushka, 1999). Hanna and Osman (1993) stated that more than one million feddan (0.42 million ha) can be reclaimed around the reservoir. The Egypt Water Master Plan (1986) however, shows only about 195,000 feddans (81,900 ha) of high priority to be reclaimed out of 781,600 feddans (328,270 ha). In 1987, a joint study between Cairo University and MWRI showed that the arable area of and around Lake Nasser is about 103,500 feddans (43,470 ha).

The Government's initial plan is to cultivate 50,000 feddan (21,000 ha) around Lake Nasser's shores. They are situated on the western shore, and only one area of 9,000 feddans (3,700 ha) on the east side shore, i.e. the Wadi Allaqi area. On the west side the three areas are: Wadi Kurker, 14,000 feddans (5,880 ha), Kalabsha, 22,000 feddans (9,240 ha), and Abu Simble 5,000 feddans (2,100 ha).

Studies carried out by the Desert Research Center (DRC, 1999) show that lifting water from Lake Nasser depends on the elevation above sea level (masl). Two methods can be used:

(a) Lifting water for high lands (above 182 masl) by using giant pump stations and floating pipe line then connected to affixed pipe line on land.

(b) Lifting water for Lake Shore farming and irrigation by using small mobile pump motors that the farmer moves from field to another. These pumps are connected to a flexible hose and then to 4-6 aluminum pipes.

As part of the national strategy to combat poverty, the Government of Egypt plans to settle approximately one million people on reclaimed desert in the area around Lake Nasser by the year 2017. In order to avoid any negative impacts there are a number of research projects being undertaken to develop sustainable strategies for improving the socioeconomic conditions, health and livelihoods of poor and marginalized settlers living in fragile ecosystems.

The Ministry of Water Resources and Irrigation (MWRI) has prepared a National Water Policy to the year 2017 including three main themes:

- optimal use of available water resources;
- development of water resources; and
- protection of water quality and pollution abatement.

(ii) Water Master Plan

At present, Egypt is addressing the issue of limited water quantity by managing the demand side. MWRI formulated a water master plan in 1981. This plan is currently being updated. The process of updating the water Master Plan aims to allocate available water resources according to various needs and demands that are feasible from the economic perspective. It also aims to gain social acceptance and political support. The Water Master Plan is updated through the National Water Resources Plan (NWRP) project.

The NWRP has been operated since 1998 and is jointly funded between MWRI and the Netherlands Government. This project is directed towards developing a National Water Resources Plan that describes how Egypt will safeguard its water resources both quantity and quality and how it will optimize the use these resources in response to the socio-economic and environmental conditions.

1.3 Policy Framework of the Eastern Nile Subsidiary Programme (ENSAP)

The policy guidelines adopted by the NBI's Council of Ministers of Water Affairs (Nile-COM) in February 1999 further define the primary objectives of the NBI. These objectives are:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

The Eastern Nile Subsidiary Action Program (ENSAP), which includes the countries of Egypt, Ethiopia, and Sudan, is initiating a regional, integrated, multipurpose program through a first set of investments. Within this regional context, the Eastern Nile riparian countries decided that the objective of the first ENSAP project, referred to as the Integrated Development of the Eastern Nile (IDEN) project, was to initiate a regional, integrated, multipurpose development program that confirms tangible win-win gains and demonstrates joint action for the Eastern Nile countries. IDEN comprised the following seven

components: Eastern Nile Planning Model, Baro-Akobo Multipurpose Water Resources Development, Flood Preparedness and Early Warning, Ethiopia–Sudan Transmission Interconnection, Eastern Nile Power Trade Investment, Irrigation and Drainage, and Watershed Management.

***Watershed Management CRA*:** The first Cooperative Regional Assessment (CRA) for Watershed Management in the Eastern Nile Basin undertook a Transboundary Analysis, a Distributive Analysis and identified mechanisms for cooperation. The CRA identified the baseline conditions and provided an understanding of four Sub-basins as integrated water systems: the Baro-Sobat-White Nile, the Abbay-Blue Nile, the Tekeze-Atbara and the Main Nile from Khartoum to the Aswan High Dam. The CRA identified a programme of Direct and Supporting Interventions for sustainable watershed management. The potential impacts of these were assessed in qualitative and in some case quantitative terms at the local, national, regional and global levels. An outcome of the Watershed Management CRA was the preparation of a long term Eastern Nile - Watershed Management Project (EN – WMP).

Eastern Nile Watershed Management Project (EN-WMP): The immediate objective of the Eastern Nile Watershed Management Project (EN-WMP) is to provide continued and enhanced support the sustainable watershed management of the Eastern Nile Basin in order to improve the living conditions of the people, create alternative livelihoods, enhance agricultural productivity, protect the environment and in the long term reduce sediment transport and siltation of infrastructure and prepare for sustainable development oriented investments. The overriding regional significance of this will be its contribution to enhanced food security and poverty alleviation in the region and its long term contribution to arresting degradation of the natural resource base.

The EN-WMP will support the Eastern Nile Basin countries to develop sound approaches to sustainable watershed management at the regional and national level. The Eastern Nile countries recognize that future development of the Basin must be environmentally and socially sustainable. Identifying natural resource base and development synergies and thus sustainable development opportunities in the Eastern Basin is now a major priority. Focusing on trans-boundary issues provides the riparian countries with a major opportunity to make significant progress towards their economic, social and environmental goals in ways that have proved difficult to achieve independently.

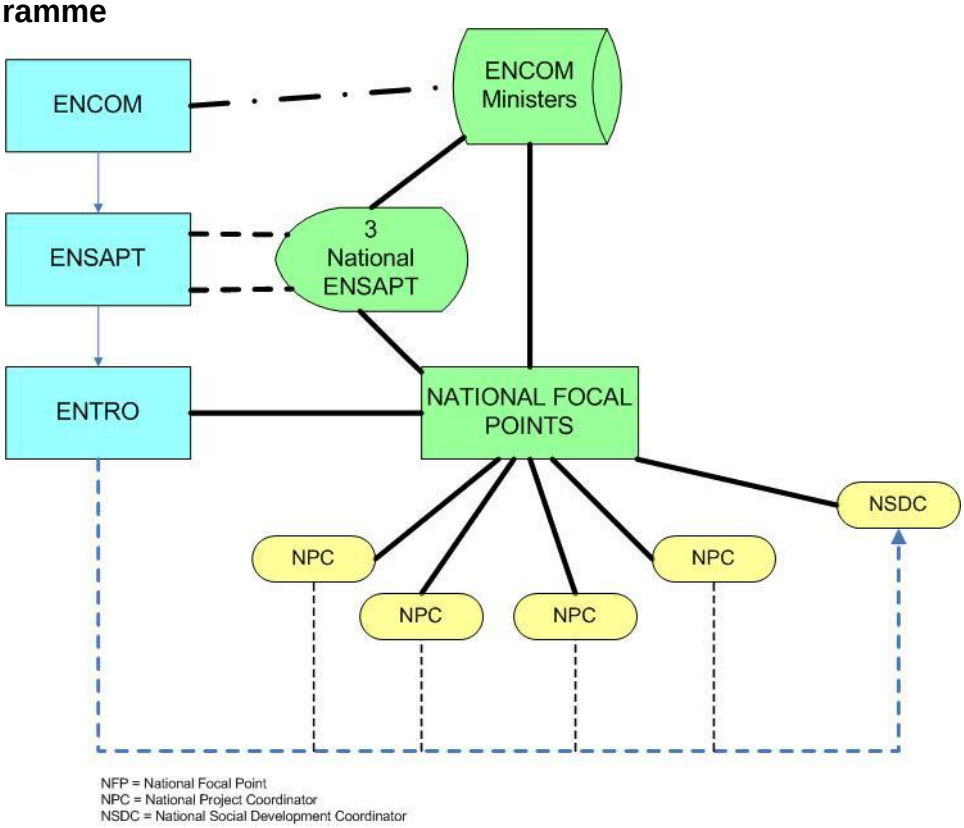
A component within EN-WMP was the preparation, funding, implementation and coordination of a first round of watershed management projects, and the subsequent identification of a second round of projects.

1.4 Institutional Framework for Project Implementation in the Eastern Nile:

1.4.1 ENSAP

The Eastern Nile Subsidiary Action Programme (ENSAP) is an investment programme by the Governments of Egypt, Ethiopia and the Sudan under the umbrella of the Nile Basin Initiative (NBI). It is led by the Eastern Nile Council of Ministers (ENCOM). ENCOM comprises the Ministers representing key stakeholder ministries and the ENSAP Teams (ENSAPT) comprise three technical country teams. The primary objective of ENSAP is to achieve joint action of the ground to promote poverty alleviation, economic growth and arresting environmental degradation. The Eastern Nile Technical Regional Office (ENTRO), which is a legal entity established by an ENCOM decision in 2002, manages and coordinates the preparation of ENSAP Projects. (Figure 2)

Figure 1. Institutional Structure of the Eastern Nile Subsidiary Action Programme

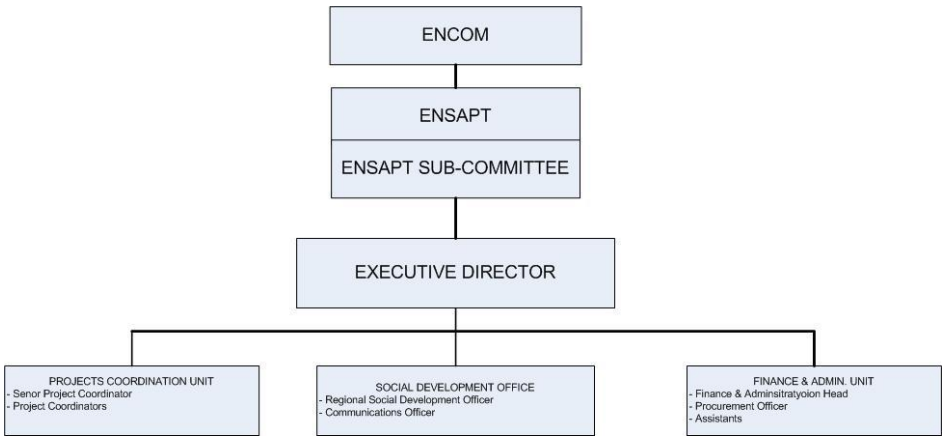


1.4.2 Eastern Nile Technical Regional Office

The Eastern Nile Technical Regional office (ENTRO) currently prepares, manages and coordinates projects within the Eastern Nile basin. As well as coordinating the implementation of ENSAP, ENTRO, strengthens institutions and provides secretariat support to ENCOM/ENSAPT. ENTRO has a Social Development Office (SDO) that supports all ENSAP Projects through capacity building in social development, input into project design, formulation of guidelines and the initiation of studies and analysis.

At the Country level ENSAP has National Focal Points (NFP) that undertakes overall coordination and liaison of National Coordinators and Working Groups (of specific projects) and the National Social Development Coordinators (NSDC's). Restructured in 2003. ENTRO itself is led by the Executive Director and has three Units: (i) Projects Coordination Unit, (ii) Social Development Office and (iii) the Finance and Administration Unit. The Projects Coordination Unit has a Senior Project Coordinator and Project Coordinators for each of the ENSAP Projects (Figure 2)

Figure 2. Organizational Structure of ENTRO



The current ENSAP programme is a set of sub-projects comprising the Integrated Development of the Eastern Nile (IDEN). IDEN comprises seven components:

- Eastern Nile Planning Model,
- Baro-Akobo Multi-purpose Water Resources Development,
- Flood Preparedness and Early Warning,
- Ethiopia-Sudan Transmission Interconnection,
- Eastern Nile Power Trade Investment
- Irrigation and Drainage
- Watershed Management

The general elements of a CRA are (i) institutional strengthening, (ii) a participatory process for building trust and confidence, and (iii) to gain a transboundary understanding the watershed system from a basin wide perspective.

The results of the analyses of the sectoral CRA's and Fast Track Projects will be brought together in the design and decisions in a joint multi purpose programme (JMP) of interventions. The JMP will encompass a comprehensive set of components including investments in infrastructure linked to the River and Power Systems; Watershed and Environmental Management; Enhanced Agricultural production; Leveraged growth and economic integration and supported by an Information base and Institutional regimes.

1.4.3 National Institutions

In all three countries the two primary institutions that have responsibilities for Watershed Management activities are the Ministries of Water Resources and Ministries of Agriculture (each with slightly different names in each country). The Ministry of Agriculture in Egypt also includes responsibilities for land reclamation, whilst that in Ethiopia in within a broader ministry of Rural development. However, in matters of "river basin" planning the Ministries of Water Resources in each country take the lead. In Ethiopia draft legislation is already drafted to establish River Basin Authorities (RBA's) which will have a clear mandate in matters of basin planning and watershed management.

Although the three countries have a federal structure of government, decentralization of development responsibilities is further advanced in Ethiopia. However, in Egypt the Aswan High Dam Authority (AHDA) has wide ranging responsibilities for developments in and around Lake Nasser, although the institution works closely with the Ministries of Water Resources and Irrigation and Agriculture and land Reclamation.

1.5 Criteria for Identifying the First Round Proposed Watershed Projects

1.5.1 Introduction

The Watershed Management CRA terms of reference called for the identification:

> *through analysis, the next round of watershed management projects, that are promising from a local livelihoods as well as a regional benefits point of view and are rational in view of anticipated multipurpose developments in the Eastern Nile region .*

The Distributive Analysis identified a comprehensive set of watershed management interventions to be implemented within Ethiopia, Sudan and Egypt. The majority of these had substantial in-country benefits in terms of reducing poverty, sustaining livelihoods and arresting the decline in the integrity of the natural resource and environmental base of the countries concerned. A number of these had regional and global benefits. Many of the interventions identified were, or were likely to be in the future, integral parts of on-going development programmes.

The Cooperative Mechanisms Analysis examined a continuum of increasing levels of potential cooperation amongst the three riparian countries of the Eastern Nile Basin. These ranged from uni-lateral action with no cooperation through coordination (e.g. of information collection and sharing), collaboration (e.g. collaborative research or collaborative Watershed Management Planning) to Joint Activities (e.g. administration of Transboundary National Parks). With in this framework many of the interventions outlined in the Distributive Analysis required a relatively low level of cooperation between the riparian countries, notwithstanding downstream (i.e. regional or Global benefits that could accrue to them.

A number of criteria were identified to enable a selection to be made of a first round set of potential projects from those identified in the Transboundary Analysis and outlined in the Distributive Analysis. The "Benefits" criterion is broad in its interpretation. Benefits include positive impacts on (i) poverty reduction, (ii) support to sustainable livelihoods and reducing vulnerability, (iii) reducing or arresting natural resource degradation. Benefits accruing to these development goals are inextricably linked and are thus, considered together. Benefits were also assessed at the local/national, Regional/Eastern Nile Basin and the Global scales. All selected Projects have benefits at all three levels. All Projects selected also support to a greater or lesser extent ongoing or proposed Projects within the NBI or ENSAP framework.

These are elaborated upon below.

1.5.2 Implementation Requires Cooperation

The most important criterion is whether and to what degree the proposed project fosters cooperation among the riparian countries and contributes to confidence building and knowledge exchange.

ENTRO's Strategic Plan 2006-2010 (ENTRO, 2006) states "Country-level planning in the Eastern Nile focuses on development needs at national and/or local levels. In contrast, ENSAP is a programme for multi-country cooperative investments that capture development with trans-boundary implications." ENTRO's Mission is to "serve ENCOM and ENSAPT in their pursuit of cooperation and joint action in the eastern Nile".

In selecting a first round a Watershed Management projects for preparation under the EN-WMP an assessment was made as to whether project preparation, planning and implementation would enhance cooperation and build confidence among the three riparian countries. Interventions that could be effectively implemented within the national framework of development activities were accorded a lower priority.

In considering Projects that would enhance cooperation, careful consideration was given to the degree of cooperation that project planning and implement would entail. The continuum outlined in the Cooperative Mechanisms Analysis was used to determine the relative degree of complexity in terms of institutional mechanisms. Thus Projects were categorized into the three broad categories: (i) Coordination, (ii) Collaboration and (iii) Joint Activities. This was for the purpose of action planning rather than prioritizing. Thus a "Joint Activities" project could score high in terms of priority but be scheduled later because of the need for ENTRO to develop the more complex institutional mechanisms.

1.5.3 Project Implementation Accrues Local, Regional Benefits and Possibly Global Benefits

A second criterion examined the anticipated benefits and their distribution and the range and size of benefits in terms of their impact at the local, national, Regional (Basin-wide) and Global levels. At the local level benefits that contributed significantly to poverty reduction, enhancing sustainable livelihoods and/or to arresting/reducing degradation of the natural resource base were accorded a higher priority.

Areas of severe resource degradation or "hot spots" were identified in the Transboundary Analysis and were taken into consideration in the Project selection. Empirical work in Sudan and in Ethiopia has indicated generally high levels of poverty in all rural areas and most particularly amongst pastoralists, agro-pastoralists and rainfed agriculturalists. There are in both countries large numbers of households "churning at the margin" of the poverty line. For this reason no specific group or geographic area was used as criteria, rather the level and degree of impact the intervention had on the levels of household production, income and vulnerability.

The expectation of regional benefits such as the alleviation of downstream environmental, economic and/or social damages, were also seen as very important. Cooperative action in terms of watershed management is likely to be more forthcoming where benefits accrue to two or more riparians.

Where a Project accrues global benefits this is also very important particularly in terms of seeking and obtaining financing from one of the global financing mechanisms: e.g. the Global Environment Fund (GEF), Carbon Fund, etc.

1.5.4 Relationship to other ENSAP Projects and the Joint Multi-purpose Programme

Another criterion assessed whether and to what degree the proposed projects are related or support other IDEN/ENSAP projects, the Joint Multi-purpose Programme (JMP) or Projects/Programmes within the NBI. It is important to identify potential areas for synergy between other ENSAP, the eastern Nile Multipurpose Programme and NBI to realize maximum benefits from cooperative projects within the Eastern Nile.

1.5.5 A Strategic Framework for Action

The interventions outlined in matrices 1 (Ethiopia), 2 (Sudan) and 3 (Egypt) of the Distributive Analysis were assessed using the criteria outlined above. All the Projects selected conformed to the three criteria. There were no other interventions in the Matrices presented in the Distributive Analysis that conformed to all three criteria. The list is therefore inclusive. Costings were estimated on the basis of similar components of projects within the NBI and other recent project documents, and are therefore approximate.

The results of the assessment are presented in the matrix below. All projects have the potential to be included in the first round of Watershed Management projects to be prepared in Component 3 of the long-term Eastern Nile Watershed Management Project. Whether all or only a selection of these projects are included in the First Round and the order in which they are prepared is clearly a decision to be made by ENTRO, ENSAPT and ENCOM. However, the matrix provides a basis for such an assessment.

Matrix 1. A Strategic Framework for Action

INTERVENTIONS	Outline costs (US$ million)	Links IDEN Projects, JMP, NBI	INSTITUTIONAL COMPLEXITY	DIRECT BENEFITS	SECONDARY BENEFITS	REGIONAL/GLOBAL BENEFITS
PROFILE 1: Collaborative Research into arresting drifting sand and moving sand dunes	1.65	Yes Fast track WSM (Egypt, Sudan)	Simple: In-country Research on-going	• practical and effective means of arresting drifting sands and moving dunes established,	• shared scientific knowledge of the physics of wind blown sand,	• Firm foundation and modalities established for future collaborative research and cooperation.
PROFILE 2: Establishment of the Trans-boundary Wadi Allaqi Biosphere Reserve	1.20	Yes Fast track WSM Eqypt	Simple: Biosphere Reserve already established in Eqypt	• shared experiences in Biosphere Reserve management, • cost-effective joint management of the Reserve as one eco-system, and	• shared scientific knowledge of this unique ecosystem.	• Enhanced conservation of biodiversity.
PROFILE 3: Joint Tekeze-Atbara Ground and Surface Water Survey & Development Plan	8.22	Yes Fast Track WSM Sudan, IDEN Irrigation & Drainage	Moderately complex: Some institutional networking thru UNESCO-HELP	• Improved and more potable water supplies and improved health and well-being. • Improved water supplies for livestock.	• Sustainable exploitation of surface water in terms of water harvesting & irrigation would increase crop production, reduce food insecurity and improve livelihoods.	• Experience would be gained in joint surveys and development planning of shared natural resources. • Sustainable exploitation of surface and sub-surface water resources would be achieved across the Sub-basin.
PROFILE 4: Joint Dinder-Rahad Watershed Management Plan	8.50	Yes IDEN Flood Control, Irrigation & Drainage	Moderately complex: Need to establish new institutional mechanisms	• Upstream at the local level WSM interventions would have a positive impact on crop and livestock production through reduced soil erosion and degradation	• Positive impacts on livelihoods and increased food security. • Downstream at the local level reduced sediment loads & sedimentation of	• Increased flood buffering capacity of Maya'as reducing flood damage on rainfed and irrigated cropland. • Biodiversity value of the maya'a wetlands would be enhanced.

					maya'a wetlands • More assured water supply for human, livestock and wildlife.	
PROFILE 5: Abbay-Blue Nile Wetlands Survey and Management Plan	8.10	Yes: IDEN Flood Control, Irrigation & Drainage	Moderately complex: Need to establish new institutional mechanisms	• Accurate inventory and threat assessment of the Blue Nile Wetlands would be obtained; • Sound plan for their sustainable management and conservation would be developed	• Hydrological services maintained (flood buffering, sediment reduction, dry season flows enhanced) • Sustainable livelihoods enhanced; vulnerability reduced	• Biodiversity value of wetlands preserved and enhanced.
PROFILE 6: Establishment of the Dinder-Alatish Transboundary National Park	4.80	Yes: NBI Environment	Moderately complex: Need to establish new institutional mechanisms, although initial Ethiopia-Sudan discussions over number of years	• Shared experiences in community-based Park management	• Cost-effective joint management of the Park as one eco-system, • Strong possibility of international recognition and ability to secure both Government and external funding.	• Firm foundation and modality established for future cooperation in biodiversity conservation between the Sudan and Ethiopia. • Biodiversity preserved and enhanced.
PROFILE 7: Joint Wildlife and Habitat Inventory and Assessment: Boma & Gambella National Parks	2.80	Yes NBI Environment	Moderately complex: Need to establish new institutional mechanisms, although work already commenced in Sudan	• Shared experiences in wildlife and habitat inventory and assessment, • Shared experiences in scientific research, • Cost-effective joint survey across an area of two countries,	• Assessment of the total ecosystem and a firm foundation for Park Management Planning for the two Parks,	• Firm foundation and modality established for future cooperation in biodiversity conservation between the Sudan and Ethiopia. • Enhanced conservation of biodiversity.
PROFILE 8: Comprehensive Watershed	9.80	Yes IDEN Flood	Moderately complex:	• Increased scientific	• More effective	• Increased cooperation

Management Research project: Choke Mountain Chain, Abbay-Blue Nile Sub-basin		control, Irrigation & Drainage	Need to establish new institutional mechanisms	knowledge of the complex relationships between land cover, land management, hydrology, erosion, deposition in the landscape, sediment delivery to the river system and fluvial sediment transport	watershed management interventions and a deeper understanding of their potential impacts at various scales;	and knowledge sharing and confidence building among countries of the Eastern Nile Basin; • Increased capacity in sciences of hydrology, erosion and sedimentation and the establishment of a cadre of professionals knowledgeable in the practical applications of these areas.
PROFILE 9:: Southwest Ethiopian Highlands: Participatory Development of Sub-catchments	4.8	Yes IDEN Irrigation & Drainage	Moderately complex: Need to establish new institutional mechanisms although some initial work over past 5 years	• At the local level an integrated system of natural resource management would be established • agricultural production diversified & sustainably increased	• food security increased supporting sustainable livelihoods and reducing poverty.	• At the Sub-catchment and regional levels equitable access to water resources by downstream irrigators and mini-hydro power developments would be assured. • At the Global level sustainable management and use of the forest resources would ensure the conservation of biodiversity and in particular the wild coffee gene pool.
PROFILE 10: In-depth Study: Determination of the Economic, Social and Environmental benefits & Costs of Watershed	0.95	Yes IDEN Eastern Nile Planning Model	Simple: Some on-going work thru TerrAfrica	Increased knowledge of the economic, social and environmental benefits and costs of watershed management interventions	• Increased capacity in environmental and social economics and the establishment of a cadre of professionals	• increased cooperation and knowledge sharing and confidence building among countries of the

Management Interventions in the Eastern Nile Basin				in the context of multi-purpose cooperative development of the eastern Nile Basin and thus increasing the scope and effectiveness of impact assessment of such investments;	knowledgeable in the practical applications of this area of economics.	Eastern Nile Basin;

PROJECT PROFILE 1. COLLABORATIVE RESEARCH INTO ARRESTING DRIFTING SAND AND MOVING SAND DUNES

I. Objectives

The objective of the project is to support a collaborative research programme into methods and techniques of arresting drifting sand and moving sand dunes onto valuable cropland and settlements.

II. Background and Rationale

Drifting sand is an acute problem in irrigated lands of the Lower Atbara, the northern part of the White Nile (West bank) and Main Nile in Sudan and along the western shore of Lake Nasser/Nubia. Around Lake Nasser the most extensive areas of sand are to the west and that the prevailing winds are from the northwest. Both factors, which when combined explain the problem of drifting sand into the Lake. The Dam Authority in collaboration with the Environment Research Institute is undertaking some research studies on wind speed, sand dunes movements, types and quantities of sand, estimates of sand volumes which are deposited into the lake using sand traps in 12 stations on the western side of the lake where there are active sand movements. The purpose of this research is to find the most effective ways of solving the problem.

It has been estimated that the moving sand amounts to 700m^3/km annually and that wind blown sand constitutes 1 to 2 percent of sediment entering the Lake. Thus, approximately 1.36 million tons are blown into the lake annually.

According to a study carried out by the Public Corporation for the Development of the High Dam Lake of the Ministry of Agriculture and Land Reclamation the woody vegetation in the area is mainly desert scrub including; *Tamarix mannifera* (Tarfa or Abal) which grows very densely and to very appreciable sizes in seasonally inundated areas or in areas which are not regularly inundated to a distance of three kilometers from the lake. From the air the Tarfa seems to grow in a form of a belt along the lake shore. It is not known how effective this belt of trees is in preventing wind blown sand reaching the Lake.

It was reported that a main source area for the sand is the Tushka Depression. If a large area of the depression is developed for irrigation it is possible that the amount of sand entering the Lake will be reduced. Moattessem (2005) has called for more research in order to determine a more accurate estimate of sand entering the lake.

In the Sudan the main area where shifting wind blown sand is a problem is in the Gash Irrigation Scheme. In 1923 the irrigation Advisor the Sudanese Government noted the problem of drifting sand into the new canals, which suggests that there was no cover in the central area of the delta even then. A part of the problem is the gradual degradation of the flooded woodland due to extraction of fuelwood and wood for charcoal and house construction.

A second area is along the lower Atbara where drifting sand is covering fields and canals. A study by Mekii Abdel Latif (2005) found drifting sand a serious problem endangering crop production in a large number of villages. Approximately 30 percent of the cropland is invaded by sand. Sand in irrigation ditches causes severe problems in water management and entails long hours of pump operation because of the increased porosity of canal linings. Wind-borne sand causes severe physical damage to plants often completely shredding leaves.

Along the Dongola reach of the Main Nile moving sand dunes encroaching on irrigated land and into the river is an additional problem. Moving sand dunes can overwhelm settlements, fields and roads. The dominant wind direction is from the northeast. Thus the most hazardous dunes are located to the northeast of the Nile. These are located between Dongola and Karima. There are 14 smaller dune fields: four are on the river and ten are close by. Three larger fields are located 20 to 60 kms from the river. The source areas for the dune fields are the very extensive areas of loose and shifting sand that overlies the rock pavement as well as the three larger dune fields to the northwest.

Those on the river present a hazard for tipping sand into the river, whilst the other 10 are a hazard to settlements and irrigated fields. The latter currently do not present an immediate problem. The smaller dune fields total some 67,000 feddans (14,300 ha). However, they are generally elongated and aligned in the main wind direction some 2 to 4 kms wide although 5 to 15 kms long. This means they present a narrow advancing front, which reduces the length of tree breaks required to halt the dunes.

An examination of the Africacover map of the area reveals that approximately 6,200 feddans (2,570 ha) of currently irrigated land that is immediately threatened. There is an unknown area of potentially irrigable land currently not developed, estimated at 33,000 feddans (13,860 ha). In the absence of any measurements it is difficult to estimate the amount of sand tipping into the River. Two of the 14 dune fields abut the river, each with a front of about 2.6 kms.

Both countries are undertaking research programmes into methods of arresting these phenomena. This research includes the physics of wind blown sand, assessing the most suitable plant species for shelter-belts and sand stabilization and the most effective modes of plant establishment and survival.

Clearly, synergy could be obtained by collaboration in these research activities. At the lowest level this could be simply through exchange of information of research results, through to field visits and joint workshops to a single collaborative research programme.

III Accordance with Policy and Development Frameworks

The Project accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental

concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

The Project accords with Egypt's Master Land Use Plan and its National Water Master Plan by addressing concerns of water availability and water quality. It also accords with Egypt's National Strategy to Combat Poverty by addressing concerns of agricultural sustainability for the proposed 1 million people to be settled around the shores of Lake Nasser by 2017.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The project would support the collaborative research programme by supporting field trials, capacity building, knowledge exchange and dissemination of lessons learnt.
An assessment of lessons learnt from a number of sites in Sudan in controlling sand encroachment was made by the Drylands Coordination Group (Musnad and Nasr, 2004) and by UNEP. The key role was played by strong community participation in shelterbelt establishment in Ed Debba in Northern State. At a more technical level the keys lessons learnt from an assessment of 19 sites across Sudan were as follows:

- the most effective shelterbelt design incorporated six external rows rectangular in shape, 6 times longer than tree height and orientated perpendicular to the wind. The belts should be 30-40 percent penetrable by the wind. Successive internal belts should be placed at distances 10 time tree height;
- Drip irrigation was found to be the most effective and efficient form of irrigation.

In Egypt the Aswan High Dam Authority (AHDA) in collaboration with the Environment Research Institute is undertaking some research studies on wind speed, sand dunes movements, types and quantities of sand, estimates of sand volumes which are deposited into the lake using sand traps in 12 stations on the western side of the lake where there are active sand movements. The purpose of this research is to find the most effective ways of solving the problem.

The key locations of research would include (but not limited to) areas of drifting sand in the Atbara, northern White Nile (west bank) and Main Nile Sub-basins (including the areas surrounding Lake Nasser/Nubia (Map 1).

V. Cost Estimate

The estimated costs of the Project is US$ 1.65 million, with US$ 0.33 million provided by the two countries (20%) and US$ 1.32 million from international funding.

Satellite Imagery	-	US$ 0.25 million
Field trials:	-	US$ 0.56 million
Capacity building (Physical):	-	US$ 0.42 million
Knowledge Exchange & Dissemination	-	US$ 0.42 million

VI. Anticipated Benefits and their Distribution

The collaborative research programme would have a number of national and regional benefits:

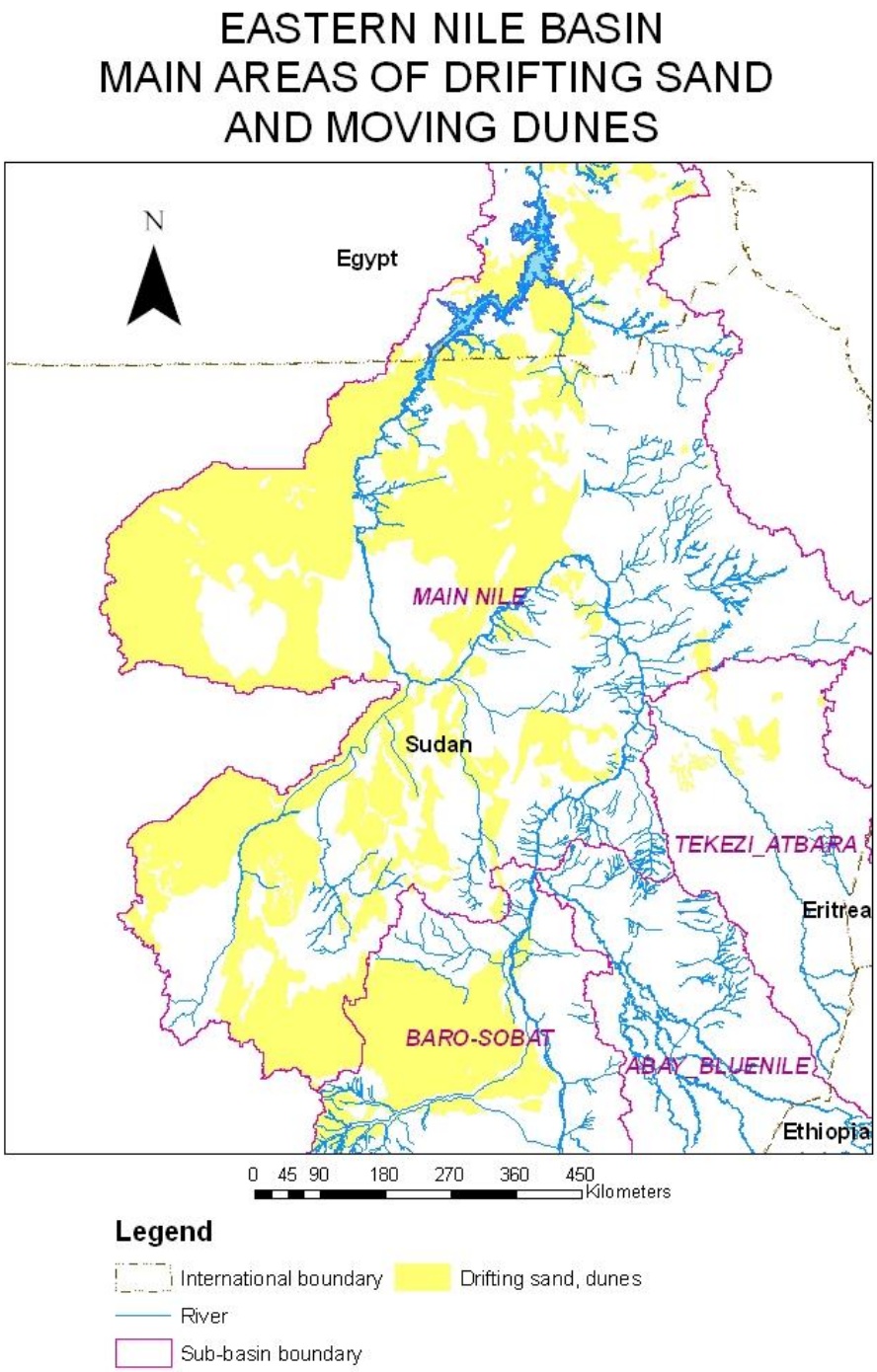
- practical and effective means of arresting drifting sands and moving dunes established,
- shared scientific knowledge of the physics of wind blown sand,
- a firm foundation and modalities established for future collaborative research and cooperation.

VII. Options for Phasing and Timing

- Formal expression of commitment by Egyptian and Sudanese Governments to establish a collaborative research programme,
- Establish a Joint Steering Committee
- Develop Work Plan and responsibilities,
- Implement Research Programme,
- Information and knowledge sharing: Regional Workshops
- Dissemination of Research findings.

VIII Relationships to other IDEN Projects

Watershed Management Fast Track Project: Sudan Lower Atbara component.
Watershed Management Fast Track Project: Egypt-Sudan: Lake Nasser/Nubia Management Framework
NBI: Nile Transboundary Environmental Action Project.



Mao 1. Eastern Nile Basin: Location of Shifting Sand and Moving Sand Dunes.

PROJECT PROFILE 2. ESTABLISHMENT OF THE TRANSBOUNDARY WADI ALLAQI MAN AND THE BIOSPHERE RESERVE

I. Objectives

The objective of the project is to provide support to the Governments of Egypt and the Sudan in establishing a Transboundary Wadi Allaqi UNESCO Man and the Biosphere Reserve.

II. Background and Rationale

The Wadi Allaqi extends some 250 kms southeastwards from Lake Nasser/Nubia into northern Sudan (see map 2). It is the most extensive drainage system in the Nubian Desert and lies across the geological boundary of two formations: the basement complex to the southeast and the Nubian Sandstones to the northwest. From an ecological perspective the Wadi forms an integrated unit based on linear channels, which have hydrological and ecological integrity. Human habitation of the wadi is of great antiquity. Currently, the Wadi is inhabited by the nomadic Ababda and Bisharin peoples.

Within Egypt the area was declared a Protected Area in 1989 under the jurisdiction of the Egyptian Environmental Affairs Agency. In 1993 it was declared a UNESCO Man and the Biosphere Reserve. The Reserve is zoned into two "Core" Areas, each with "Buffer" zone and the remaining "Transition" area.

It has been proposed that the Sudan part of the Wadi be encompassed within a trans-boundary Man and the Biosphere Reserve to extend protection to the whole of the Wadi.

III Accordance with Policy and Development Frameworks

The Project accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

The Project accords with Egypt's National Strategy to Combat Poverty by addressing concerns of agricultural sustainability for the proposed 1 million people to be settled around the shores of Lake Nasser by 2017.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide support to both Egypt and the Sudan to develop an integrated Biosphere Reserve Management Plan that encompasses the whole of the Wadi. This would require undertaking botanical, ecological and livelihoods surveys from the Egyptian part of the Reserve into the newly designated area within the Sudan.

The project would provide human capacity building support to enable close collaboration between Egypt and the Sudan both at the local and the national levels. This would involve provision of logistical support to undertake the necessary surveys. The project provides support to enable knowledge exchange through workshops and meetings.

V. Cost Estimate

Estimated cost of the project is US$ 1.20 million with US$ 0.24 million provided by the two riparian countries (20%) and US$ 0.96 million external funding.

Capacity Building (Human)	-	US$ 0.36 million
Knowledge Exchange	-	US$ 0.84 million

VI. Anticipated Benefits and their Distribution

A Trans-boundary Biosphere Reserve would have a number of local, Regional and Global benefits:

- shared experiences in Biosphere Reserve management,
- cost-effective joint management of the Reserve as one eco-system, and
- shared scientific knowledge of this unique ecosystem.
- enhanced conservation of biodiversity.

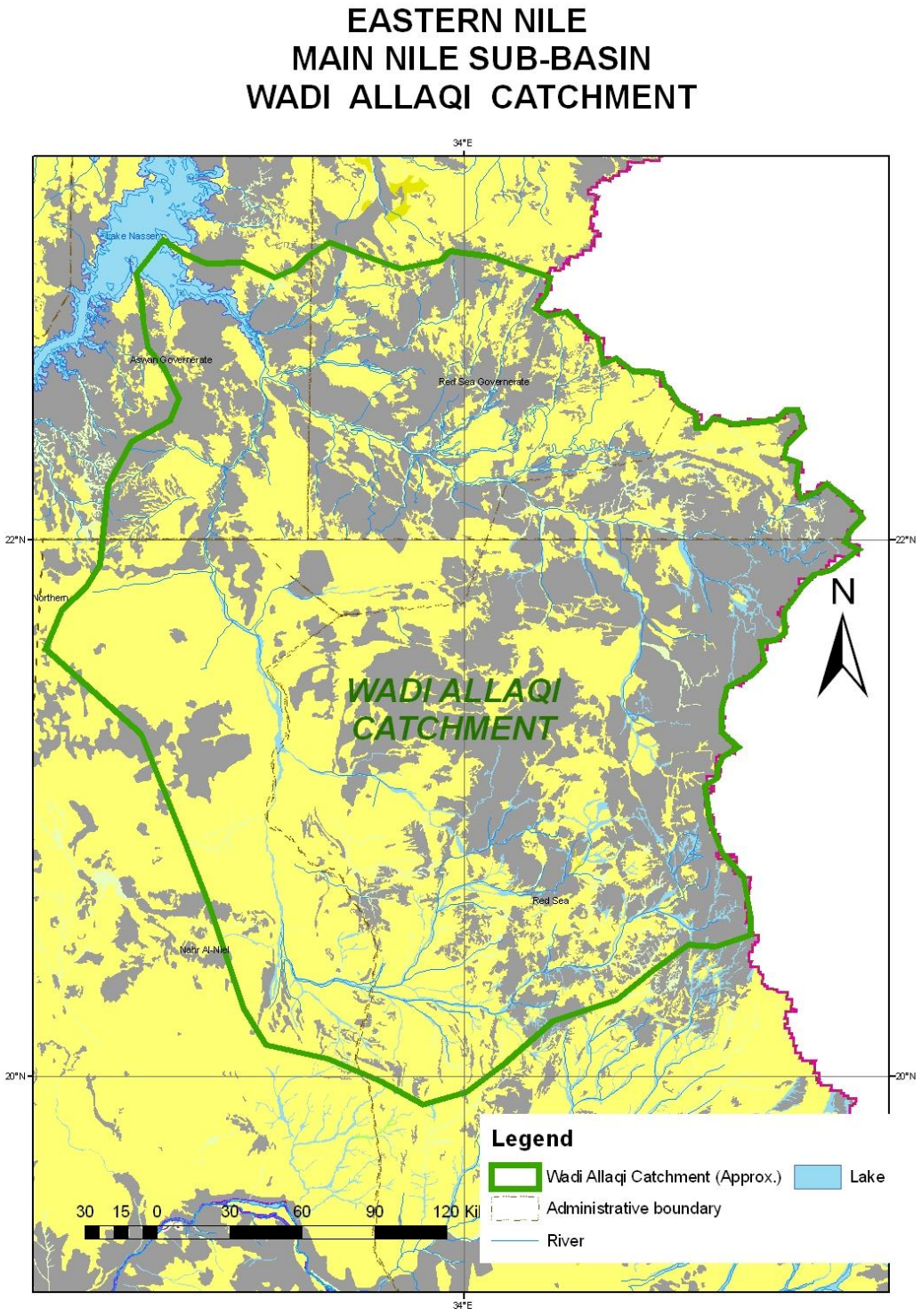
VII. Options for Phasing and Timing

The establishment of the Trans-boundary Reserve would follow a number of sequential stages:

- Formal expression of commitment by Egyptian and Sudanese Governments to establish a Transboundary Biosphere Reserve,
- Establish a Joint Steering Committee
- Develop a single Reserve Management Plan
- Implement human capacity building
- Establish formal joint monitoring system

VIII. Relationships to other IDEN/NBI Projects

Supports the IDEN Watershed Management Fast Track Project - Egypt-Sudan: Lake Nasser/Nubia Management Framework, also the NBI Nile Transboundary Environmental Action Project.



Map 2. Catchment Boundary (Approx.) of the Wadi Allaqi: Location of the Proposed extension to the Biosphere Reserve

PROJECT PROFILE 3. JOINT TEKEZE-ATBARA GROUND AND SURFACE WATER SURVEY AND DEVELOPMENT PLAN

I. Objectives

The objective of the project is to provide support to the Governments of Ethiopia and the Sudan in undertaking a joint hydrological survey (surface and ground water) of the Tekeze-Atabara Sub-basin.

II. Background and Rationale

The Consultants' Report for the Sudan Fast Track Watershed Management Project talking of the upper Atbara area in Sudan stated that

"Perhaps the biggest break-through in the economic and social development of the area will follow from a full and proper assessment of the distribution of water (especially underground) resources and (of even greater importance) the technologies available to exploit them".

A previous study (the South Kassala Agricultural Project - SKAP) advocated that groundwater supplies should be reserved for domestic supplies whilst surface water resources should be developed for irrigated agriculture.

In Sudan many shallow wells in many villages are polluted, saline or seasonal. On the Ethiopian side of the border the Humera Lowlands are being resettled and are being opened up to Commercial agriculture. Given that the hydro-geology is the same it would be cost-effective to undertake the surface and ground water survey and development plan as a joint exercise.

In the Ethiopian Highlands surface and sub-surface water supplies are being developed for small-scale irrigation and water supplies (domestic and livestock). Whilst the macro hydrology of Tekeze Sub-basin has been studied in a recent Master Plan Study, there is need for more detailed information on the micro hydrology in order to develop small-scale irrigation and village water supplies in both a cost and technically effective way.

The development plan will not only indicate the most appropriate technologies but also develop in participation with communities the most appropriate institutional arranges for cost-sharing and operation and maintenance.

III Accordance with Policy and Development Frameworks

The project accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project supports Sudan's Decentralization Policy in the following aspects:

- Improving systems and practices of local publicprivate partnerships in service delivery;
- Support to Locality development planning;
- Improving Locality information systems;
- Establishing Locality monitoring systems;

The Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide support to the Project by providing funds for the survey and development planning; for physical and human capacity building in terms of logistics, equipment and training in surface and ground water survey techniques; in participatory planning, knowledge sharing and dissemination of the survey finding and the Development Plan.

The area of the Project would cover the whole of the Tekeze-Atbara Sub-basin (Map 3).

V. Cost Estimate

Estimated cost of the project is US$ 8.22 million with US$ 1.64 million provided by the two riparian countries (20%) and US$ 6.58 million external funding.

Survey Logistics:	-	US$ 2.90 million
Capacity Building (Human/Physical):	-	US$ 2.48 million
Participatory and Development Planning:	-	US$ 2.01 million
Knowledge sharing/Dissemination:	-	US$ 0.83 million

VI. Anticipated Benefits and their Distribution

A joint survey and development plan would have a number of benefits at the Local and Regional levels:

At the local level befits to local communities would be substantial in terms of improved and more potable water supplies and improved health and well-being. In addition there would be benefits to livestock production in terms of improved water supplies for livestock. The sustainable exploitation of surface water in terms of water harvesting and irrigation would increase crop production, reduce food insecurity and improve livelihoods.

At the regional scale experience would be gained in joint surveys and development planning of shared natural resources. Sustainable exploitation of surface and sub-surface water resources would be achieved across the Sub-basin.

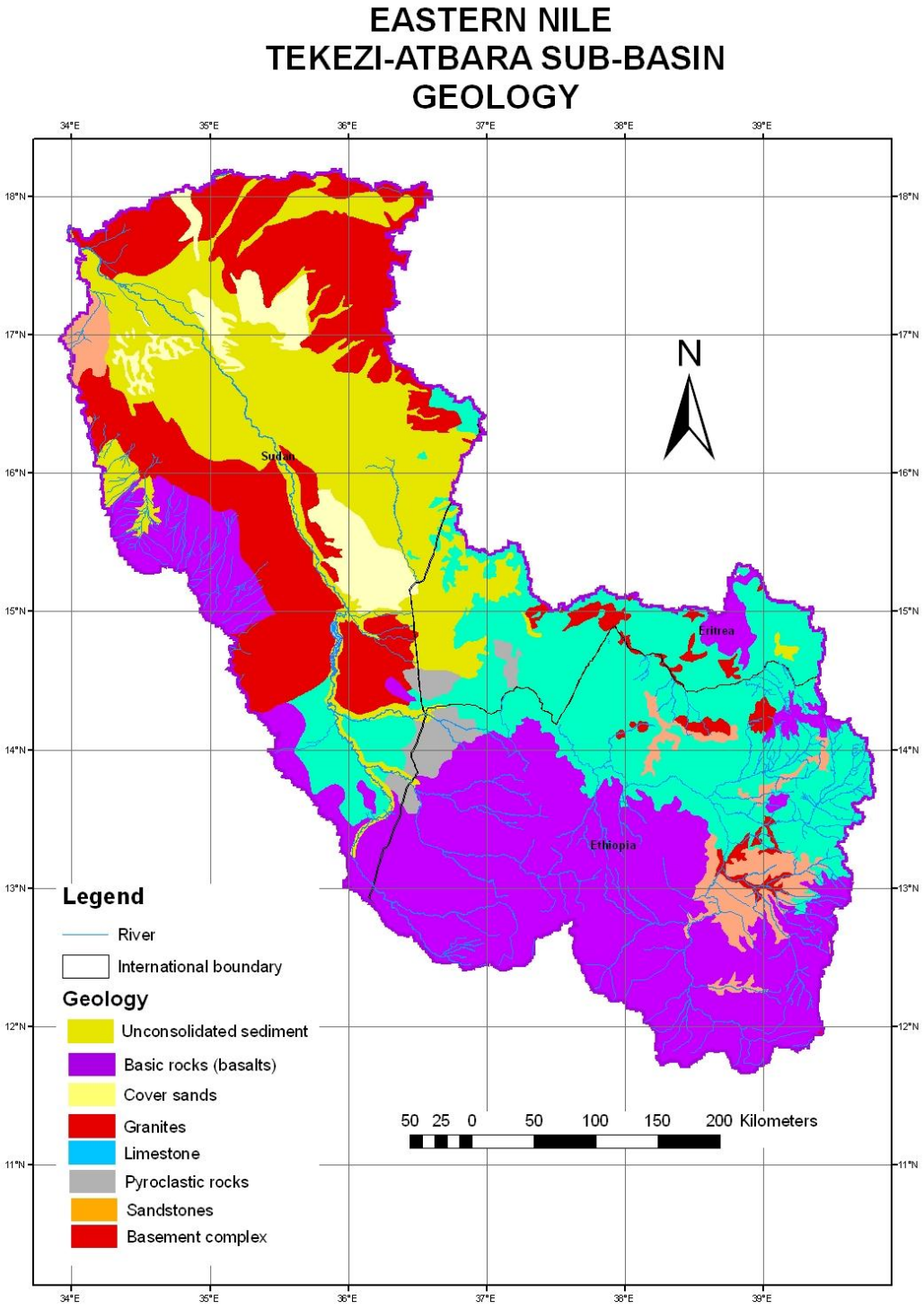
VII. Options for Phasing and Timing

The survey of would be undertaken in a number of sequential steps:

- Formal expression of commitment by the Ethiopian and Sudanese Governments to undertaker the survey,
- Establish a Joint Steering Committee
- Design the survey and determine logistics and responsibilities
- Implement training,
- undertake the survey and analysis
- Formulate the Development Plan
- Information and knowledge sharing: Regional Workshop

VIII. Relationships to other IDEN Projects

Supports IDEN Irrigation and Drainage and IDEN Flood Control and Management Projects.



Map 3. Geology of the Tekeze-Atbara Sub-basin: Surface and Sub-surface Water Survey and Plan

PROJECT PROFILE 4. JOINT DINDER-RAHAD WATERSHED MANAGEMENT PLAN

I. Objectives

The objective of the project is to provide support to the Governments of Ethiopia and the Sudan in undertaking a joint development and formulation of a Watershed Management Plan for the Rahad-Dinder Catchment

II. Background and Rationale

Currently, the Dinder-Rahad Catchment within Ethiopia is relatively undeveloped. Although only supplying 4 km^3 compared with the 50 km^3 of the Blue Nile as its leaves Ethiopia the sediment loads are high. The Catchment experiences frequent and extensive flooding on the Sudan side of the border. Excess sedimentation is occurring in the *maya'a* wetlands in the Dinder Park and beyond.

On the Sudan side of the border is a considerable belt of woodland and shrubland that is in the Dinder National Park. On the Ethiopian side of the border is the proposed Alatish National Park. However, the wooded clay plains on the Ethiopian side offer considerable potential for rainfed cropping and livestock production and parts are now being developed for sesame production. A key problem of the area is water supplies as the rivers generally do not flow for part of the dry season. Groundwater resources are known from the alluvial aquifers but the main Nubian sandstone aquifer lies below the basalt and requires considerable technical expertise to locate.

The cooperative development of a Catchment Watershed Management Plan could ensure that the sediment loads in the two main rivers are reduced. Expertise that has been developed in the Sudan in avoiding problems of rainfed cropping on the clay soils would be of considerable use to land developers in Ethiopia. A joint groundwater survey of the Lowlands could reduce costs and increase accuracy. There are thus a number of cooperative activities in terms of watershed management planning that are mutually beneficial.

III Accordance with Policy and Development Frameworks

The project accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project supports Sudan's Decentralization Policy in the following aspects:

- Improving systems and practices of local publicprivate partnerships in service delivery;
- Support to Locality development planning;
- Improving Locality information systems;
- Establishing Locality monitoring systems;

The Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide support to the Project by providing funds for the surveys, data collection, data analysis and watershed management planning; for physical and human capacity building in terms of logistics, equipment and training in survey techniques; in participatory planning, knowledge sharing and dissemination of the survey finding and the Watershed Management Plan.

V. Cost Estimate

Estimated cost of the project is US$ 8.50 million with US$ 1.7 million provided by the two riparian countries (20%) and US$ 6.80 million external funding.

Survey/Planning Logistics	-	US$ 6.35 million
Capacity Building (Physical & Human)	-	US$ 1.28 million
Knowledge Sharing/Dissemination	-	US$ 0.85 million

VI. Anticipated Benefits and their Distribution

A joint survey and watershed management plan of this catchment would have a number of benefits at the local, Regional and Global levels:

Upstream at the local level implementation of the integrated watershed management interventions would have a positive impact on crop and livestock production through reduced soil erosion and degradation with secondary impacts on livelihoods and increased food security. Downstream at the local level with reduced sediment loads and sedimentation of *maya'a* wetlands there would be a more assured water supply for human, livestock and wildlife. At the regional level reduced sedimentation of the *maya'a* wetlands would increase their flood buffering capacity reducing flood damage on rainfed and irrigated cropland. At the global level the biodiversity value of the maya'a wetlands would be enhanced.

VII. Options for Phasing and Timing

The survey of would be undertaken in a number of sequential steps:

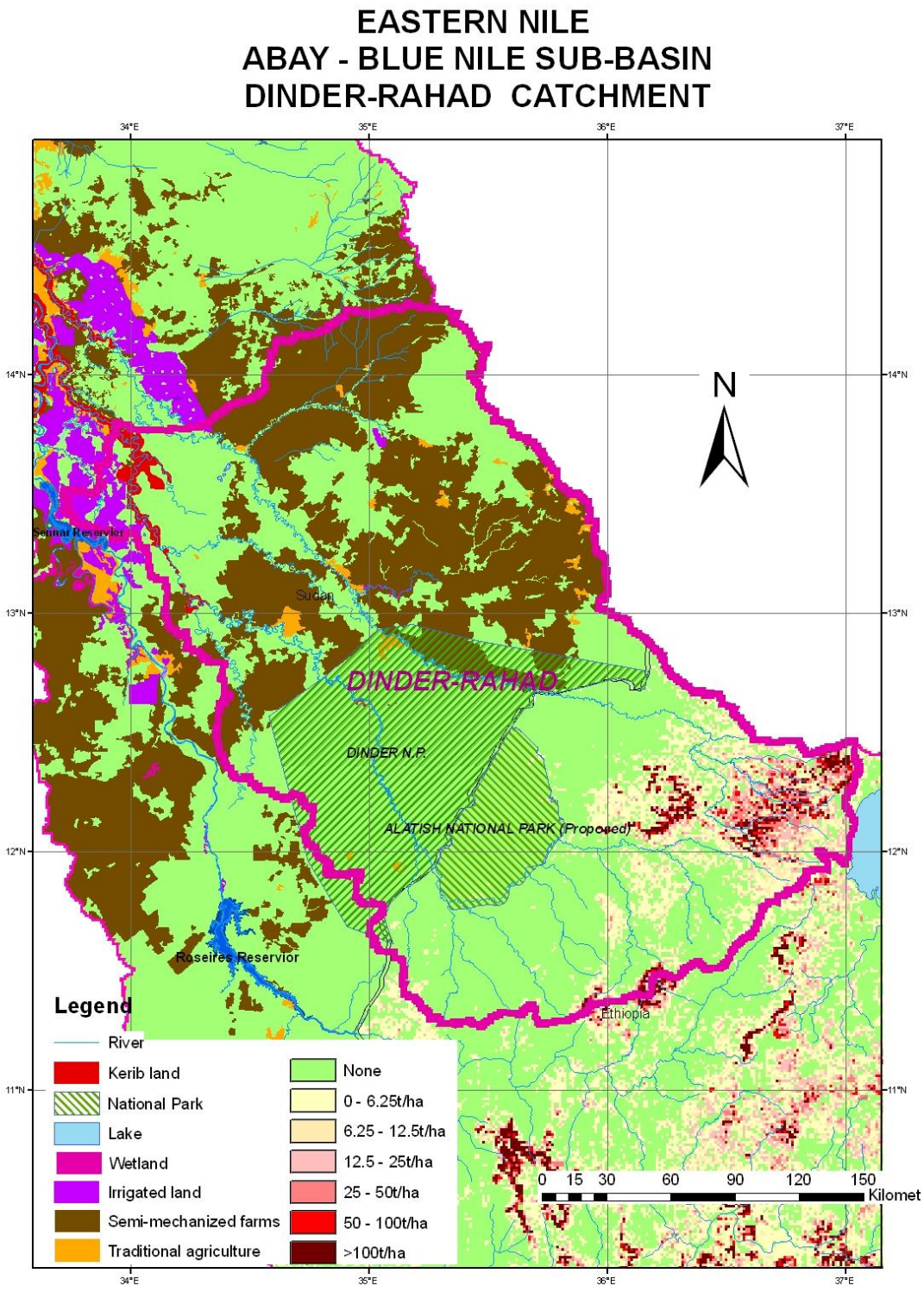
- Formal expression of commitment by the Ethiopian and Sudanese Governments to undertaker the survey,
- Establish a Joint Steering Committee
- Design the survey and determine logistics and responsibilities
- Implement training,
- undertake the survey and analysis
- Develop Watershed Management Plan
- Information and knowledge sharing: Regional Workshop

VIII. Relationships to other IDEN Projects

The project supports the following:

Watershed Management Fast Track Project: Sudan Dinder National Park component.

IDEN Flood Control and Management and Irrigation and Drainage Projects



Map 4. Rahad-Dinder Catchment: Location for the Proposed Watershed Management Plan

PROJECT PROFILE 5. JOINT ABBAY-BLUE NILE WETLANDS SURVEY AND CONSERVATION PLAN

I. Objectives

The objective of the project is to provide support to the Governments of Ethiopia and the Sudan in undertaking a joint survey of the Abbay-Blue Nile Wetlands and developing a Plan for their conservation and sustainable management.

II. Background and Rationale

In the lowlands between the Dinder and Rahad Rivers the wetlands are locally known as "*maya'as*". They are depressions along and between the rivers. The area way from the river is covered with fossil streams and rivers. The depressions are abandoned meanders which have formed "ox-bow" lakes. These lakes however are ephemeral as they gradually silt up, fill with swamp vegetation and then as they silt up dry out.

This area is frequently subject to severe flooding. The wetlands have the capacity to "buffers" flood peaks allowing the flow to pass through the system more easily. Many of the Dinder-Rahad wetlands are now cutoff from the main river systems by the expansion of large-scale rainfed agriculture. It is not known how far this is responsible for the recent flooding and far they are due to silting up of small lakes and ponds from sediment derived from the Ethiopian highlands. However, it is a subject that requires immediate and detailed investigation.

Whilst the wetlands within the Dinder National Park are now part of a well developed conservation programme those outside the park have no protection. Little is known of the contribution to the hydrology of the Dinder and Rahad drainage systems or of their biodiversity value. Indeed, they have not been mapped by the recent Africover mapping project.

A first step would be to undertake a detailed inventory and study of their distribution, their hydrology in relation to the Dinder-Rahad system (in particular to the seasonal flooding), their biodiversity status and their utilization by local peoples. Given the integrated nature of the catchment in Ethiopia and Sudan the study should encompass the whole of the Dinder-Rahad Watershed to understand sediment sources and run-off characteristics.

The wetlands in the lowlands along the Blue Nile comprise the *sun't* forests of *Acacia nilotica* subsp. *nilotica* and subsps. *tomentosa*. These are found in the back-swamp areas and silt-filled ox-bow lakes that are seasonally inundated. Many of these *sun't* forests are under threat from illegal felling. There is a need to undertake a detailed survey and threat assessment of these wetlands and develop a Conservation Plan.

In the Ethiopian Highlands there are three types of wetlands. Around Lakes Tana and Chomen are lacustrine wetlands of papyrus and reed that fringe the lake shores. In some places (e.g. in the Fogera Plain) these have been reclaimed and at lake Chomen some have been flood by the reservoir behind the Fincha'a Dam. To the north and west of the Abbay on the Gojam Plateau are extensive seasonally flooded grasslands in wide valley plains. These provide valuable dry season grazing for livestock when the hill pastures are in poor condition. South of the Abbay and west of the Didessa River are valley bottom wetlands that are increasingly being drained for crop production and grazing.

The wetlands of the Abbay-Blue Nile thus provide an extremely wide range of hydro-ecological conditions and thus a wide range of products and services of value top peoples livelihoods as well to the general hydrology of the whole Sub-basin.

III Accordance with Policy and Development Frameworks

The project accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project supports Sudan's Decentralization Policy in the following aspects:

- Improving systems and practices of local publicprivate partnerships in service delivery;
- Support to Locality development planning;
- Improving Locality information systems;
- Establishing Locality monitoring systems;

The Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide support to the Project by providing funds for the survey and conservation planning; for physical and human capacity building in terms of logistics, equipment and training in survey techniques; in participatory planning, knowledge sharing and dissemination of the survey finding and the Conservation Plan.

The survey would cover all wetland types within the lowlands and highlands of the Abbay-Blue River Basin (Map 5).

V. Cost Estimate

Estimated cost of the project is US$ 8.10 million with US$ 1.62 million provided by the two riparian countries (20%) and US$ 6.48 million external funding.

Survey/Planning Logistics	-	US$ 4.05
Capacity Building (Physical & Human)	-	US$ 2.85
Knowledge Sharing/Dissemination	-	US$ 1.20

V. Anticipated Benefits and their Distribution

A joint survey and conservation plan of this important element of hydrology, biodiversity and livelihoods support would have a number of benefits at the local, Regional and Global levels:

Upstream at the local level a deeper understanding of the role of wetlands in peoples' livelihoods would inform and enrich development and poverty reductions programmes. At a higher the results would provide valuable information for understanding the hydrology of the Abbay-Blue Nile river system both for water storage, irrigation and flood control planning. At the global level the conservation plans would provide enhanced conservation of valuable species and habitat biodiversity.

VI. Options for Phasing and Timing

The survey of would be undertaken in a number of sequential steps:

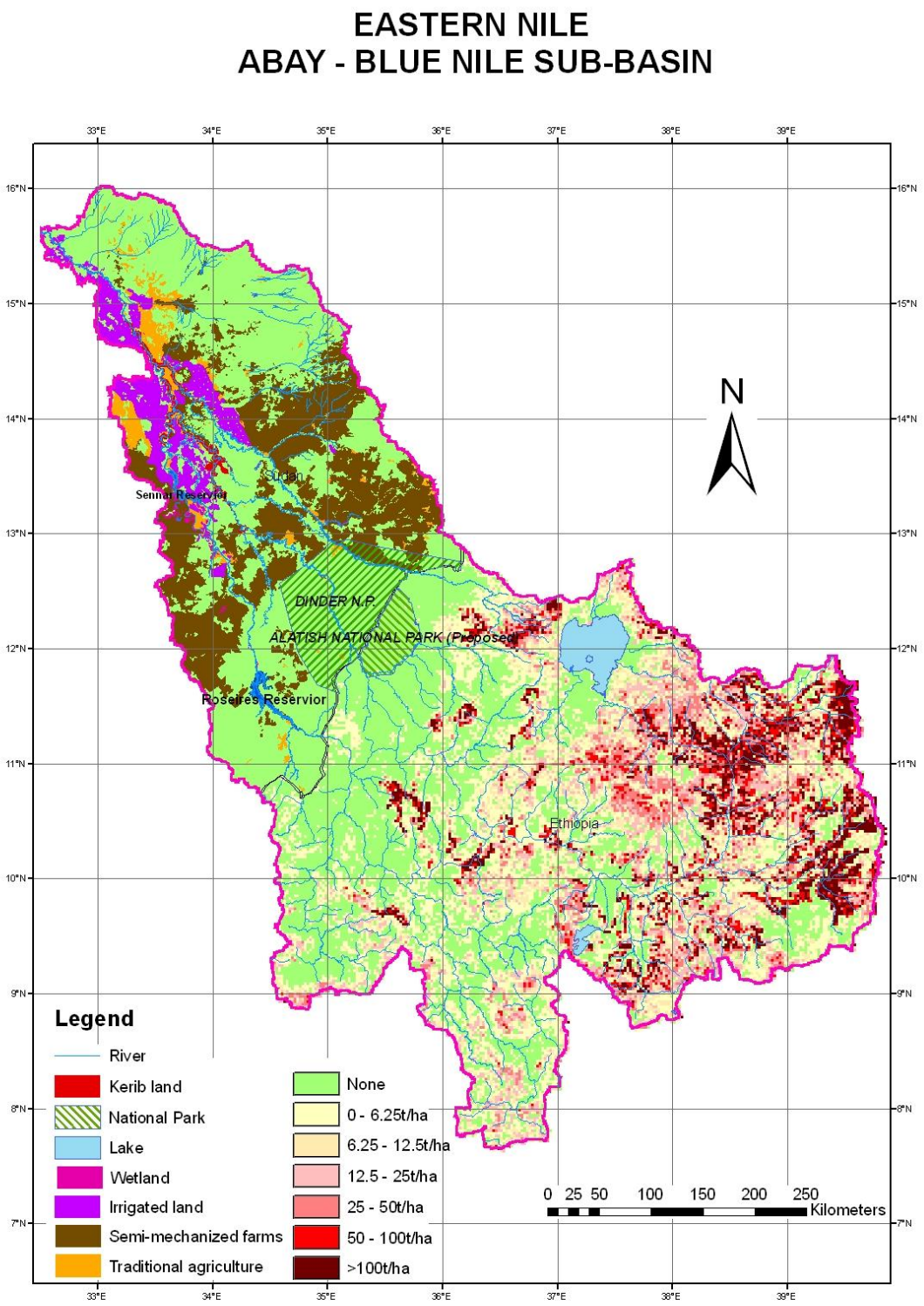
- Formal expression of commitment by the Ethiopian and Sudanese Governments to undertaker the survey,
- Establish a Joint Steering Committee
- Design the survey and determine logistics and responsibilities
- Implement training,
- undertake the survey and analysis
- Develop Conservation Plan
- Information and knowledge sharing: Regional Workshop

VII. Relationships to other IDEN Projects

Watershed Management Fast Track Project: Sudan Dinder National Park component.

IDEN Irrigation and Drainage and the Flood Control and Management Projects.

NBI Transboundary Environmental Action Project.



Map 5. Abbay-Blue Nile Sub-basin: Location of the Wetlands Survey and Management Planning

PROJECT PROFILE 6. ESTABLISHMENT OF THE DINDER-ALATISH TRANSBOUNDARY PARK

I. Objectives

The objective of the project is to provide support to the Governments of Ethiopia and Sudan in establishing a Transboundary Park comprising the Dinder National Park in Sudan and the Alatish National Park in Ethiopia.

II. Background and Rationale

The Dinder National Park, which was proclaimed in 1935 is located within three States: Sennar, Blue Nile and Gedarif. It boundaries follow to the north of the Rahad in the north, to the south of the Dinder in the south and the Ethiopian border to the east, and covers an area of 8,960 km^2. It is also a designated Biosphere Reserve and has been designated under the Ramsar Convention as an international Wetland. Immediately across the border within Ethiopia the Amahra regional State have designated an area as the Alatish National Park

The Park lies on a transition ecotone between two floristic regions: the Ethiopian High Plateau and the arid Saharan-Sudanian biomes. It also lies along the boundary of two major faunal Realms of the world: the Palaearctic and the Ethiopian. It is also located along a major north-south flyway of migratory birds.

It has a high level of biodiversity with over 160 species of birds, 27 species of large mammals and unknown number of small mammals. It comprises the last extensive tract of woodland in eastern Sudan. Its importance to conservation can be summarized as follows (ArabMAB, 2006):

- The proximity of the Park to the desert and semi-desert makes it an important buffer zone for the vegetation cover of central Africa in addition to its significance in providing genetic material for the rehabilitation in the semi-arid and arid areas.

- The park is an important watershed area protecting the most important feeders of the Blue Nile, the Dinder and Rahad rivers.

- The Park, together with the south-western corner of the Ethiopian Plateau make a complete Ecosystem for wild animals, for which the Park is the dry season habitat for migratory species.

- The park supports a high diversity of fauna and flora, including such animals of international conservation importance as the African elephant, African buffalo and the lion.

There are three groups of people who have an interest in the park. The first is the original inhabitants of the areas - a small group of Maganu people who continue to

live in the south-eastern part. This community has a unique culture that needs to be preserved. They depend on subsistence farming in the rainy season and supplement their diet by collecting fruits and wild honey. In the dry season they move to the Dinder for fishing.

The second group are pastoralists and agro-pastoralists who enter the Park in the Dry Season looking for forage and water because much their rangeland has been converted into semi-mechanized farms. Included in this group are the Um Barrarow or Falata who use the Park in the dry season along the Dinder River and move into Ethiopia during the wet season. They burn the tall grasses in the dry season to make green grass available, but in doing so eliminate susceptible herbs and shrubs.

Around the Park are a considerable number of Internally Displaced Peoples taking refuge from the war in Dafur in the 1970's and are settled along the Dinder ands Rahad rivers and enter the Park for fishing, fuelwood and honey collection but also for illegal hunting and present the most serious threat to the wildlife. It is estimated that 100,000 people live around the park in 36 villages.

The Dinder and the Rahad Rivers and their tributaries drain the Park. They rise in the Ethiopian Highlands and are highly seasonal almost drying out in the dry season. Due to the abrupt change in gradient the rivers meandering a large number of cut-off meanders have been formed locally called *Maya'as*. They are generally flat and cover an area some 0.16 to 4.5 km2. Rain and flood water fill them during the rainy season. The maya'as provide a valuable source of water and forage for domestic livestock and wildlife, as well as unique habits rich in biodiversity.

Under natural conditions there is a constant evolutionary sequence of the formation of young maya'as that are deeper with clear water. Gradually they pass through stages of becoming gradually silted up. Over long periods of time with the meandering new maya'as are being formed. The spectrum runs from young productive maya'as to old non-productive dry ones.

With the accelerated erosion in the Ethiopian Highlands this gradual and long term evolutionary process has been disturbed because increased flood peaks and high sediment loads. The area is now subject to annual flooding and many of the Maya'as are becoming silted up with a consequent loss of habitat biodiversity and forage productivity.

In Ethiopia the Amhara regional Government has proposed to develop the Alatish Regional Park in Quara wereda of North Gonder Zone, almost opposite the Dinder national Park in the Sudan. The area represents the Sudan-Guinea Biome. The park has been gazetted as a Regional Park and demarcated. However, the Park lacks national legislation and international recognition (Cherie Enawgaw et al., 2006).

The Park covers an area of 2,666 km2 to the north of the Dinder River, which forms its southern boundary, and to the south of the Gelegu River that forms its northern boundary. The Alatish and other ephemeral streams drain the central area. Its altitude ranges from 500 to 900 masl. The main vegetation is woodland, shrubland and lowland bamboo thicket. Studies so far have revealed that the Park contains 48 mammal species and 180 bird species. It contains such endangered species as *Loxodonta africana, Panthera pardus* and *Panthera leo*.

The area is intact with no permanent settlement, although Fellata pastoralists enter the Park in the dry season with over 10,000 head of livestock. The northern and eastern sides have a 2 kms buffer zone, but the southern boundary has no buffer zone as it border Beneshangul-Gumuz regional State.

The Gumuz people have settled to the south of the Park and practice poaching and fishing along the Dinder River. Settlement is increasing and agriculture expanding along the northern boundary and numbers are being swelled by migrants from other parts of Amhara region. People enter the Park area to collect honey, gums and resins.

There is an urgent need to collaborate with the Beneshangul-Gumuz Regional government and with the Government of Sudan to secure the area. The Ethiopian Wildlife Conservation Organization has strongly recommended that the Alatish Park been proclaimed a National park and that in the future it should form part of a Transboundary Park with the Dinder National Park. There is also an urgent need to develop a park management plan in participation with local communities.

There is considerable scope to develop an international trans-boundary park by combining the Dinder and the proposed Alatish National Parks. Both Parks are located alongside each other, either side of the border between Ethiopia and Sudan. The Dinder Park is well established, gazetted and internationally recognized. In contrast, the Alatish Park currently has only Regional government recognition although the Federal Ethiopian Wildlife Development and Conservation Department (EWDCD) has recommended that it be nationally gazetted and also made the recommendation for the establishment of a Transboundary Park.

There is now considerable experience in Sudan of a community-based approach to Park management in the Dinder National Park. Both Parks experience seasonal grazing from Felata pastoralists and are subject to pressures from people living around the Park.

III Accordance with Policy and Development Frameworks

The project accords with the Ethiopia's Environmental Policy and the Conservation Strategy of Ethiopia. In particular, with respect to the conservation of genetic, species and ecosystem biodiversity; the conservation and sustainable use of forest, woodland and tree resources; and the protection of water resources – in particularly wetlands.

The project also accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project accords with Sudan's National Water Policy, in particular as it affects the environment and related matters such as pollution and catchments degradation. It also accords with the Environmental Protection Policy (2001) regarding the

conservation of biodiversity. In addition, the Project supports Sudan's Decentralization Policy in the following aspects:

- Improving systems and practices of local publicprivate partnerships in service delivery;
- Support to Locality development planning;
- Improving Locality information systems;
- Establishing Locality monitoring systems;

Finally, he Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes.

The Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide support to both Ethiopia and Sudan to develop Park Management Plans that although separate are compatible with each other. The project would also provide physical and human capacity building support to enable physical infrastructure (roads, offices) within the Park and training to Park staff. In the initial stages of establishment there will be need for close collaboration between Ethiopia and Sudan both at the local and the national levels. The project provides support to enable this process through workshops and meetings. There is considerable experience in Southern Africa in establishing Transboundary Parks and the project would provide funds for a Study Tour to enable concerned Ethiopian and Sudanese officials to learn from experiences in that Region.

V. Cost Estimate

Estimated cost of the project is US$ 4.80 million with US$ 0.96 million provided by the two riparian countries (20%) and US$ 3.84 million external funding.

Preparation Compatible Management Plans	-	US$ 1.30 million
Capacity Building (Physical & Human)	-	US$ 2.40 million
Knowledge Sharing, Study Tour & Working Meetings	-	US$ 1.10 million

VI. Anticipated Benefits and their Distribution

A cooperative or joint management of a Trans-boundary Park would have a number of advantages:

- shared experiences in community-based Park management
- cost-effective joint management of the Park as one eco-system, and
- the strong possibility of international recognition and ability to secure both Government and external funding.

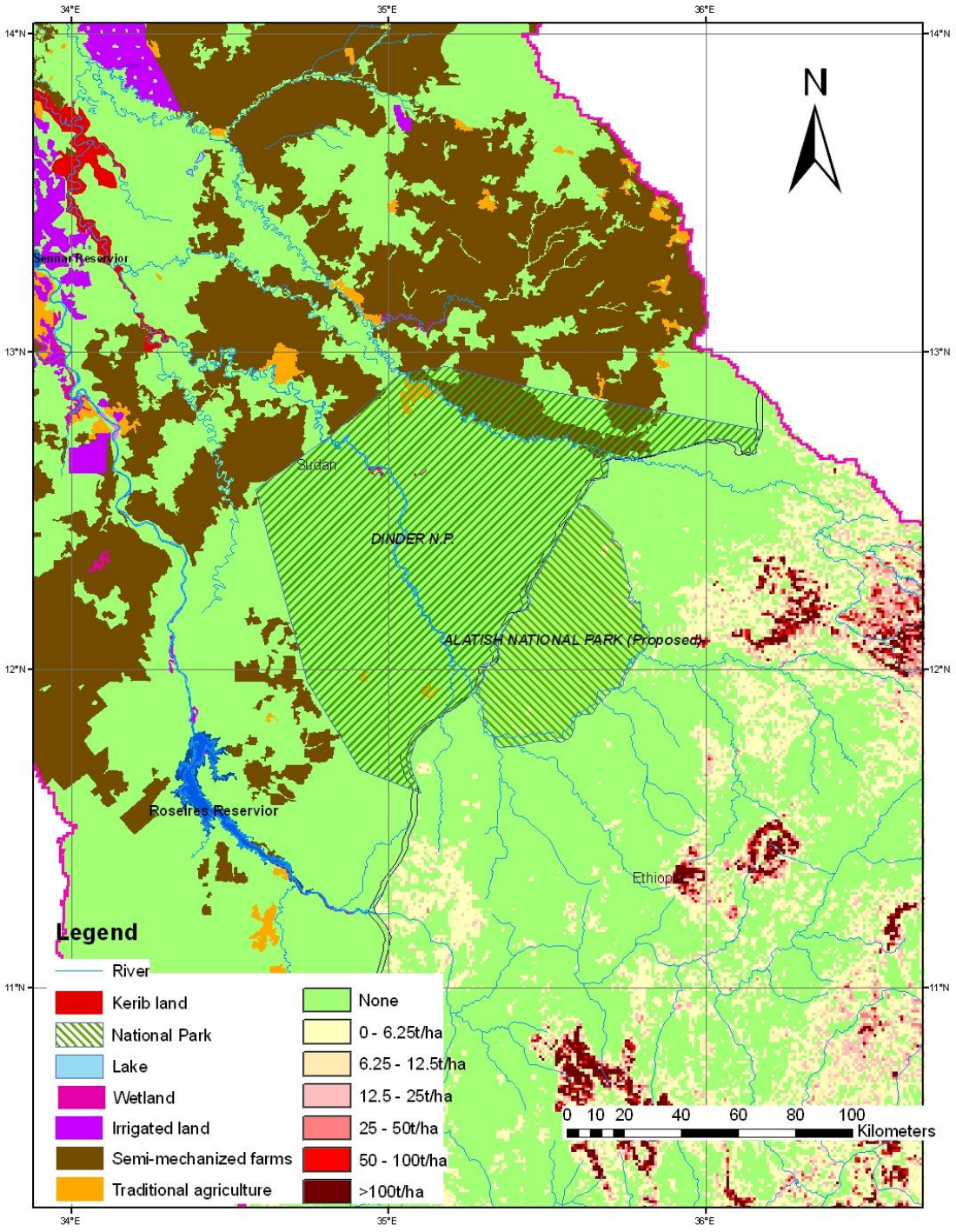
VII. Options for Phasing and Timing

The establishment of the Trans-boundary Park would follow a number of sequential stages:

- Gazetting of the Alatish Regional Park and as a "National Park"
- Formal expression of commitment by Ethiopian and Sudan Governments to establish a Transboundary Park
- Establish a Joint Steering Committee
- Develop compatible Park Management Plans
- Implement physical and human capacity building
- Establish formal joint monitoring system

VIII. Relationships to other IDEN Projects

The Watershed Management Fast Track project in Sudan is providing support to the Dinder Park. The NBI – NTEAP has a Community Development micro-grant project in the Dinder Park.



Map 6. Location of the Proposed Dinder-Alatish Transboundary Park.

PROJECT PROFILE 7. JOINT WILDLIFE AND HABITAT INVENTORY AND ASSESSMENT: BOMA AND GAMBELLA NATIONAL PARKS

I. Objectives

The objective of the project is to provide support to the Governments of Ethiopia and the Sudan in undertaking a joint wildlife and habitat inventory and assessment in the area in and between the Gambella National Park in Ethiopia and the Boma National Park in the Sudan.

II. Background and Rationale

There are two national parks in the Baro-Sobat-White Nile Sub-basin: the Gambella National Park in Ethiopia and the Boma National Park in the Sudan.

The Gambella Regional Park is 506,100 ha in extent and is located between the Akobo and Ghilo rivers, east of the road between Gambella and Gog. The Gambela Park was proposed because of the numerous large wildlife species, particularly Nile Lechwe, White eared Kob and the Whale-headed Stork. The White Eared Kob migrates every year between the Sudd in Sudan and the Gambela Marshes. A survey by Lavrenchenko et al. (1989) inventories some 88 mammal species of 9 Orders and 28 Families. In addition to White-eared Kob they include elephant, Nile Lechwe, Topi and Road Antelope. In smaller numbers Lion, Leopard, Lelwel Hartebeeste and Buffalo are also found. There are extensive areas of swamp habitat. Some 43 species of mammals and an IBA team recorded 230 species of birds (EWNHS/Bird Life International (1996). There are two near threatened bird species: the Shoebill (last recorded in 1961) and the Basra Reed Warbler (last recorded in 1976). Golubtsov et al (1989) recorded the presence of 92 fish species belong to 51 genera and 23 families.

The Park is not legally gazetted and no Management plan has been prepared. There are no visitor facilities. The two vehicles and Park stores were destroyed during the government change over in 1991. The Park contains the Akobo large-scale farm and Alwero Dam, and irrigation developments is currently underway in the centre of the Park. There is a critical problem of illegal hunting, with a large number of arms made available because of the Sudanese Civil War. The Phugnido Refugee Camp is located adjacent to the Park. The last major study of the area was made in 1986 by the Russian Institute of Evolutionary Morphology and Animal Ecology under the UNESCO Man and the Biosphere programme. (Sokolov, 1989) although a bird survey was undertaken in 1995-96 by the Ethiopian Wildlife and Natural History Society (EWNHS-Bird Life Int., 1996).

The local inhabitants include the Anuak to the east, who cultivated along the Baro and Akobo Rivers and the agro-pastoral Nuer to the west and into Sudan.

The Boma National Park encompasses an area of some 2.28 million ha of the clay plains and a mosaic of wetlands, seasonally flooded grasslands and open wooded savanna grassland in the north-western part. The south-eastern part of the Park includes part of the Boma Plateau and the escarpment that separates the plateau from the plains. It was declared a National, Park in 1977 but has not been gazetted. The area is extremely inaccessible, most particularly during the wet season. The main routes have been mined and minor routes un-maintained. The Park is now managed by the New Sudan Wildlife Organisation (NSWO) and a regional headquarters has been established at Boma town. There are 22 Staff including 5 Senior Staff but facilities and equipment are lacking (Morjan et al., 2001).

Some five ethnic groups inhabit the park and its environs: the Murle (Boma plateau agriculturists), Murle (plains pastoralists), Jie, Anuak, Suri (Kichepo). The plains Murle, Suri and the Jie are predominantly pastoralists whilst the Anuak and plateau Murle are predominantly agriculturalists. The pastoralists used to have very large herds of cattle, sheep and goats but have lost substantial numbers during the conflict and now own 25 to 30 percent of their previous holdings.

In the wet season of 2001 a Team supported by USAID and in collaboration with the University of Missouri, USA, undertook a survey to assess the impact of conflict on the Boma National Park looking in particular at the status of food security livestock and wildlife (Deng, 2001). Generally the pastoralists saw internal tribal conflict as the major source of livelihood vulnerability the agriculturalists saw drought as the main external shock to their livelihoods. Hunting and wild food collecting was a coping mechanism adopted by all peoples as an alternative livelihoods strategy, although the degree to which this strategy was adopted varied among the different groups.

Some 800,000 White Eared Kob migrate every year between the Sudd in Sudan and the Gambella Marshes. Elephant also follow a migratory route of some 1,500kms into and between the two National parks.

A major wildlife inventory had been undertaken in 1980 (Fryxell, 1983) and provided a baseline for the 2001 study. With the exception of population estimates for Reedbuck, Ostrich and Eland populations the 2001 estimates suggest that there has been a massive decline in nearly all animal species. The most affected were the White-eared Kob and the Mongalla Gazelle. A summary is provided in table 17. The big increase in hunting has caused the migratory routes of White-eared Kob and Elephant to change over 20 years (Map 24).

Table 1. Comparison between Wildlife Population estimates in the years 1980 and 2001.

Species	2001 count Wet season	1980 count Wet season	1980 count Dry season
White-eared Kob	176,120	680,716	849,365
Lesser Eland	21,000	2,612	7,839
Oribi	3,920	2,939	2,264
Reedbuck	28,840	2,000	3,000
Road Antelope	1,960	2,059	3,085
Mangalla Gazelle	280	5,933	21,678
Warthog	280	293	4,868
Ostrich	3,640	1,306	2,151
Tiang	N.S.	24,078	29,460

Lelwel Hartebeest	5,600	8,556	47,148
Zebra	N.S.	24,078	29,460
Buffalo	N.S.	2,965	11,179
Giraffe	N.S.	4,605	9,028
Waterbuck	N.S.	620	2,462
Steinbuck	N.S.	292	1,981
Grants Gazelle	N.S.	1,222	1,811
Elephant	N.S.	1,763	2,179

Source: Deng, 2001.
N.S. – Not seen

The vegetation survey revealed an increase in tree densities an indication of habitat improvement and stability.

There is an urgent need to undertake an aerial and ground survey across the whole area in and between to the two parks to determine the status of both wildlife and habitats. Given the inter-dependence of the areas in Sudan and Ethiopia this will have to be a joint trans-boundary survey.

III Accordance with Policy and Development Frameworks

The project accords with the Ethiopia's Environmental Policy and the Conservation Strategy of Ethiopia. In particular, with respect to the conservation of genetic, species and ecosystem biodiversity; the conservation and sustainable use of forest, woodland and tree resources; and the protection of water resources – in particular wetlands.

The project also accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project accords with Sudan's National Water Policy, in particular as it affects the environment and related matters such as pollution and catchments degradation. It also accords with the Environmental Protection Policy (2001) regarding the conservation of biodiversity. In addition, the Project supports Sudan's Decentralization Policy in the following aspects:

- Improving systems and practices of local publicprivate partnerships in service delivery;
- Support to Locality development planning;
- Improving Locality information systems;
- Establishing Locality monitoring systems;

Finally, he Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes.

The Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide support to the survey by providing funds for the ground and the aerial survey. It will be important to undertaker a livelihoods survey of peoples living in the area to provide a basis for subsequent participatory management planning of the two parks. Finally, the project will support for training of Park staff in techniques of aerial and ground wildlife and habitat surveys and for subsequent analysis and knowledge sharing.

V. Cost Estimate

Estimated cost of the project is US$ 2.80 million with US$ 0.56 million provided by the two riparian countries and US$ 2.24 million external funding.

Survey (Ground/aerial)	-	US$ 1.40 million
Livelihood Survey	-	US$ 0.56 million
Capacity Building (Human)	-	US$ 0.50 million
Analysis/Knowledge Sharing/Dissemination	-	US$ 0.34 million

VI. Anticipated Benefits and their Distribution

A joint survey of this important biodiversity area would have a number of benefits:

- shared experiences in wildlife and habitat inventory and assessment,
- shared experiences in scientific research,
- cost-effective joint survey across an area of two countries,
- an assessment of the total ecosystem and a firm foundation for Park Management Planning for the two Parks,
- a firm foundation and modality established for future cooperation in biodiversity conservation between the Sudan and Ethiopia.

VII. Options for Phasing and Timing

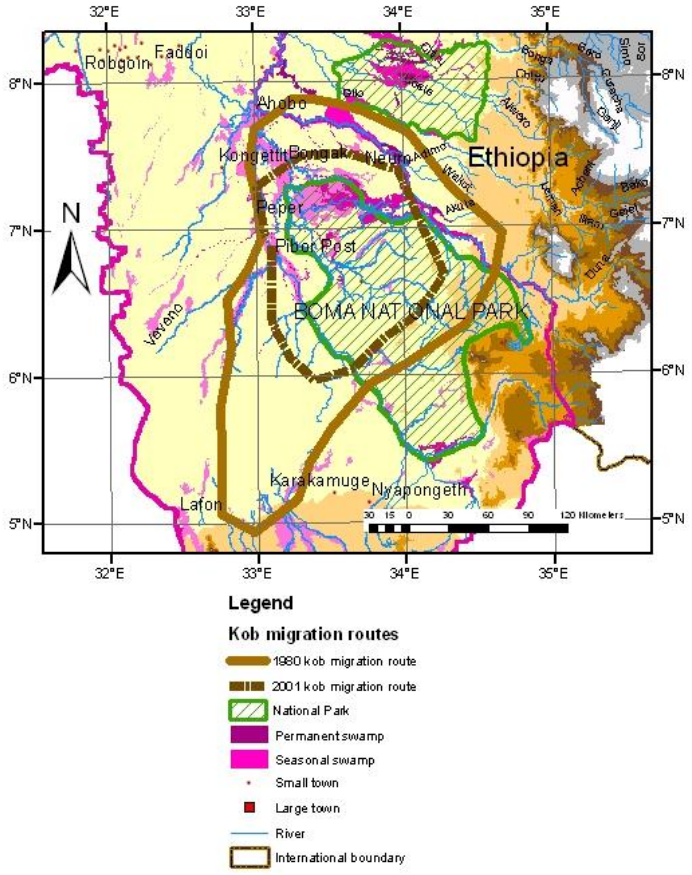
The survey of would be undertaken in a number of sequential steps:

- Formal expression of commitment by the Ethiopian and Sudanese Governments to undertaker the survey,
- Establish a Joint Steering Committee
- Design the survey and determine logistics and responsibilities,
- Implement training,
- undertake the survey and analysis
- Information and knowledge sharing: Regional Workshop

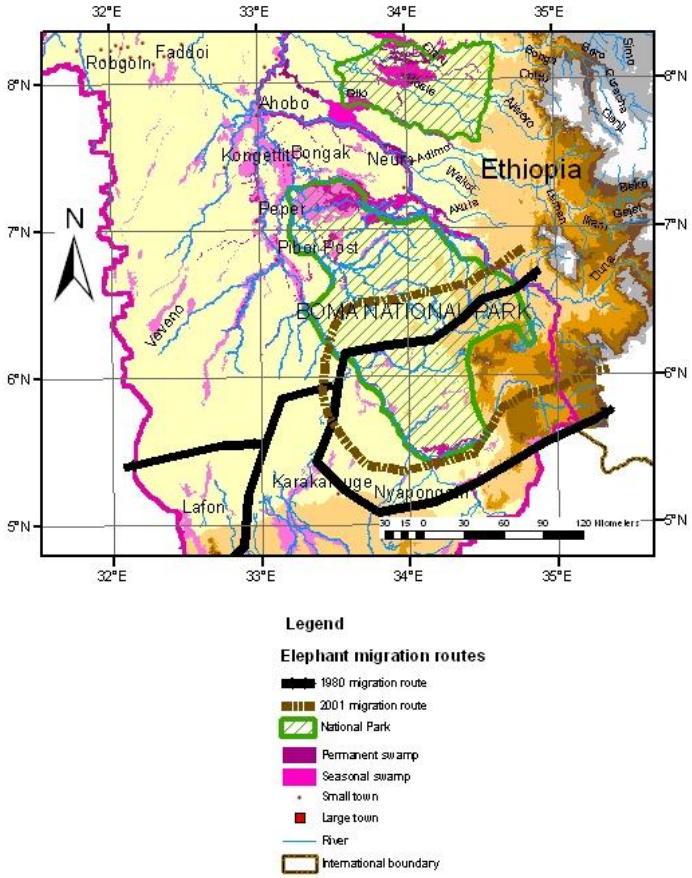
VIII. Relationships to other IDEN Projects

Baro-Sobat-White Nile Multi-purpose Water Resources development Project

BARO-SOBAT-WHITE NILE SUB-BASIN
WHITE EARED KOB MIGRATION ROUTES
1980 AND 2001



BARO-SOBAT-WHITE NILE SUB-BASIN
ELEPHANT MIGRATION ROUTES
1980 AND 2001



PROJECT PROFILE 8. COMPREHENSIVE WATERSHED MANAGEMENT RESEARCH PROJECT – CHOKE MOUNTAIN CHAIN, ETHIOPIA

I. Objectives

The objective of this joint research project is to provide support to a wide-ranging and comprehensive watershed management research project covering a number of Sub-catchments that drain the Choke Mountain chain into the Abbay River system and located in the Western Highlands of Ethiopia. The major objective of the programme would be to gain an understanding of the complex hydrological-land use and erosion-deposition relationships at various scales: micro-catchment, sub-catchment, catchment and Sub-basin. The project will provide information of value not only to the eastern Nile Basin but also to sustainable land management programme throughout Africa.

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II. Background and Rationale

There are many complex relationships between land use/land cover and hydrology, and between land use/land cover, erosion, deposition and sediment delivery to the stream-river system. Different processes act with different intensities at different catchment scales. The science of these relationships is only imperfectly understood.

In developing basin-wide cooperative and joint activities it will be important that all riparian countries see the benefits (and the costs) in quantitative terms as far as is possible. This is most critical in assessing a programme of watershed management activities that has both up-stream and down-stream costs and benefits. If an element of benefit and cost sharing within a joint project is to be introduced and accepted it will be vital that the quantitative impacts that a programme of watershed management interventions can be determined.

Hitherto, these complex relationships have only been researched at the micro-scale: field plot and micro-catchment. No research has been undertaken at the various catchment scales to gain an understanding of the various levels of inter-actions and relationships. This project aims to redress this large gap in our understanding of these relationships. It will involve a number of inter- related research activities being undertaken at different scales.

Institutionally, the Project will be implemented by a number of research institutes and organizations from all three Eastern Nile countries under the coordination of ENTRO.

The Project would be undertaken in two phases. The first phase would develop a comprehensive framework for research activities that take cognizance of the scale effects of the various factors relating to hydrology, land cover, erosion, deposition in the landscape, sediment delivery and fluvial transport. Both surface and groundwater aspects would be covered. The second phase would implement a series of inter-

related research activities over a period of five years in order to capture the natural variance in many of the controlling parameters.

III Accordance with Policy and Development Frameworks

The project accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on arresting natural resource degradation which is a root cause of poverty in all three countries of the Eastern Nile Basin. It will support programmes to improve agricultural productivity, improve water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide funds for both the research design phase and the research implementation phase. Information sharing will be a key component of the project to ensure maximum synergy from the wide range of disciplines involved. Human and institutional capacity building will also be important components of the project to ensure that a body of expertise is developed and maintained.

V. Cost Estimate

Estimated cost of the Phase I of the project is US$ 1.8 million with US$ 0.3 million provided by the three riparian countries and US$ 1.5 million external funding.

Estimated cost of the Phase II of the Project is US$ 8.00 with US$ 1.60 million provided by the three riparian countries (20%) and 6.80 million from external funding.

Phase I (Research design) - US$ 1.8 million
Phase II:

Research Contracts	-	US$ 4.8 million
Capacity Building (Human & Physical)	-	US$ 2.0 million
Knowledge sharing/Dissemination	-	US$ 1.2 million

VI. Anticipated Benefits and their Distribution

There are a number of local, regional and global benefits that would accrue to the Project:

- increased scientific knowledge of the complex relationships between land cover, land management, hydrology, erosion, deposition in the landscape, sediment delivery to the river system and fluvial sediment transport
- contribution to more effective watershed management interventions and a deeper understanding of their potential impacts at various scales;
- increased cooperation and knowledge sharing and confidence building among countries of the Eastern Nile Basin;
- Increased capacity in sciences of hydrology, erosion and sedimentation and the establishment of a cadre of professionals knowledgeable in the practical applications of these areas.

VII. Options for Phasing and Timing

The project would be undertaken in two Phases following a number of sequential steps:

Phase I:

- Establish a Joint Steering Committee of with representatives of all concerned Research Groups and Institutions;
- Design the Research Framework, methodologies of the various research elements, and determine logistics and responsibilities;
- Commence training and capacity building activities;

Phase II

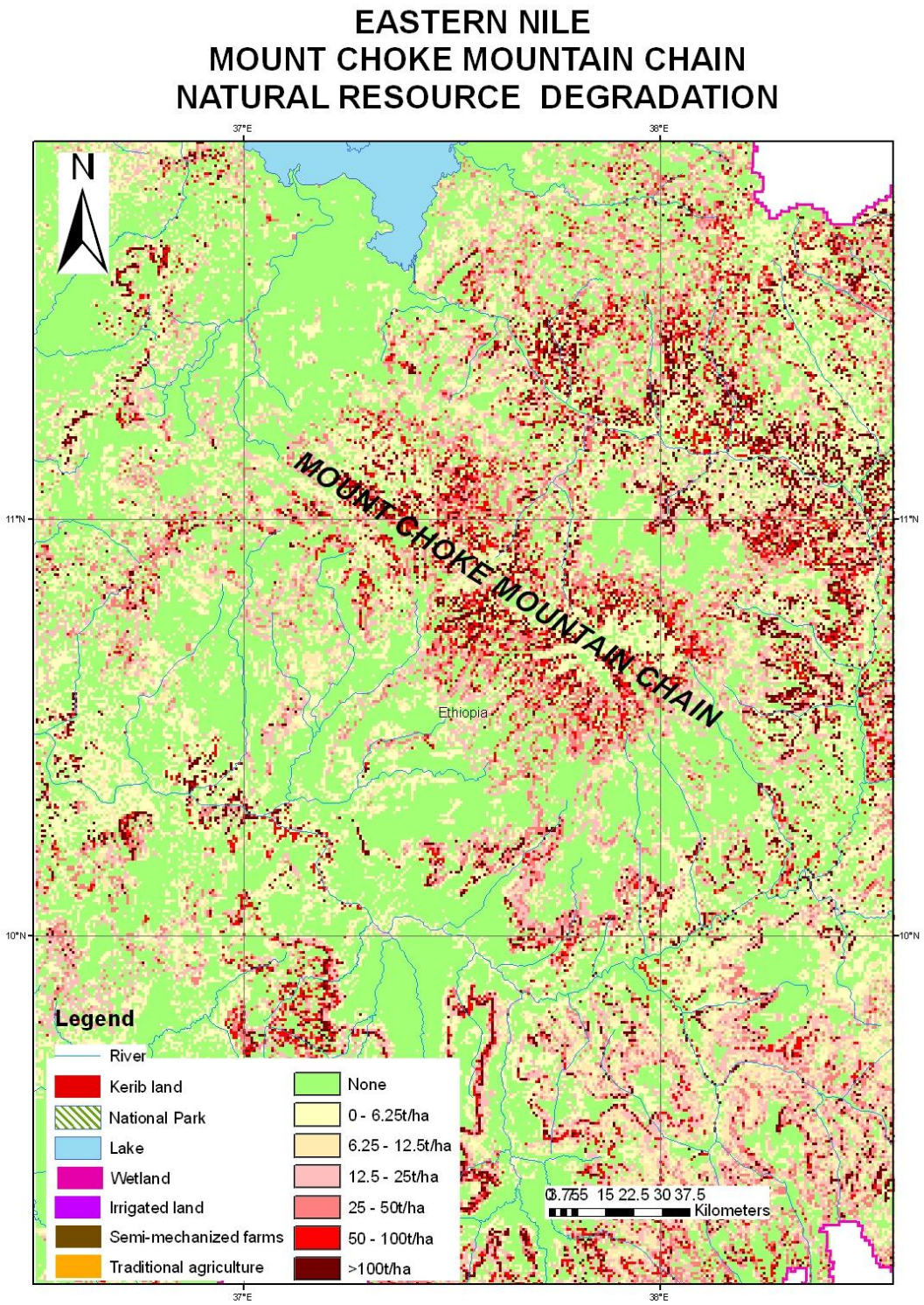
- Implement Research Activities, Monitor progress and coordinate related activities;
- Information and knowledge sharing: Workshops and dissemination of preliminary findings
- Document Research results. .

VIII. Relationships to other IDEN Projects

The project will support the following projects through an improved understanding of the processes and impacts of resource degradation in the Eastern Nile Basin:

Joint Multi-purpose Programme

Long-term Watershed Management CRA



Map 8. Location of the Proposed Comprehensive Watershed Management Research Project

PROJECT PROFILE 9. SOUTHWEST ETHIOPIAN HIGHLANDS - PARTICIPATORY DEVELOPMENT AND MANAGEMENT OF SUB-CATCHMENTS

I. Objectives

The objective of this joint project is to provide support to developing a participatory two tier approach to sustainable development and management of Sub-catchments and their Micro-catchments in the Southwestern Ethiopian Highlands. The project would also support the establishment of the higher level institutional procedures and organization to facilitate coordination at the Sub-catchment level. The project will provide information of value not only to the eastern Nile Basin but also to sustainable land management programme throughout Africa.

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II. Background and Rationale

The Highlands of the Upper Baro-Akobo Sub-basin are a mosaic of forest patches, upland cropland and grazing land and valley-bottom swamps – many of which are being drained for crop production. The area is under increasing population pressure and has varying, but growing, levels of food-insecurity. With mean annual rainfall exceeding 1,500 mm/yr the area has been identified as having good micro-hydro power potential. The valley-bottom swamps are located in micro-catchments at the top of a nested-hierarchy of hydrologically linked micro-catchments and sub-catchments that comprise the Upper Baro-Akobo Sub-basin. Whilst, currently only 5-15 percent of these swamps have been drained for crop production with increasing land pressure and food-insecurity the pace of swamp conversion is likely to accelerate.

A sustainable approach to swamp development for multiple uses has been developed by a local NGO based on traditional practices, a scientific study of ecological succession and governed by local institutions. On the uplands, community-based approaches to participatory forest management have also been developed. Related developments have taken place with respect to sustainable harvesting, improved marketing and quality control of non-timber forest products. In particular, the development of the production, quality control, certification and improved marketing of organically produced coffee is also receiving attention. There is a need to bring all these separate development initiatives together through a process of participatory land use planning at the micro-watershed level but which then integrates these into the overall planning and development at the Sub-catchment level to ensure equitable access to water across the Sub-catchment. This process would be linked to the proposed land use zoning of the remaining High Forest areas.

This two tiered level of watershed management planning would ensure that larger investments such as mini hydro power developments and lowland irrigation would be assured of sufficient water. Additionally, infrastructural developments such as

improved road access to markets and crop processing plants would form an integral part of the overall Sub-catchment development. This two tiered approach to watershed management is only just now beginning to receive attention. Previous approaches initially used the Sub-catchment as the only level of development, which were then changed to the micro-catchment approach. There is a need to integrate the two approaches and increase the role for community participation with market incentives.

III Accordance with Policy and Development Frameworks

The project accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project supports Sudan's Decentralization Policy in the following aspects:

- Improving systems and practices of local publicprivate partnerships in service delivery;
- Support to Locality development planning;
- Improving Locality information systems;
- Establishing Locality monitoring systems;

The Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would provide support to the Project by providing funds for participatory land use planning at the micro-catchment level and for the water and other infrastructural planning at the Sub-catchment level; for physical and human capacity building in terms of logistics, equipment and training in survey

techniques; in participatory planning, knowledge sharing and dissemination of the survey finding and the Micro-Catchment and Sub-catchment Plans.

Institutionally, the Project will be implemented by a number of research institutes and organizations from all three Eastern Nile countries under the coordination of ENTRO.

V. Cost Estimate

Estimated cost of the project is US$ 4.80 million with US$ 0.96 million provided by the three Riparian countries (20%) and US$ 3.84 million external funding.

Micro-catchment Participatory Land Use Planning	-	US$ 2.88 million
Sub-catchment Planning	-	US$ 0.74 million
Capacity Building (Physical & Human)	-	US$ 0.70 million
Knowledge Sharing	-	US$ 0.48 million

VI. Anticipated Benefits and their Distribution

There are a number of local, regional and global benefits that would accrue to the Project.

At the local level an integrated system of natural resource management would be established that would diversity and sustainably increase agricultural production thereby increasing food security, supporting sustainable livelihoods and reducing poverty. At the Catchment and Sub-basin levels equitable access to water resources by downstream irrigators and mini-hydro power developments would be assured.

At the Global level sustainable management and use of the forest and wetland resources would ensure the conservation of biodiversity and in particular the wild coffee gene pool.

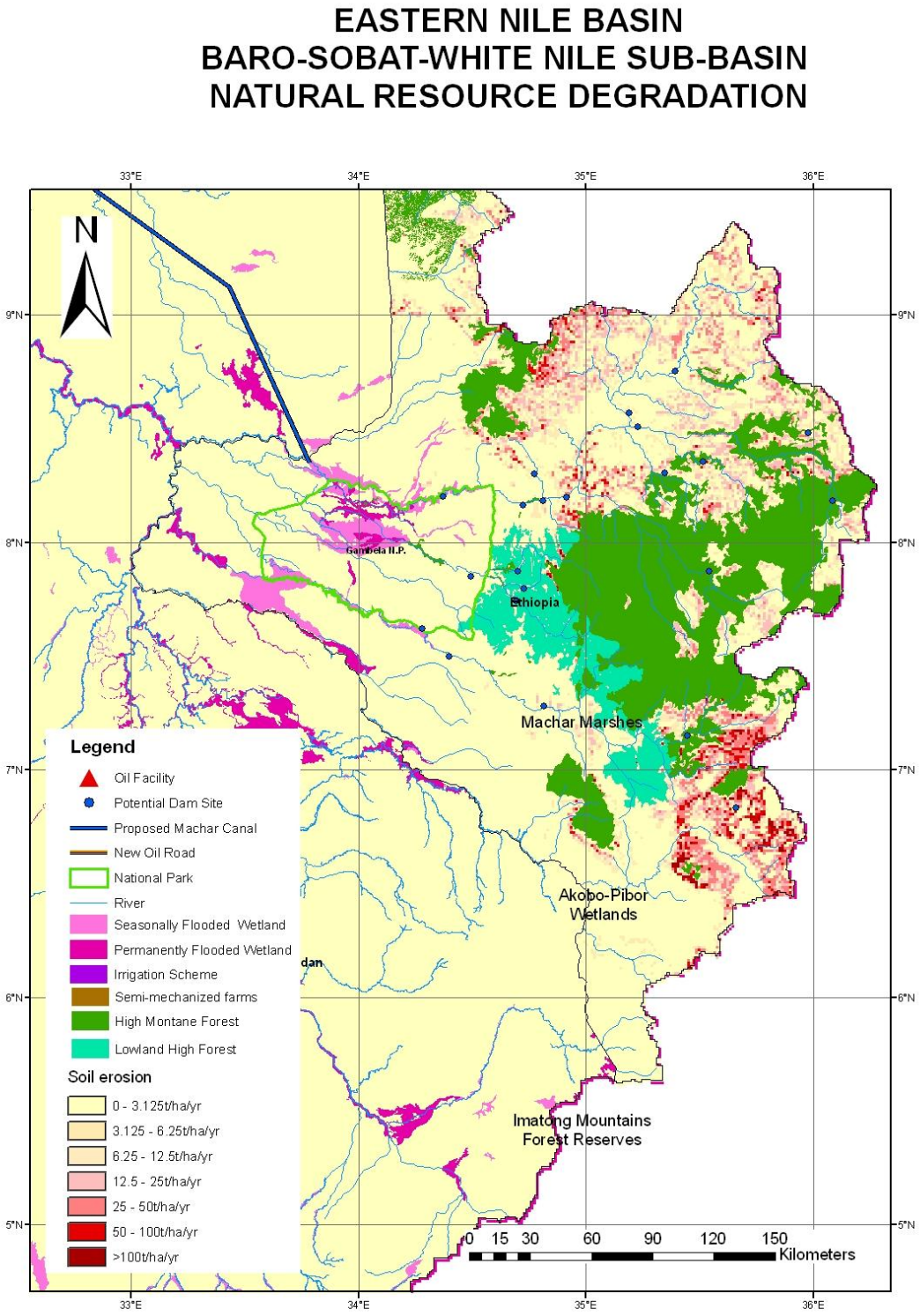
VII. Options for Phasing and Timing

The project would be undertaken in a number of sequential steps:

- As the Project covers three Regional States, establish a Joint Steering Committee;
- Establish local and Sub-catchment institutional arrangements and organizational mandates;
- Design the methodology of the Micro-catchment and the Sub-catchment surveys and participatory planning, and determine logistics and responsibilities;
- Implement training and capacity building activities;
- undertake the participatory planning at micro-catchment level (local stakeholders) and collaborative planning at the Sub-catchment levels (local and regional Stakeholders);
- Information and knowledge sharing: Regional Workshops.

VIII. Relationships to other IDEN Projects

Baro-Sobat-White Nile Multi-purpose Project.



Map 9. Baro-Akobo Sub-basin: Location of the Participatory Development and Management of Sub-Catchments Project

PROJECT PROFILE 10. IN-DEPTH STUDY: DETERMINATION OF ECONOMIC, SOCIAL AND ENVIRONMENTAL BENEFITS AND COSTS OF WATERSHED MANAGEMENT INTERVENTIONS IN THE EASTERN NILE BASIN

I. Objectives

The objects of this in-depth study would be to determine the range of economic, social and environmental benefits and costs at local, national, regional and Global levels of watershed management interventions across the Eastern Nile Basin.

II. Background and Rationale

A preliminary estimate of the economic, social and environmental benefits and costs of a basin wide programme of watershed management interventions was undertaken in the in the Watershed Management CRA. This preliminary assessment estimated that current annual costs of natural resource degradation were some US$ 671.4 million and that these would rise to US$ 4.5 billion over the next 25 years. The Report estimated that the total incremental costs of a 10 year programme of watershed management interventions were US$ 4.67 billion whilst the incremental benefits were $US 13.18 billion: a benefit:cost ratio of 2.8.

This in-depth study would build on this and undertake a much more in-depth analysis than was possible in the CRA, which by its nature was reconnaissance and preliminary.

The Study would be inter-disciplinary and involve economists, hydrologists and natural resource scientists from Universities and/or Research organizations from the three Countries in the Eastern Nile Basin. Its findings would feed into the evaluation process of the Joint Multi-purpose Programme of investments as well as providing key data and information to the Eastern Nile Planning model.

III Accordance with Policy and Development Frameworks

The project accords with Ethiopia's Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) with particular emphasis on arresting natural resource degradation which is a root cause of poverty in all three countries of the Eastern Nile Basin. It will support programmes to improve agricultural productivity, improve water resources development, development of potable water supplies and the expansion of small irrigation to reduce vulnerability to climatic shocks and to enhance sustainable livelihoods.

The Project also accords with the Sudan's National Comprehensive Strategy (which incorporates the National Environmental Strategy) by incorporating environmental concerns into development programmes. It also accords with the policy outlined in the Joint Appraisal Mission (JAM) that identified the need to address environmental challenges in order to ensure equitable and sustainable development. It also accords with Sudan's Poverty Reduction Strategic Plan to integrate environmental concerns in poverty reduction activities.

Finally the Project accords fully with ENSAP's Policy guidelines in particular:

- To develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples;
- To ensure efficient water management and the optimal use of the resources;
- To ensure cooperation and joint action between the riparian countries, seeking win-win gains;
- To target poverty eradication and promote economic integration; and
- To ensure that the program results in a move from planning to action.

IV. Scope and Extent

The Project would fund the establishment and workings of an inter-basin multidisciplinary team of economists, hydrologists and natural resource scientists who would undertake the in-depth study. It would fund peer review, technical assistance and capacity building where required, and support information exchange and knowledge sharing. Finally, the project would support the production and dissemination of the analysis and results.

V. Cost Estimate

The estimated costs of the project are US$ 950,000 of which the three countries would fund US$ 190,000 (20%) and international funding sources US$ 760,000.

Research Contracts	-	US$ 715,500
Capacity Building, Technical Assistance	-	US$ 142,500
Knowledge Sharing, Report Production/Dissemination	-	US$ 95,000

VI. Anticipated Benefits and their Distribution

The collaborative in-depth study would have a number of national and regional benefits:

- increased knowledge of the economic, social and environmental benefits and costs of watershed management interventions in the context of multi-purpose cooperative development of the eastern Nile Basin and thus increasing the scope and effectiveness of impact assessment of such investments;
- increased cooperation and knowledge sharing and confidence building among countries of the Eastern Nile Basin;

- Increased capacity in environmental and social economics and the establishment of a cadre of professionals knowledgeable in the practical applications of this area of economics.

VII. Options for Phasing and Timing

It is possible that the Study be broken down by Sub-basin and then the results aggregated in a similar manner to the Distributive Analysis of the WSM-CRA.

- Formal expression of commitment by the three riparian Governments to establish a collaborative in-depth study,
- Establish a Joint Steering Committee
- Develop Work Plan and responsibilities,
- Implement the Study
- Information and knowledge sharing: Regional Workshops; technical assistance and capacity building
- Dissemination of Study findings.

VIII. Relationships to other IDEN Projects

It would provide technical and economic input to the Joint Multi-purpose Programme and subsequent investment evaluations. It would also link strongly with Project Profile 8: the Comprehensive watershed Management Research Project, most specifically for empirical data on erosion, sedimentation and productivity losses.

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