EASTERN NILE TECHNICAL REGIONAL OFFICE, ADDIS ABABA

PROJECT PREPARATION

FLOOD PREPAREDNESS AND EARLY WARNING

PROJECT IMPLEMENTATION PLAN

FINAL

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Executive Summary

OBJECTIVES

The Flood Preparedness and Early Warning (FPEW) Project was initiated by the Eastern Nile Technical Regional Office (ENTRO) after consultations with the national governments of Egypt, Sudan and Ethiopia and The World Bank. The FPEW Project is one of the fast-track projects identified for priority action under the Eastern Nile Subsidiary Action Program (ENSAP) as part of the Nile Basin Initiative (NBI). The development objective of the FPEW Project is to reduce human suffering and damages from, and capture the benefits of, flooding in the Eastern Nile. The project focuses on flood risk management and non-structural approaches to managing the impacts of floods: including floodplain management and flood mitigation planning; flood forecasting and warning; and emergency response and preparedness at regional, national, local and community levels. This will contribute to the longer term goal of establishing a comprehensive regional approach to flood management that integrates watershed, river and floodplain management, and incorporates a suite of structural and non-structural flood mitigation measures within a broad multipurpose framework.

Outcomes expected from the FPEW Project include:

- Assessment of the flood risk in the Eastern Nile region to support flood management planning and ENSAP investment planning.
- Improved floodplain management for major urban centers vulnerable to flood damage, and for flood-prone rural communities.
- Operational flood forecasting systems in Eastern Nile countries with appropriate compatibility and mechanisms for exchange of information and data.
- Improved emergency response by governments at all levels, and enhanced community preparedness.
- Enhanced regional collaboration and cooperation during flood events.

During the preceding conceptualization phase, it was determined that Project Preparation will include formulation of national and regional flood risk management strategies, and development of project implementation plans for priority actions. It was further agreed that forecasting activities to be included in the PP would focus on riverine flooding. Flood mitigation planning, and emergency response and community preparedness activities would focus on selected riverine areas in each country, namely:

- in Ethiopia, selected flood-prone areas, particularly in the Lake Tana area;
- in Sudan, major urban areas and selected rural communities at risk from flooding along the Blue Nile and Main Nile;
- in Egypt, primarily related to operations of High Aswan Dam (HAD) to improve flood protection and mitigate downstream flood risk.

This PIP describes the components, tasks and activities of the Project and provides a budget, financial and economic analyses, and a financing plan for Phase 2 Project implementation. It discusses risks associated with Project implementation, and appropriate management measures. Implementation and institutional arrangements are included, with

plans and schedule for implementation, plans for procurement and financial management, and a disbursement schedule. A framework for monitoring and evaluation is provided. There is a summary of consultations, and a proposed Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) are included consistent with World Bank requirements.

PHASING OF PROJECT IMPLEMENTATION

In parallel to this Project Preparation (PP), the Eastern Nile Technical Regional Office (ENTRO) are initiating Phase 1 of the FPEW Project implementation. Phase 1 aims to use funding that has become available in order to undertake some early actions on the basis of "no regrets" so that urgent action on FPEW Project implementation does not have to await formal approval of this PIP. The aim is for the Phase 1 activities to commence by early 2007, whereas implementation of work associated with Phase 2 implementation is unlikely to commence until some time in 2008. This PIP is for Phase 2 implementation of the FPEW Project.

Data collection activities will be undertaken under the Phase 1 program. It proposes that a web-based database of flood-related data and information (*e.g.* meteorology, hydrology, topography, channel/floodplain and other characteristics, land use, historical floods, existing and planned/potential regulations and other interventions, *etc.*) will be developed and established at ENTRO by a Regional Flood Coordination Unit (RFCU). It proposes that preliminary flood risk maps will be produced together with other related mapping products to support flood management. Phase 1 activities are proposed over a 3-year time span, and so should overlap with early activities under the Phase 2 of implementation. If that proposal proceeds as planned, some work will be undertaken and more data collected before approval of this PIP is formalized.

PROJECT AREA

The Project extends to the three countries of the Eastern Nile region: Egypt, Sudan and Ethiopia.

In Ethiopia, only the western part of the nation is in the Eastern Nile basin, including the sub-basins of the Tekeze, Abbay and Baro-Akobo river systems. Of these, the Abbay is the largest, originating in the Ethiopian highlands near Lake Tana, and becoming the Blue Nile as it flows into the Sudan. Further north, the Tekeze River, known as the Atbara River in the Sudan, is an important tributary to the Main Nile. To the south, the Baro-Akobo River, which is named the Sobat River in the Sudan, is the most important tributary of the White Nile downstream of the swamps and marshes of the Sudd.

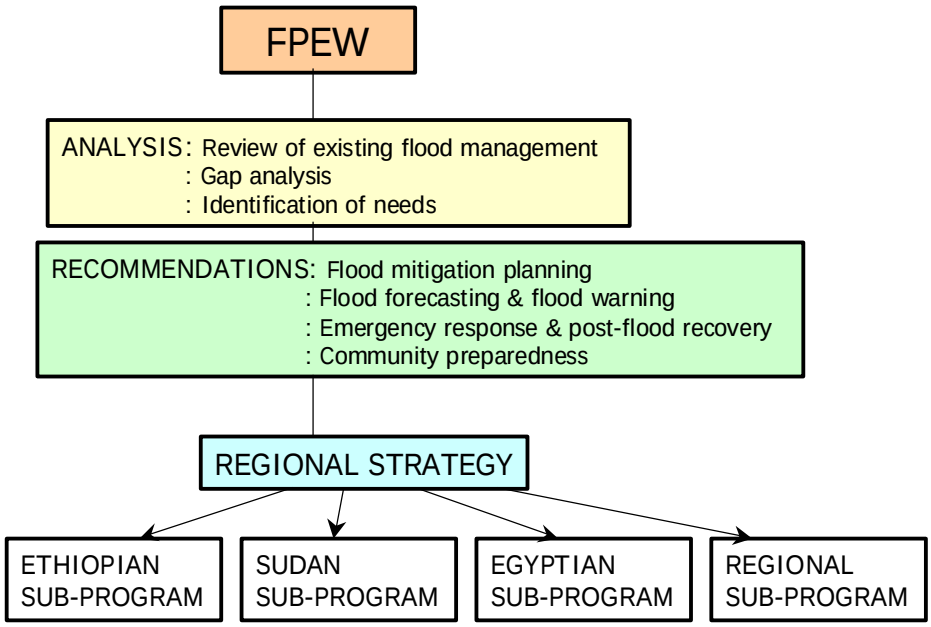
In Sudan, the Project extends to the Blue Nile and its tributaries the Dinder and Rahad; the White Nile only downstream of Jebel Aulia Dam; and the Main Nile downstream of Khartoum and its single tributary the Atbara.

In Egypt, the original intention was to focus on operations of HAD and associated flood forecasting, however there are significant issues for flood management in the Nile downstream of HAD that will benefit from technical assistance.

PROJECT ACTIVITIES

The Project undertakes actions for capacity building, institutional strengthening and technical assistance to improve the management of flood risk in the three riparian countries. It also includes programs for practical training and public education, raising of awareness and community preparedness in areas of high flood risk within the Sudan and Ethiopia. One outcome should be that communities are better prepared and are equipped with practical knowledge so that community-driven flood management initiatives can be developed and supported.

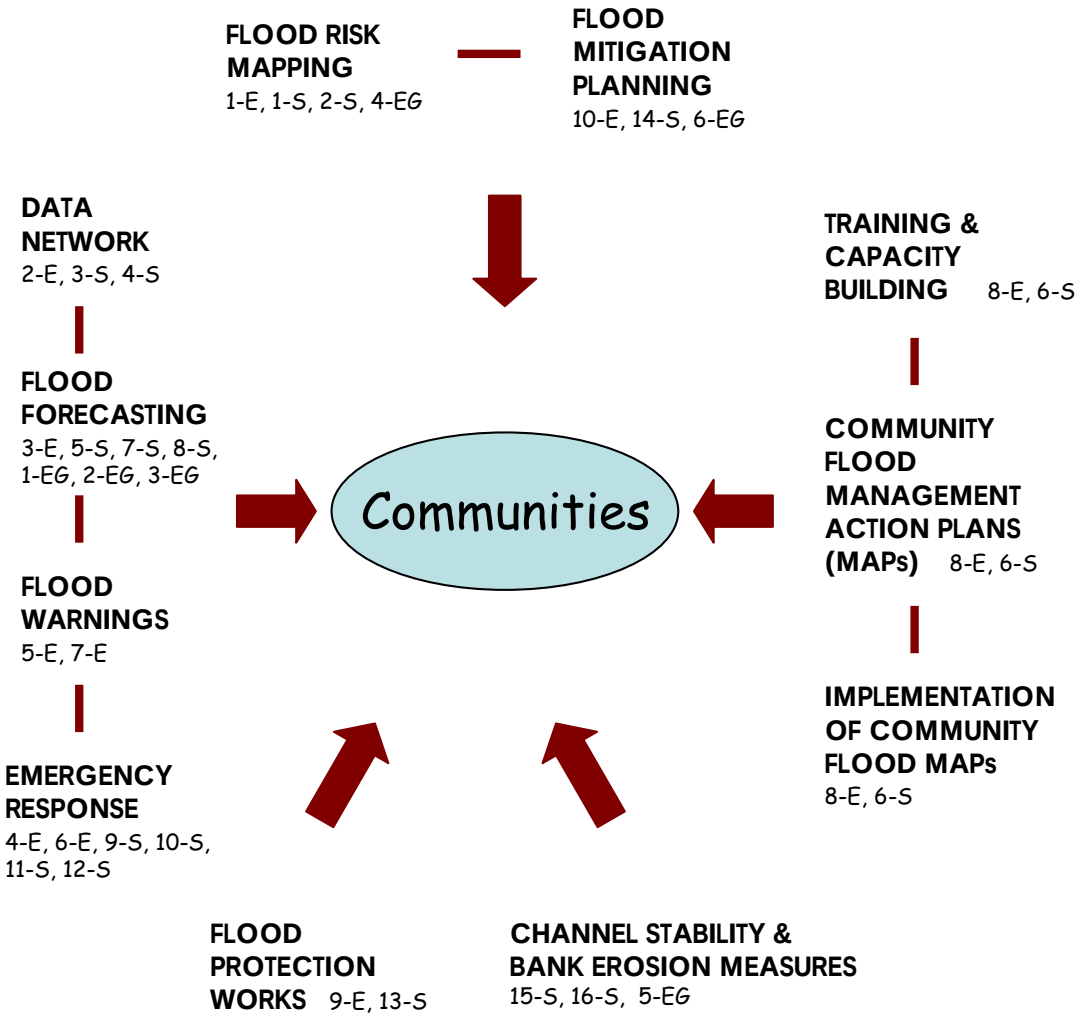
An effective strategy for future management of flood risk in the region was developed from analysis of current flood management activities and future needs. During Project Preparation, investigations were undertaken to review existing flood management practice and policy in the region, analyze gaps and constraints, and identify needs. The overall strategy to address those needs includes three national strategies for Ethiopia, Sudan and Egypt; plus a regional strategy that is intended to lead to integration and coordination of activities in the medium and longer terms.



Implementation of the strategy during Phase 2 Project implementation will include a program of 39 distinct Project activities, which are described in the PIP. From practical considerations, the program is assembled in four sub-programs: three national sub-programs, and one regional sub-program.

All of the Project activities will directly or indirectly benefit the communities at risk from river and lake flooding in the EN region. The following diagram indicates how communities will derive benefits from every Phase 2 Project activity in the three national sub-programs. At the top of the diagram are grouped activities that improve the knowledge of flood hazard faced by communities and plan in advance for the management of flood risk. At the left of the diagram are grouped activities that provide real-time information about storms and floods in flood risk areas, provide systems for dissemination of flood warnings to communit-

ies at risk, and facilitate government and community response to flood emergencies. At the bottom of the diagram are grouped activities that undertake either physical works to modify flood risk to communities or investigations to gain knowledge for more scientific treatment of flood hazards. On the right of the diagram are grouped activities that entail working directly with communities to equip them with knowledge and resources to plan their own measures for flood management at community scale and implement those measures with the assistance of the FPEW Project. Communities are at the center of the diagram because all of the program activities serve the interests of the communities by helping to manage the flood risk with which they must contend.



Codes attached to each of the Project components above refer to items (*i.e.* Phase 2 program activities) identified in PIP chapter 2, Tables 2-1, 2-2 and 2-3. For example, 1-E refers to item 1-E in Table 2-1, *viz.* flood risk mapping: Lake Tana & Baro-Akobo.

EXPECTED OUTCOMES

The Project will strengthen capacities of government agencies to assist communities in flood risk areas, and at the same time strengthen the capacity of communities for self-organization and preparedness. In the course of Phase 2 implementation, many communities should have gained the knowledge to initiate community-driven projects that initiate on-ground works and planning initiatives that complement government services in the management of flood risk.

The Project is consistent with the strategic objectives of the ENSAP under the NBI, which are:

- To ensure efficient water management and optimal use of the Nile resources through equitable utilization and causing no significant harm.
- To ensure cooperation and joint action between the Eastern Nile countries through win-win gains.
- To target poverty eradication and promote economic integration.
- To ensure that the ENSAP results in a move from planning to action.

The FPEW Project contributes to optimal use of Nile resources by reducing damages and economic losses due to flooding. It will strengthen regional cooperation and involve implementation of coordinated programs in the management of flood risk. It will target poor urban and rural communities located in flood risk areas and improve livelihoods by reducing damages and economic losses in those communities. Implementation of Phase 2 will advance the movement from preparation and planning to effective action that will have been initiated during Phase 1.

PROJECT COST

The total cost of Phase 2 of the Project at 2006 values is US$42.2 M, to be expended over five years.

Over a 30-year project life cycle, assuming a discount rate for opportunity by capital of 10%, the Present Value of investments in the Project is US$35.6 M. The Project costs will be financed 5.0% by contributions from the Government of Ethiopia, 3.2% by contributions of the Government of Sudan, 0.3% by contributions of the Government of Egypt, and 91.5% by international lending.

The breakdown of costs according to the four sub-programs is shown below.

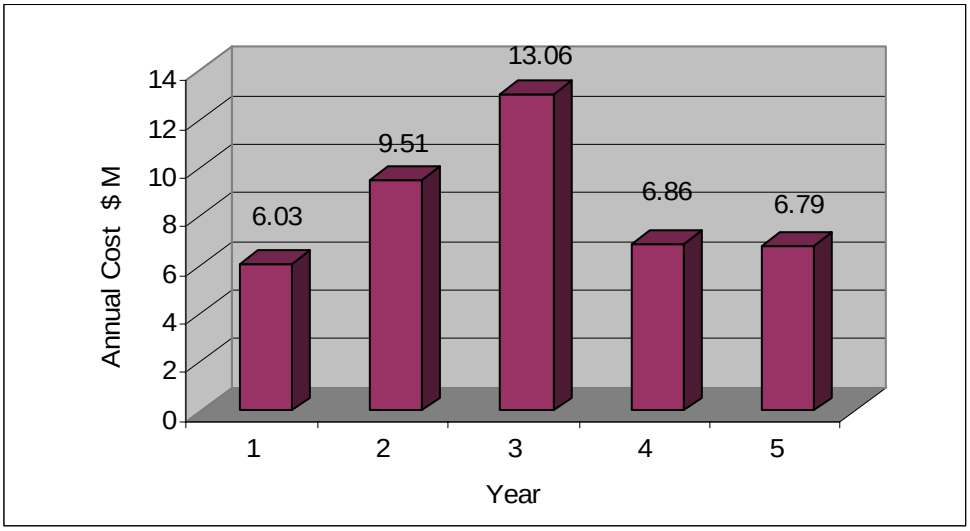
Cost Breakdown by Sub-Program

Sub-Program				
Sudan	**Ethiopia**	**Egypt**	**Regional**	**TOTAL**
$19.54 M	$14.66 M	$3.46 M	$4.58 M	$42.24 M

Note, however, that activity 2-E included in the Ethiopian sub-program at a cost of $3.54 M is of regional benefit. Activity 2-E is the design and implementation of a network for acquisition and transmission of real-time river and rainfall data in Ethiopia that would enhance flood forecasting and flood management in all three countries. It is included in the

Ethiopian sub-program because the Ethiopian Ministry of Water Resources (MWR) and National Meteorological Agency (NMA) would have primary operational responsibility for the network.

The annual schedule of expenditure is shown in the diagram below.



Annual Cost Schedule

An economic evaluation of the Project is presented in chapter 2 of the PIP.

COMMUNITY BASED FLOOD PREPAREDNESS AND ACTION

An important emphasis of the FPEW Project is to assist people at risk at the community level; and to promote and implement modest-scale but widespread works and activities on the ground that will directly benefit communities at risk, particularly rural and village communities. To that end, the awareness, basic skills and practical knowledge of communities needs to be developed and enhanced. That will require, in the first instance, a program of public education and training that will raise their awareness of flood risk, improve their skills and enhance their knowledge of what they can do to reduce or manage the flood risk to which they are exposed.

Chapter 3 of the PIP is directed to elaboration of this component of the Phase 2 program for implementation. To support the program, funding must be made available to enable and empower people at community level to implement measures they include in their community action plans for flood risk management and preparedness. Institutional arrangements and management procedures are described in chapter 3, and in the appended Environmental and Social Management Framework (ESMF), to ensure accountability for the disbursement and application of funds made available.

The activities to work with communities at risk from flooding to prepare and implement community flood risk Management Action Plans (community flood MAPs) can be summarized as follows:

- convening of a specialist group (specializing in flood risk management, disaster management and preventative health care management) – also referred to as the expert group;
- preliminary preparation by the expert group of training materials;
- training of extension training teams;
- dispatch of extension teams to raise awareness and skills of communities at risk and local authorities;
- selection by extension teams of community Flood Preparedness Action Groups (FPAGs) in each community;
- joint preparation by FPAGs and extension teams of community flood risk Management Action Plans (community flood MAPs);
- training of selected local authority staff in administrative procedures for reviewing and approval of applications for funding;
- preparation by FPAGs, assisted by extension teams and local officials, of applications for funding of implementation of measures included in community flood MAPs;
- a fund administered by ENTRO – or national finance ministries where funds derive from bilateral loans instead of grants through international aid agencies – for disbursement to communities of funds necessary to support the program and implementation of community flood MAPs;
- annual reviews by the expert group in conjunction with extension teams for monitoring and evaluation of the program;
- other administrative and management arrangements to ensure accountability;
- revision of training materials to capture lessons learned and practical experience, in the interests of longer term sustainability.

The two community-based activities in Ethiopia and Sudan account for $12.08 M of the total budget.

OTHER PROJECT ACTIVITIES

Other key activities of the Phase 2 program are as follows:

- Capacity building of institutions with relevant management functions: provision of training, essential resources, and minor restructuring to enhance functional capability.
- Development of an integrated real-time data acquisition network, improvements in data sharing, and enhanced flood forecasting capability, complemented by improved communications for effective flood warning.
- Technical assistance to build technical skills and support national and regional flood management initiatives – and undertake flood risk mapping.
- In certain urban areas where substantial development already exists in flood risk areas that is irreversible, structural measures are recognized as a key measure for flood mitigation planning.

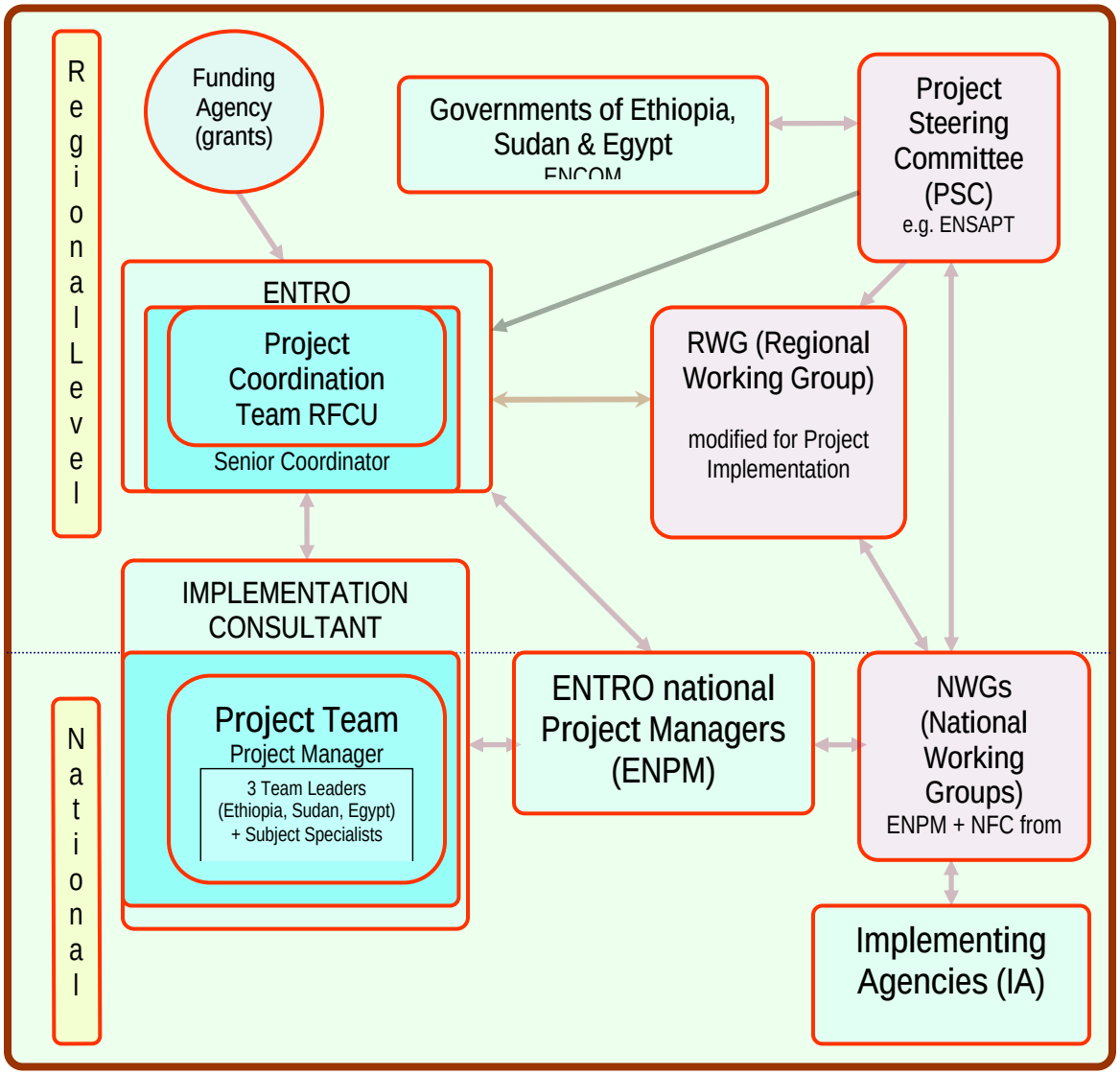
These are described in chapter 2 of the PIP.

INSTITUTIONAL ARRANGEMENTS FOR PROJECT IMPLEMENTATION

The key institutional arrangements proposed are as follows:

- High level cooperation to be achieved among the three countries (Ethiopia, Sudan and Egypt) through a Project Steering Committee (PSC) to be drawn from the ENSAP Team;
- Regional Working Group (RWG) to facilitate improved data access, sharing and partnership among relevant agencies in each country in the Eastern Nile Region;
- National Working Groups (NWG) appointed and coordinated by a National Focal Point Institution (NFPI) to provide close linkage, continuous interaction and effective co-ordination among the National Agencies and the State/Region Governments involved in the implementation of the project;
- A Project Coordination Team within ENTRO to function as the administrative hub for project management and steering support by providing accounting, administrative and documentation support to the PSC and RWG.

An overall organization chart showing the institutional arrangement for implementing the project is presented below.



In practice, all of the funding required may not be available at the outset, and it may prove necessary to implement Phase 2 in stages as funds are made available. Even if all the funding required is readily available, it may be derived from different types of sources – *e.g.* funding by international donor organizations channeled through the World bank; or bilateral funding agreements channeled through national governments. In these circumstances, it may be necessary to implement the complete Phase 2 program as a number of packages. The PIP discusses the implications of these possibilities in chapters 4 and 5.

FINANCIAL MANAGEMENT

The Eastern Nile Council of Ministers (ENCOM) has invested ENTRO with legal status including the power to receive and administer grant funding in the territories of the three EN region countries. ENTRO will be the recipient of grant funds, and jointly with the EN countries will manage Phase 2 implementation and be responsible for coordination of activities including management of funds, and procurement of goods and services. ENTRO is responsible for financial management of FPEW Phase 1 implementation, and it should build upon the systems and accumulated experience from Phase 1 in the financial management of Phase 2 implementation.

Financial management and control functions will be the day-to-day responsibility of ENTRO's Regional Flood Coordination Unit (RFCU), however with respect to these functions the RFCU manager will be accountable to the Financial Advisor to ENTRO and ENTRO's Finance and Administration Unit.

At the national level, the NFPI will be primarily responsible for financial management of project activities under its national sub-program, accountable to the finance wing of the Ministry of Finance (or equivalent).

To complement donor grants for funding of implementation, there may be elements of national sub-programs that attract loans through bilateral agreements. These funds would not be channeled through ENTRO (and The World Bank) but would come through the national Ministry of Finance (or equivalent). If so, modified financial management arrangements are proposed in chapter 5.

Procurement actions under this Project will follow appropriate World Bank guidelines and procedures. Procurement rules and procedures developed by ENTRO are consistent with best international practices and they address many of the funding agencies' requirements in principle, particularly those of the World Bank. Procurement methods and procedures for Phase 2 implementation of the Project are presented in chapter 5.

PROJECT SCHEDULING

Phase 2 of FPEW Project implementation will take place over a period of 5 years. The scheduling of project activities within that time-frame is presented and discussed in chapter 6.

MONITORING AND EVALUATION

The proposed institutional arrangement for the project is a multi-national and multi-agency model. In order to achieve coordinated performance by all the Implementing Agencies and

ENTRO – which will be the coordinating agency – timely and accurate flow of information on all aspects of project implementation is critical for success. Continuous monitoring and incorporation of the learning from the project will assume importance in achieving the longer-term goals of attaining more integrated and effective flood risk management.

Procedures for monitoring and evaluation are described in chapter 7. This will cover:

- financial progress;
- staff development under the various institutional capacity building activities;
- progress on implementation of data acquisition networks and upgrading of facilities;
- programs for public education and community preparedness and the performance of NGOs supporting the programs;
- technical assistance to existing or proposed government programs;
- physical and financial progress of civil works under flood mitigation planning.

During the implementation of Phase 1 of the Project, ENTRO will engage a full-time specialist in project monitoring and evaluation (M&E). The ENTRO M&E specialist will work with Implementation Consultants in monitoring outcomes and results of activities and sub-tasks during implementation of Phase 2. For each of the Project activities/elements, a separate M&E system will be developed under the project consultancies in collaboration with the ENTRO M&E specialist.

Formal Mid-Term Reviews will be undertaken after 21 months and after 42 months of commencement of implementation of Phase 2, and a Project Completion Review will be undertaken at the end of the five year program.

ENVIRONMENTAL AND SOCIAL MANAGEMENT

A comprehensive framework for management of environmental and social aspects of the program is provided through an Environmental and Social Management Framework (ESMF) presented in Appendix E, and a Resettlement Policy Framework (RPF) presented in chapter 9.

1. Introduction

1.1 FLOOD RISK MANAGEMENT IN THE EASTERN NILE NATIONS

The practice of flood risk management is not well developed in any of the Eastern Nile countries, and varies considerably from one country to another. While Egypt enjoys a good measure of flood mitigation due to the High Aswan Dam (HAD), completed in 1968, flood hazard areas in the Sudan and Ethiopia remain very much at risk, and there are large populations exposed to regular flooding.

In all three countries the annual floods, derived from high summer rainfall over the western Ethiopian highlands, are a boon as well as a bane. They replenish soil moisture and soil fertility, and recharge groundwater. Without the floods the riparian communities resident along the Blue Nile and Main Nile in Sudan would be desperate. The flood sustains their livelihoods. Land close to the river is prime land, and people are unwilling to move just because the flood may cause some temporary hardship and inconvenience. Most villages are located right on the river banks, and residents have adapted to the seasonal flux of the rivers. It is only when the annual floods are larger than usual that serious problems arise.

1.1.1 Ethiopia

Relatively, Ethiopia is less troubled by floods than its neighbors. Drought and famine are far more keenly etched in the national memory. For the most part, the rivers have deeply incised valleys in the high plateaus, and the best arable land and most pleasant living conditions are on the highlands remote from the rivers. There are exceptions, however, most notably on river floodplains adjoining Lake Tana in the north of the Abbay River sub-basin, and on the plains near Gambella in the Baro-Akobo sub-basin in the far south-west of Ethiopia, where widespread inundation of low-lying lands occurs regularly every year. People cope with routine flooding by raising sleeping platforms and food stocks above the flood levels, and by other simple measures, however the conditions are unsanitary and disease takes its toll of the population and their livestock every year. Incidences of malaria and other water-borne diseases surge in the post-flood period (September to November). The simple measures taken are inadequate when the floods are much higher than average or longer than usual. Despite these risks, people are reluctant to leave their land and homes as it is the land that sustains them, and the floods leave moisture in their soils for their crops and pasture for the remainder of the year.

It is fair to say that flood management has not been a high priority in Ethiopia, despite the real hardships endured by sectors of the population. Policy and practice have focused on drought, which can blight the entire economy. Attention has sometimes been drawn to the need for flood management policy, but little practical has been done. Ethiopian government institutions such as the Ministry of Water Resources (MWR), National Meteorological Agency (NMA) and Disaster Prevention & Preparedness Agency (DPPA) are aware of a need for flood management, but with inadequate resources to perform their higher priority tasks they have been unable to do very much. The communities in flood risk areas receive little assistance in the way of planned measures to alleviate their hardships. What assistance

they receive occurs mainly only after floods have occurred and local authorities have alerted government agencies to their plight. After assessment teams are dispatched and have reported on immediate needs, communities may receive some practical assistance. These procedures are reactive rather than proactive, and relief arrives only slowly.

1.1.2 Sudan

Sudan contrasts markedly with the Ethiopian highlands. Except in the far south it is much drier, and the landscape is relatively flat. The perennial rivers (White Nile and Blue Nile, joining at Khartoum to form the Main Nile) are vital water sources in a dry land, and most of the population resides near these rivers. Consequently, floods are generally regarded as the worst of the natural disasters with which the country must contend, and they do receive government attention as a priority.

As noted above, most villages are located right on the river banks, but residents have adapted to the seasonal flux of the rivers. It is only when the annual floods are larger than usual that serious problems arise. Then the emergency response agencies and post-flood relief agencies struggle to cope with the scale of the problems. The floods also erode river banks (known as *haddam* in the Sudan), threatening riverside dwellings, orchards, vegetable gardens and village assets like pumps. Malaria and other water-borne diseases also surge after floods because mosquitoes breed in residual ponded water, water sources may become contaminated and sanitation facilities can be adversely affected.

There is no national flood management policy *per se*, however there are a number of initiatives that have become standard practice, many in response to serious flooding that occurred in 1988. For example, there is a National Council for Civil Defense that meets regularly during the flood season, now chaired by the Vice-President, that assembles all relevant Ministers to plan actions by their Ministries in preparation for the seasonal floods and, when the need arises, to coordinate actions by their Ministries to respond to flood disasters. The NCCD is mirrored by similar Councils convened by Governors in the States. The Civil Defense Organ (CDO) is charged with responsibility for flood emergency response, in addition to its other roles related to natural disasters, public security, security of government premises, *etc*. The Humanitarian Affairs Commission (HAC) has responsibility for coordinating post-flood relief and recovery services. In practice it relies heavily on NGOs, and when resources available nationally are clearly inadequate to cope, helps organize international appeals for assistance. The Ministry of Irrigation & Water Resources (MIWR) also operates a Nile Forecasting Center in Khartoum to forecast flood heights. The Sudan Meteorological Agency provides weather forecasting that attempts to forecast probability of flash flooding (flooding due to intense local rainfall).

Despite these efforts, the communities at risk claim to receive little support from government, and this is partly because the geographical scale of the problem, affecting as it does all the major rivers simultaneously, or at least sequentially, overwhelms the capacity to respond; partly because the resources available are inadequate; and partly for other reasons. The lack of a unifying national flood management policy could be cited as a reason for inadequate institutional planning. The NCCD attempts to take a planning role, however a committee of Ministers is not an adequate substitute for sound professional planning within the institutions themselves.

1.1.3 Egypt

A very high percentage of the Egyptian population lives in the valley of the Nile. Only 10% of the land surface can be considered arable, and most of that is in the narrow strip bordering the River Nile extending from HAD to the delta north of Cairo.

Over the course of millennia large floods in the River Nile were a recurring source of misery and disaster, although without the river the civilization could not have prospered. After construction of HAD in the late 1960s many considered the issue resolved. By reference to Figure 1-1, during the 1970s the vast reservoir filled, and only reached its intended operating level in the late 1970s. This was followed by a period of severe drought in Ethiopia, and as around 85% of the Nile flows originate from the Ethiopian highlands the reservoir levels fell, only recovering to normal in the 1990s. A series of above average inflows over the years 1998 to 2001 caused spills to the Toshka spillway (to the Western Desert) and forced downstream releases to be made at unprecedented rates. Although releases of up to 350 MCM/d were anticipated in the operating rules, it was discovered that releases exceeding 260 MCM/d to 270 MCM/d caused problems downstream with scour of structures, inundation of islands used for agriculture, and flooding of infrastructure and development that had been allowed to encroach upon the floodplain. In other words, flood damages were incurred.

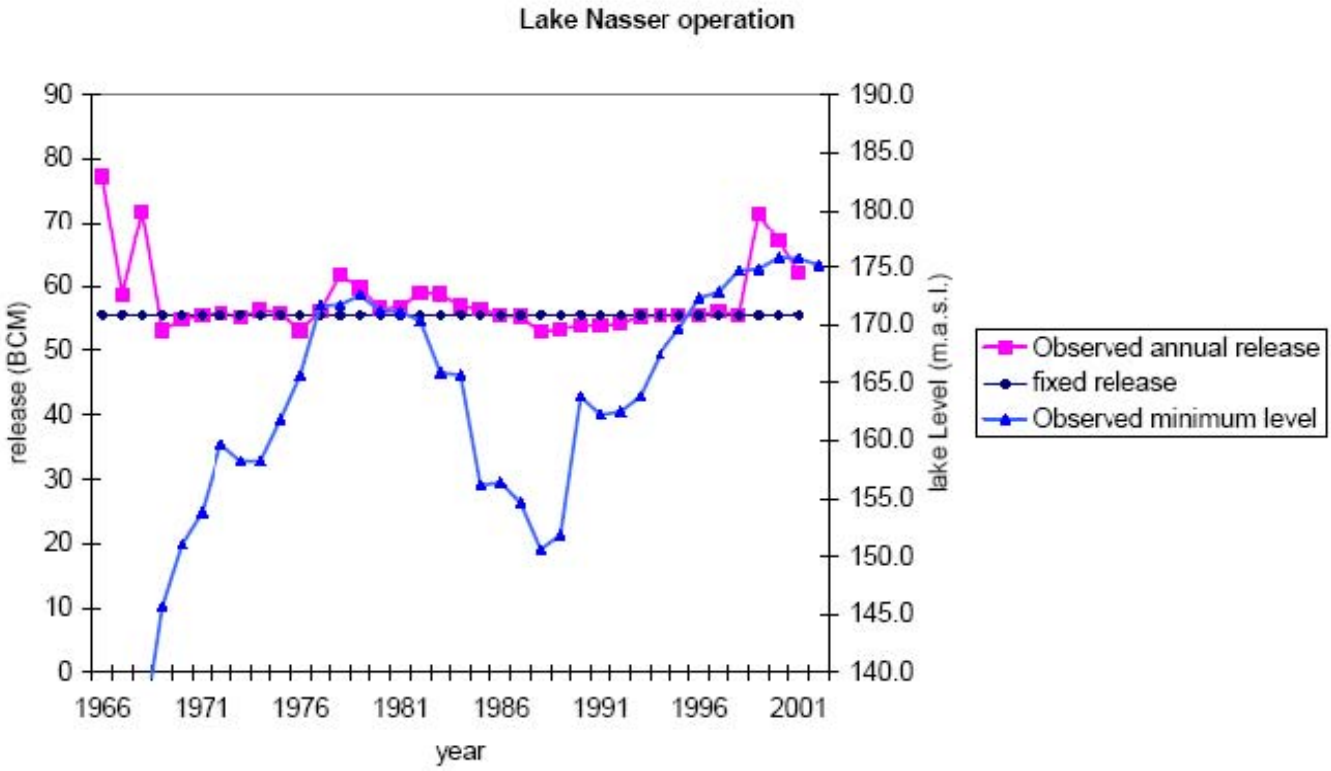


Figure 1-1: Annual Minimum Water Levels and Annual Releases, High Aswan Dam

The reservoir rose within 0.4 m of its maximum operating level in 2001. This prompted renewed investigations and planning to prepare for future high floods. For example, there

are currently plans to increase the capacity of and regulate spills through Toshka spillway; and work is being undertaken to revise mapping of control, or management, lines in the downstream floodplains.

Even before these events, with mainly US assistance, Egypt had set up a flood forecasting system at the Nile Forecast Center (NFC) in Cairo; however, its main objective was to forecast inflow volumes so that operations of HAD could be optimized to make most efficient use of the water stored for hydropower, irrigation and water supply.

Responsibility for flood management in Egypt resides with the Ministry for Water Resources & Irrigation (MWRI), particularly the Nile Water Sector and the Nile Planning Sector, in which the NFC is located. Little attention has been directed to flood emergency response planning or to planning for post-flood relief and recovery services – these activities were considered unnecessary after commissioning of HAD.

1.1.4 Regional Coordination

Under the international agreement established for sharing of Nile waters during development of HAD, Egypt was granted permission to operate river gauging and rainfall stations in several Nile basin countries – including Sudan and Uganda, but not Ethiopia[1] – that relay virtual real time data to the NFC.

There are few formal mechanisms for information exchange. An exception is the Eastern Nile Council of Ministers (ENCOM), however this operates only at the highest executive level. The Nile Basin Initiative (NBI) and the Eastern Nile Subsidiary Acton Plan (ENSAP), under which the FPEW Project was conceived, are recent initiatives that are being supported by national governments in the region and have been successful in initiating some technical exchange of information.

Historically, the flood management frameworks that have developed in the Eastern Nile region countries, such as they are, have been developed independently and there has been little exchange of technical and planning information or data.

1.2 IMPORTANT CONSTRAINTS AND OPPORTUNITIES

The past lack of regional coordination has been an impediment to integration of flood forecasting and integration of flood risk management generally. None of the Eastern Nile countries have well articulated flood risk management policies, and what policies exist are either minor appendages to broader water resources management policies or remain undocumented. Flood risk management has evolved as a response to past flooding, and is therefore best practiced in the Sudan where the flood risk situation is greatest. Even there, the practice of flood risk management has evolved piecemeal, and is poorly integrated. As a result, in all three countries flood risk management is reactive rather than proactive.

Exchange of data and information is poor. The river basin as a natural physical system is integrated, and unconstrained exchange of information would undoubtedly improve flood

[1] The NFC does get access to rainfall data from a few stations in Ethiopia that are available from the European Medium-Range Weather Forecasting Center.

risk management. As in all river basins, there is more interest and incentive for data exchange in downstream countries, which stand to gain the most direct benefit. In the case of the Eastern Nile countries, the practice of flood risk management is more advanced in the downstream countries, so Ethiopia also has much to gain from technical transfer and an exchange of experience and practice in the other countries.

In Ethiopia, only a small fraction of the population are regularly exposed to significant flood risk, and flood risk management is poorly developed. In one of the flood risk areas in the Eastern Nile basin in Ethiopia, around Lake Tana, short lead times would be available with the best of forecasting and warning systems, and proactive planning and preparedness is therefore more difficult. In the other main flood risk area near Gambella, however, lead times are adequate to be able to undertake effective advance planning. Virtually nothing has been done because of limited resources and poor communications.

There is no flood forecasting capacity in Ethiopia. As a consequence, emergency response planning has also been neglected, and planning has instead been directed to post-flood relief and recovery. Even the planning for post-flood relief and recovery has been an adjunct to drought disaster planning, and is too slow to be very effective for flood relief.

In Sudan, flood emergency response is made difficult by the scale of the problem. During large floods, communities stretched over nearly 2 000 km will require assistance simultaneously. Available resources are simply inadequate to cope. Nevertheless:

- Assistance could be better targeted if the CDO maintained a good flood intelligence database and had a special unit permanently committed to advance flood emergency response planning.
- The flood forecasting undertaken by MIWR is useful in flood risk management; but the system is in need of a major upgrade, and lead times are limited because no data is available from Ethiopia. This applies particularly for communities along the Blue Nile, and its tributaries, the Dinder and Rahad.
- The flood forecasting would be more useful if it could be better related to the consequences of flooding (requires a reliable flood intelligence database), and there should be more open broadcasting to the public of forecast river heights, not only current river heights.

A major deficiency for effective flood risk management is the lack of flood risk mapping that specifies the flood risk areas, probabilities of inundation, flood depths in planning floods, *etc*. This is regarded as a top priority to improve the capacity of flood risk management.

Apart from what the government can do for the community, there is a question of what the communities can do for themselves. First, they need to be well organized. With proper education and training, communities could be better prepared, and also more aware of the potential for simple but effective measures, and of sources of funding and government services they can access. This opportunity has been recognized by the Sudanese Red Crescent Society (SRCS), which has a program for flood preparedness and flood risk reduction that emphasizes training and community education and is very worthy of Project support.

Egypt had been relatively free of flood damage in the decades following commissioning of HAD. While it will continue to be true that the probability of flood hazard is low because of HAD, the experience of 2001 demonstrates that flood damages will still be incurred. Given the density of population and intensity of downstream land use, the consequences of having to release large flows down the Nile are potentially very great. The discipline of flood risk management needs to be strengthened, including reviewing the probabilities of very large floods post-HAD, rigorous flood risk mapping, development of floodplain management plans and land use planning, and planning for flood emergency response.

Efficiency of water use for hydropower, irrigation and water supply remain paramount concerns for Egyptian water resources management. In relation to this, real time acquisition of data from Ethiopia would permit refinement of inflow flood forecasting and operations of HAD during the passage of large floods.

1.3 NILE BASIN INITIATIVE

The current Project on Flood Preparedness and Early Warning (FPEW) arises in the context of the recent Nile Basin Initiative (NBI), and is taking place in the context of several other Projects, some embedded within the NBI and some not, that may have bearing on future flood management in the EN region.

1.3.1 NBI Programs

In 1997, the Nile riparian countries initiated a dialogue on a framework for long-term cooperation, and in 1999 NCOM (Nile Council of Ministers), a Council of Ministers of Water Affairs in the Nile Basin States, launched the Nile Basin Initiative (NBI) to jointly pursue sustainable development and management of the water resources of the Nile River Basin. The ministers agreed on policy guidelines for the NBI and a shared vision to “achieve sustainable socioeconomic development through the equitable utilization of, and benefit from, the common Nile Basin water resources”. An NBI Secretariat was established in Entebbe, Uganda.

Subsequently, NCOM approved a broad basin-wide program of collaborative action, exchange of experience, and capacity building (the Shared Vision Program). In parallel, they supported the preparation of sub-basin action programs aimed at physical investments in the Nile Equatorial Lakes region and the Eastern Nile Region – the latter is the Eastern Nile Subsidiary Action Program (ENSAP).

1.3.2 Eastern Nile Subsidiary Action Program

Preparation of ENSAP is managed from the Eastern Nile Technical Regional Office (ENTRO) in Addis Ababa, Ethiopia. The Eastern Nile region comprises Ethiopia, Sudan and Egypt. It includes three major tributaries of the Nile: the Blue Nile (Abbay in Ethiopia); the Tekeze (Atbara in Sudan); and the Baro-Akobo (Sobat in Sudan) – as well as the White Nile in southern Sudan, and the Main Nile downstream of Khartoum.

High climatic variability renders the region subject to droughts and floods. Through a cooperative and integrated approach, there is significant opportunity to enhance food production and energy production, mitigate floods and droughts, arrest watershed degradation, reduce erosion and sediment transport, and nurture the environment.

ENSAP is an investment-oriented program for sustainable and equitable development of the water resources of the Eastern Nile to enhance prosperity, security and peace for the countries of the region and their people. Initially the program focuses on identified areas of cooperation, including: irrigation and drainage, hydropower development and trade, watershed management and management of lakes and wetlands, river regulation, management of flood and drought, water quality management, improved water use efficiency, and integrated water resources management.

The EN countries have adopted a two-track approach to the challenge of developing a strategic framework and implementing projects within a complex major multipurpose investment program:

- A fast track to select a small but strategic sub-set of sectoral projects that can be readily identified for accelerated preparation, appraisal and implementation;
- A multipurpose track to prepare a multi-country, multipurpose program of investment by developing a strategic approach, undertaking essential baseline studies and very broad consultations, organizing project financing, and preparing the next round of investment projects.

The fast track will enable the early implementation of a few investment projects that will tangibly demonstrate the benefits of cooperation. The following projects have been identified as fast-track:

- Flood Preparedness & Early Warning Project (FPEW Project that is the subject of this PIP)
- Ethiopia-Sudan Transmission Interconnection Project
- Irrigation & Drainage Project
- Eastern Nile Planning Model
- Watershed Management Project

1.4 FPEW PROJECT

The Flood Preparedness and Early Warning (FPEW) Project is one of the fast-track projects identified for priority action under the Eastern Nile Subsidiary Action Program (ENSAP) as part of the Nile Basin Initiative (NBI), and the first to reach the Project Preparation phase.

1.4.1 Objectives and Expected Outcomes

The development objective of the FPEW project is to reduce human suffering and damages from, and capture the benefits of, flooding in the Eastern Nile. The project focuses on flood risk management and non-structural approaches to managing the impacts of floods: including floodplain management and flood mitigation planning; flood forecasting and warning; and emergency response and preparedness at regional, national, local and community levels. This will contribute to the longer term goal of establishing a comprehensive regional approach to flood management that integrates watershed, river and floodplain management, and incorporates a suite of structural and non-structural flood mitigation measures within a broad multipurpose framework.

Outcomes expected from the FPEW project include:

- Assessment of the flood risk in the Eastern Nile region to support flood management planning and ENSAP investment planning.
- Improved floodplain management for major urban centers vulnerable to flood damage, and for flood-prone rural communities.
- Operational flood forecasting systems in Eastern Nile countries with appropriate compatibility and mechanisms for exchange of information and data.
- Improved emergency response by governments at all levels, and enhanced community preparedness.
- Enhanced regional collaboration and cooperation during flood events.

1.4.2 Project Concept

Flooding in the region includes flooding from major rivers (riverine floods), flash flooding from localized rainfall, and seasonal inundation from wetlands. The extent and severity of flooding, and responses to flooding, also vary by country.

During the preceding conceptualization phase, it was determined that Project Preparation will include formulation of national and regional flood risk management strategies, and development of project implementation plans for priority actions. It was further agreed that forecasting activities to be included in the PP would focus on riverine flooding. Flood mitigation planning, and emergency response and community preparedness activities would focus on selected riverine areas in each country, namely:

- in Ethiopia, selected flood-prone areas, particularly in the Lake Tana area;
- in Sudan, major urban areas and selected rural communities at risk from flooding along the Blue Nile and Main Nile;
- in Egypt, primarily related to operations of High Aswan Dam (HAD) to improve flood protection and mitigate downstream flood risk.

The project was conceived as a number of proposed components, to be fully defined or modified during Project Preparation.

(1) Flood Mitigation Planning

This component was envisaged as proactive measures to manage the risk of floods while enhancing beneficial effects. It was intended to embrace practical measures to identify flood risk and implement community-based plans to manage flood risk. A preliminary step in risk assessment is the mapping of flood-prone areas using topographic, hydrological and hydraulic analyses, followed by determination of the exposure to flood hazard, and assessment of the vulnerability of people, property and infrastructure exposed. This information is essential not only to identify practical flood mitigation options, but also to design flood forecasting and warning systems, planning of emergency response and community preparedness, and for long-term investment planning by ENSAP. This component comprised work required to identify and implement a range of cost-effective measures to reduce flood damages, such as floodplain and land use management; small-scale structural measures; voluntary resettlement; improved communication of flood warnings; amended reservoir operations; design standards for structures in flood risk areas; public education programs. Other important elements for sustainability of flood mitigation planning are: institutional capacity building; training of professional staff; and participation and mobilization of stakeholders, where key stakeholders include communit-

ies at risk from flooding, public service providers, and other organizations that provide assistance and aid.

(2) Flood Forecasting and Warning

Development of flood forecasting systems for the Eastern Nile countries is an important measure that should build upon existing forecasting systems and capacity. Key elements of flood forecasting and warning systems include: data acquisition networks and data transmission; data processing and archiving; operational forecast modeling systems; flood warning, dissemination and communications. With respect to flood warnings, effective delivery of relevant information in a form readily understood by and useful to intended users, from government agencies to floodplain dwellers, is essential. Supporting measures may include strengthening of existing institutions, quality assurance procedures, professional development programs, and community education programs.

(3) Emergency Response and Preparedness

To be most effective, response to a natural disaster warning should be rapid, comprehensive and with clear lines of authority. Because each country has existing organizations and procedures for emergency response, this component was envisaged as strengthening national capacities and developing trans-boundary aspects of emergency response and preparedness. A key focus would be on providing appropriate services to stakeholders whose lives or property are at risk from flooding, which might entail, for example: institutional strengthening; review of emergency response plans; supporting communities to prepare and improve capacity for self-help; improved organization of post-flood recovery services; and coordinating information exchange among the countries in the region and with the international community during and after flood disasters.

(4) Regional Component

This component is intended to enhance regional cooperation and collaboration through exchange of expertise and information/data, sharing of experience, professional development and institutional capacity building, and technology transfer regionally and internationally. These aims might be achieved by developing compatible technology and information data-bases; establishing formal mechanisms and organizational linkages for information exchange; coordination of emergency response efforts; organization of regular fora; joint activities to support national capacity building, technical initiatives and good practice guidelines; and facilitating regional studies and analyses.

1.4.3 Pre-Preparation Work

During the preceding phase of project conceptualization, ENTRO organized several work components in advance of the Project Preparation.

- National Flood Coordinators in Sudan and Ethiopia prepared background reports on flood management in their countries (Bakhiet, 2004; Golla, 2004);
- The Regional Flood Coordinator for ENTRO prepared a detailed background paper covering flood management issues in all three countries (Seid, 2004);
- Consultants were engaged to conduct baseline social surveys in Sudan (Abdelati, 2005) and in Ethiopia (Teshome, 2005);

- An international consultant was engaged to consolidate the two baseline social surveys and provide operational guidelines for the social assessment work to be undertaken during the PP (Bush, 2005);
- Another international consultant was engaged to undertake a preliminary review of flood hydrology and make a rapid assessment of flood damages in Sudan (Cawood, 2005).

These substantial contributions greatly facilitated the work of the Consultant during the PP, and in particular recognized that the time available for the PP did not allow sufficient time for adequate treatment of the social issues in a large number of affected communities. The pre-preparation work listed above provided a very sound foundation for the investigations that followed.

1.4.4 Implementation Phase 1

In parallel to this PP, ENTRO are initiating Phase 1 of the FPEW Project implementation (ENTRO, 2006b). Phase 1 aims to use available funding that has been committed by the EU in order to undertake some early actions on the basis of "no regrets" so that urgent action on FPEW Project implementation does not have to await formal approval of this PP. The aim is for the Phase 1 activities to commence by early 2007, whereas implementation of work associated with this PP (Phase 2 implementation) is unlikely to commence until some time in 2008.

Data collection activities will be undertaken under the Phase 1 program. It proposes that a web-based database of flood-related data and information (*e.g.* meteorology, hydrology, topography, channel/floodplain and other characteristics, land use, historical floods, existing and planned/potential regulations and other interventions, *etc.*) will be developed and established at ENTRO by a Regional Flood Coordination Unit (RFCU). It proposes that preliminary flood risk maps will be produced together with other related mapping products to support flood management. Phase 1 activities are proposed over a 3-year time span, and so should overlap with early activities under the Phase 2 of implementation. If that proposal proceeds as planned, some work will be undertaken and more data collected before approval of this PP is formalized.

The proposal (ENTRO 2006b) states: "*FPEW 1 implementation will contribute directly to the development objective of the FPEW project by strengthening the existing capacities of the EN countries in flood forecasting, mitigation and management, promoting regional cooperation and enhancing the readiness of the EN countries to subsequent (i.e FPEW 2) implementation of the FPEW project, prepare the foundation for FPEW 2 implementation in terms of institutional settings and data collections at community and national levels, together with enhancing regional coordination and cooperation*."

Table 1-1 sets out the key components, outputs and activities proposed under FPEW 1. More details are presented in Appendix C.

Table 1-1: Phase 1 Proposal Summary

Component	Outputs	Activities
1. REGIONAL COORDINATION	1. EN Regional Flood Coordination Unit established in ENTRO	1.1 Establish RFCU operational guidelines 1.2 Establish, staff & equip RFCU
	2. Annual flood forums conducted	2.1 Build professional network & share knowledge through annual forums 2.2 Facilitate participation of EN flood forecasting specialists in international flood forums
	3. Database of flood information established & maintained	3.1 Design & agree a web-based database 3.2 Collect, collate, process, quality assure & load data
	4. Information & experience exchange	4.1 Identify key knowledge gaps 4.2 Develop training modules & deliver workshops 4.3 Conduct selected study visits
	5. Regional analysis & special studies conducted	5.1 Identify the need for special studies 5.2 Conduct special studies as required
2. PILOT FLOOD PREPAREDNESS & EMERGENCY RESPONSE	1. Flood risk mapping commenced	1.1 Prepare digital flood risk maps
	2. Community flood preparedness & response plans	2.1 Determine information needed by the community for effective response 2.2 Facilitate development of community response plans 2.3 Evaluate effectiveness of plans & process
3. FLOOD FORECASTING WARNING & COMMUNICATION SYSTEM	1. Strengthen national flood forecast & warning systems	1.1 Refine flood forecast, warning & communication system requirements 1.2 Identify appropriate approaches, technologies & equipment 1.3 Procure for pilot communities 1.4 Enhance current institutions & initiate new one in Ethiopia (*i.e.* FFC)
	2. Detailed design of regional flood forecast, warning & communication system	2.1 Refine functional specifications from PP 2.2 Undertake necessary field work 2.3 Prepare detailed design & tender docs

1.5 PROJECT CONTEXT

As noted in section 1.3, the current Project on Flood Preparedness and Early Warning (FPEW) is taking place in the context of several other Projects, some embedded within ENSAP (see section 1.3.2) and some not, that may have bearing on future flood management in the EN region and therefore have linkages to FPEW.

1.5.1 Related ENSAP Projects

(a) Watershed Management Cooperative Regional Assessment

One of the other ENSAP fast-track projects is the Watershed Management Project, or WMCRA. Its primary objective is to develop a sustainable framework for catchment management. The approach to be adopted will be holistic and multi-sectoral with a focus on sustainable livelihoods, poverty reduction and enhanced food security of the inhabitants of

three selected sub-basins, coupled with the sustainable use of natural resources and the protection and rehabilitation of the environment by improving living conditions, creating alternative livelihoods, achieving food security, alleviating poverty, enhancing agricultural productivity, protecting the environment, reducing land degradation, sediment transport and siltation, and preparing for sustainable development-oriented investments (Inception Report, Hydrosult, 2006).

The project will focus on three watersheds: the Abbay/Blue Nile, Tekeze/Atbara and the Main Nile from Khartoum to the Aswan High Dam. Because sediment transport and deposition in the main river systems aggravate river flooding, at a basin-wide scale the WM Project has particular relevance to the FPEW Project. It has the potential to manage land use and conservation practices to arrest the degradation of catchment vegetation and soil erosion that are sources of increasing sediment loads in the rivers of the EN region. At a sub-basin scale, with its focus on the Abbay/Blue Nile sub-basin, if it can achieve effective outcomes in the uplands surrounding Lake Tana it could directly benefit communities at risk of flooding adjoining the lake: sediment deposition in Lake Tana contributes to high lake levels; and even more importantly, deposition of sediment in lake tributary river channels and their floodplains leads to channel instability, lack of adequate conveyance capacity and widespread flooding. Another potential overlap is that both Projects will be working closely with communities to develop community-driven plans aimed ultimately at improving livelihoods and enhancing the welfare of those communities.

It is noted that the WM Project does not identify *haddam*, or river bank erosion, as one of the issues with which it will be preoccupied. As this is an important issue and is one of the direct impacts of flooding in Sudan and Egypt, it has been addressed during preparation of the FPEW Project.

(b) Eastern Nile Planning Model

The Eastern Nile Planning Model (ENPM) Project is another fast-track project under ENSAP designed to provide an effective planning tool to decision-makers in the EN region so that they can make informed water resources investment decisions. The project contains three major components: (i) the Modeling System, (ii) an Information Management System (IMS), and (iii) Institutional and Human Capacity Strengthening. The activities in the three project components will produce the ENPM Modeling System that can be used to simulate Nile Basin hydrological conditions and evaluate economic, environmental, and social impacts of proposed water resources investments (Project Document, Riverside Technology, 2006).

There is the potential for the FPEW Project to provide inputs to the ENPM such as real-time data, upgrading, meteorological data, a forecasting system, *etc*. Although ENPM is a planning model with different requirements than those of the FPEW Project, there are synergies and relationships with flood forecasting.

(c) Joint Multipurpose Project

A unifying goal of the Joint Multipurpose Project (JMP) is that the water resources of the Eastern Nile Basin are jointly developed in a sustainable and equitable way, ensuring shared prosperity, security and peace for all its peoples. The proper development and management of these resources calls for an integrated approach within the framework of a

multi-country joint development program, which will address the opportunities and challenges within the basin in a unified manner that benefits all riparian countries.

Towards those goals the JMP has identified key areas of interest for the development of joint projects transcending national boundaries that would attract investment in the EN region, as follows:

- Watershed and environmental management: sustainable livelihoods and ecosystems
- Linked river and power system: infrastructure backbone linking the EN states
- Enhanced agricultural production: livelihood opportunities and food security
- Leveraged growth and integration: attracting investments for overall growth
- Cooperative processes
- Regional integration and knowledge: facilitating joint decision-making
- Institutional/finance regimes for large-scale joint actions

During the Project Definition phase of FPEW Project Preparation, the JMP was still in the preceding conceptualization phase under which preliminary studies were in progress. These preliminary studies entailed, *inter alia*: a One-System Inventory aimed at compiling basic information on the water resources, environment and socio-economics of the EN region; and pre-feasibility studies on the potential for hydropower development for the region including an interlinking power grid. Although in progress at the time of FPEW PP, the One-System Inventory provided useful background information for FPEW PP. Outputs of the FPEW Project may also provide useful inputs for the JMP (*e.g.* flood risk mapping). The 'regional' component of the FPEW Project and the institutional framework for project implementation (FPEW being the first ENSAP Project to advance to this phase) are also expected to provide a model for institutional regimes for large joint multi-purpose actions under the JMP, and to build confidence and capacity for joint project implementation.

Preliminary studies of the potential for hydropower development have focused on major dam sites on the Abbay River in Ethiopia. The dam sites are downstream of the main flood risk areas around Lake Tana in Ethiopia, however if constructed the dams would have significant impacts on both flood risk and seasonal flood benefits in the Sudan along the Blue Nile and the Main Nile in and downstream of Khartoum. A draft report on one of these dam sites at Karadobi was released only in July 2006, the same month the first draft of these PP documents were prepared (Norplan *et al.*, 2006). It appears likely that one or more of these dams will be commissioned in the foreseeable future, and would transform the downstream flood risk – and is therefore highly relevant to the FPEW Project. The impacts of Karadobi Dam on downstream flood risk (and beneficial flooding) were not adequately assessed in the draft report noted above. Given the lead times necessary for such major undertakings, particularly when in an international context, it seems unlikely that the dam would be commissioned within the time-frame of FPEW Phase 1 and 2.

1.5.2 Other Developments and Projects

(a) Tana-Beles Diversion

This is a project under construction for the Ethiopian Government to divert water from Lake Tana through a tunnel into the upper Beles River to the west. Its primary function will be for hydropower generation, however potential irrigation development in the Beles valley is also foreseen. No details or documents were released to the FPEW PP team.

The capacity of the diversion tunnel is understood to be approximately 70 m^3/s. The project will modify water levels in Lake Tana and outflows to the Abbay River.

(b) Tekeze Dam

This is a project under construction of a large dam on the Tekeze River for the Ethiopian Government. Its primary function will be for hydropower generation. No details or documents were released to the FPEW PP team, however some very preliminary pre-feasibility analysis is available in the Tekeze River Basin Master Plan report (NEDECO / DHV, 1998). The storage capacity of the proposed reservoir is understood to be 9 293 MCM. The project will modify flood discharges in the Tekeze River and Atbara River downstream of the dam.

(c) Koga Dam

A relatively small dam is currently under construction for the Ethiopian Government on the Koga River, a small tributary to Lake Tana. Its primary function will be for irrigation development. No details or documents were released to the FPEW PP team. The storage capacity of the proposed reservoir is understood to be 77 MCM, and the dam regulates a catchment area of only 164 km^2. It is not expected to have any significant effect on water levels in Lake Tana or in mitigation of flood risk in the areas of highest flood risk around the lake.

(d) Lake Tana Integrated Development

The WB is considering funding assistance for an integrated resources development project for the Lake Tana region. Potential sub-projects are water storage dams for irrigation. Some of the potential dam sites previously identified by the Ethiopian Government are situated on the Megech, Ribb and Gumera Rivers and are upstream of the highest flood risk areas identified by FPEW PP – namely, the Dembiya and Fogera plains adjoining the lake. The dam sites are also subject of separate investigation for the Ethiopian Government which at the time of the Project Definition phase of FPEW PP, were at pre-feasibility stage, leading into feasibility analysis of selected sites. No documents were released to the FPEW PP team, however some preliminary data was made available. Although the proposed dams on the Megech, Ribb and Gumera Rivers would regulate runoff from only fractions of the catchments upstream of the main flood risk areas, they would have significant impact on the flood risk. Furthermore, it is expected that drainage improvements and flood protection works would be required for irrigation development on the plains, and these would substantially modify flood hazard and mitigate flood risk. The future timing of these developments is unclear, however it is certainly possible that at least one of these dam/irrigation developments may proceed within the time-frame of FPEW project implementation Phase 1 and 2.

(e) Merowe Dam

Merowe Dam is under construction on the Main Nile River in Sudan. Located upstream of Dongola and downstream of Atbara and due for completion in 2007, its primary function will be for hydropower generation, however some potential irrigation development for lands adjoining the Nile is also foreseen. The storage capacity will be 12 450 MCM; however because the mean annual discharge of the Nile River is approximately 84 000 MCM and, like other existing storages on the Blue Nile it would be operated to pass the main flood peak to minimize loss of storage to sediment deposition and capture runoff on the recession of the annual flood, past feasibility studies indicated that it would have little mitigating effect on downstream floods. Proposed operating rules were still the subject of

investigation at the time of the Project Definition phase of FPEW PP. The potential for flood mitigation, including for the city of Dongola, did not appear to have received adequate consideration at that stage, flood mitigation not being of primary importance for the success of the Merowe project. As in 2006 however, when departures from standard operating procedures were accepted at Roseires and Sennar Dams to mitigate the flood risk in Khartoum, it is anticipated that in practice some minor benefit to Dongola would be derived in the event of a threat of major floods coinciding from the Atbara and Blue Nile.

(f) Raising of Roseires Dam

Feasibility study has been completed for raising of Roseires Dam, and is under consideration by the Sudanese Government. The practice of fully opening the dam gates during the passage of flood peaks to minimize loss of storage due to sediment deposition is expected to continue, with capture of water for storage on the annual flood recession. In these circumstances the increased dam capacity is unlikely to have significant impact on flood mitigation – particularly as the project will in part be recovering capacity for water storage lost to past deposition of sediment.

1.6 PROJECT IMPLEMENTATION PLAN

This PIP describes the components, tasks and activities of the Project and provides a budget, financial and economic analyses, and a financing plan for Phase 2 Project implementation. It discusses risks associated with Project implementation, and appropriate management measures.

Implementation and institutional arrangements are included, with plans and schedule for implementation, plans for procurement and financial management, and a disbursement schedule.

A framework for monitoring and evaluation is provided. There is a summary of consultations, and a proposed Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) are included consistent with World Bank requirements.

2. Project Design

2.1 BACKGROUND

The FPEW Project was initiated by the Eastern Nile Technical Regional Office (ENTRO) after consultations with the national governments of Egypt, Sudan and Ethiopia and The World Bank. The Project aims to reduce human suffering and damages from, and capture the benefits of, flooding in the Eastern Nile through a range of measures that will improve flood risk management and community preparedness.

2.2 PROJECT OBJECTIVES

The development objective of the FPEW project is to reduce human suffering and damages from, and capture the benefits of, flooding in the Eastern Nile. The project focuses on flood risk management and non-structural approaches to managing the impacts of floods: including floodplain management and flood mitigation planning; flood forecasting and warning; and emergency response and preparedness at regional, national, local and community levels. This will contribute to the longer term goal of establishing a comprehensive regional approach to flood management that integrates watershed, river and floodplain management, and incorporates a suite of structural and non-structural flood mitigation measures within a broad multipurpose framework. Structural measures are included for selected urban areas where flood risk is high and relocation of exposed people and assets is not a realistic option.

2.3 PROJECT SCOPE

The Project extends to the three countries of the Eastern Nile region: Egypt, Sudan and Ethiopia. See Figure 2-1.

In Ethiopia, only the western part of the nation is in the Eastern Nile basin, including the sub-basins of the Tekeze, Abbay and Baro-Akobo river systems. Of these, the Abbay is the largest, originating in the Ethiopian highlands near Lake Tana, and becoming the Blue Nile as it flows into the Sudan. Further north, the Tekeze River, known as the Atbara River in the Sudan, is an important tributary to the Main Nile. To the south, the Baro-Akobo River, which is named the Sobat River in the Sudan, is the most important tributary of the White Nile downstream of the swamps and marshes of the Sudd.

In Sudan, the Project extends to the Blue Nile and its tributaries the Dinder and Rahad; the White Nile only downstream of Jebel Aulia Dam; and the Main Nile downstream of Khartoum and its single tributary the Atbara.

In Egypt, the original intention was to focus on operations of HAD and associated flood forecasting, however there are significant issues for flood management in the Nile downstream of HAD that will benefit from technical assistance.

Figure 2-1: Eastern Nile Region

The Project undertakes actions for capacity building, institutional strengthening and technical assistance to improve the management of flood risk in the three riparian countries. It also includes programs for practical training and public education, raising of awareness and community preparedness in areas of high flood risk within the Sudan and Ethiopia. One outcome should be that communities are better prepared and are equipped with practical knowledge so that community-driven flood management initiatives can be developed and supported.

2.4 EXPECTED OUTCOMES AND KEY PERFORMANCE INDICATORS

Outcomes expected from the FPEW project include:

- Assessment of the flood risk in the Eastern Nile region to support flood management planning and ENSAP investment planning.
- Improved floodplain management for major urban centers vulnerable to flood damage, and for flood-prone rural communities.
- Operational flood forecasting systems in Eastern Nile countries with appropriate compatibility and mechanisms for exchange of information and data.
- Improved emergency response by governments at all levels, and enhanced community preparedness.
- Enhanced regional collaboration and cooperation during flood events.

Specific measurable indicators for the outcomes and outputs will be developed by the management consultants to be deployed under the Project. They will develop these in consultation with ENTRO and the Implementing Agencies (IA) at the inception of the Project.

2.5 FLOOD RISK MANAGEMENT STRATEGIES

2.5.1 General Strategic Issues

An effective strategy for future management of flood risk in the region was developed from analysis of current flood management activities and future needs. The overall strategy includes three national strategies for Ethiopia, Sudan and Egypt; plus a regional strategy that is intended to lead to integration and coordination of activities in the medium and longer terms. Figure 2-2 illustrates this concept.

In general terms, the PP studies found:

- Flood risk management is constrained by lack of capacity and lack of resources. This is common to all countries in the region, however these problems are most severe in Ethiopia, and are more of a constraint in Sudan than in Egypt.
- Flood forecasting relies on access to real-time data. There is little access to real-time rainfall data and no access to real-time river gauging data in Ethiopia, despite the fact that this is where rainfall is highest and where river floods originate.
- The lack of capacity and resources noted above lead to inadequate institutional experience and skills to manage unaided.

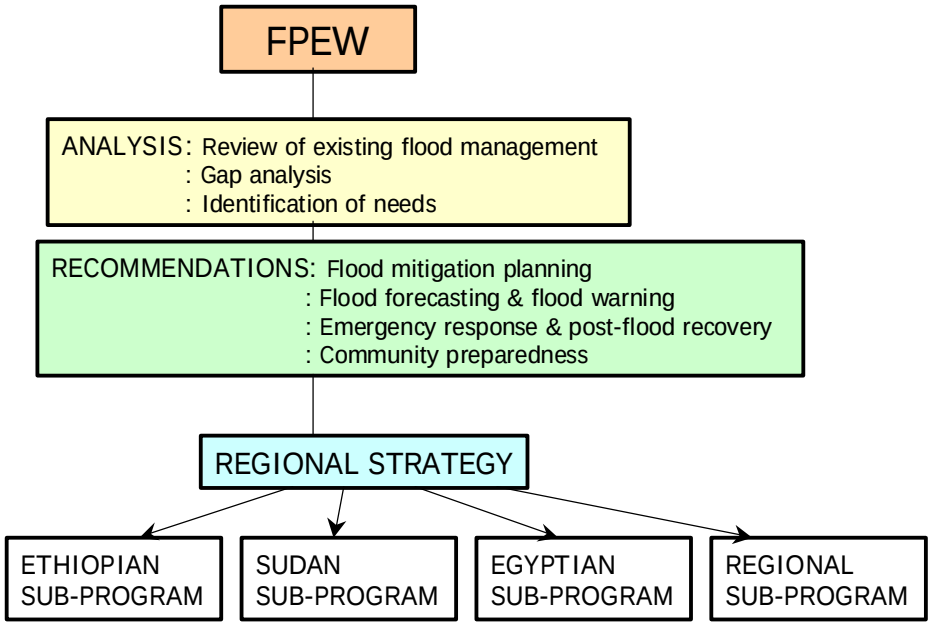


Figure 2-2: Strategy Development

- The lack of resources means that it will be especially important for communities at risk to be self-organized and prepared for floods, as it is unrealistic to expect the levels of government (institutional) support that communities may be able to rely on in more developed countries.
- Development already exists in certain urban areas that are at significant risk of riverine flooding, particularly in Dongola and Gambella. It is not practical to relocate the existing development, and planning measures and programs for community awareness and preparedness cannot resolve these problems in isolation.

As a consequence of these findings, the major threads of the proposed regional strategy are:

- Capacity building of institutions with relevant management functions: provision of training, essential resources, and minor restructuring to enhance functional capability.
- Development of an integrated real-time data acquisition network, improvements in data sharing, and enhanced flood forecasting capability, complemented by improved communications for effective flood warning.
- Technical assistance to build technical skills and support national and regional flood management initiatives.
- Programs of public education and training to raise community awareness of flood risk and equip communities with knowledge and skills to assist them organize and be prepared for floods. Despite the greater self-reliance that these programs should confer, linkages to government flood management activities need to be encouraged and strengthened, in order to achieve an integrated bottom-up and top-down approach, and realize benefits from both community-driven initiatives and government planning. Community-oriented programs should also tap the pool of practical and local knowledge as an asset for future government planning.

- In certain urban areas where substantial development already exists in flood risk areas that is irreversible, structural measures are recognized as a key measure for flood mitigation planning.

As an addendum, it is pertinent to note that, despite the great reduction in flood risk afforded the Nile Valley in Egypt by the HAD, downstream flood risk has not been eliminated. Given the density of population, and the concentration of development and resources in the Nile Valley that underpins the national economy in Egypt, it is unrealistic to consider that the concerns of the FPEW Project in the Eastern Nile region stop at the dam wall. A regional strategy must embrace management and planning both upstream and downstream of the HAD.

2.5.2 Log-Frame for Strategy

A log-frame addressing the five major threads (or goals) of Phase 2 of the Project is presented in Appendix A. For each of the five main goals, it describes the purpose, the outputs and activities related to each goal. Measurable indicators and means of verification are identified for each goal, purpose and set of outputs, and the inputs required under each set of activities is summarized. The log-frame also shows important assumptions and includes cross-references to other parts of the Project documents where more detail is available.

2.5.3 Regional and National Strategies

Appendix B presents national and regional strategies to address the Project objectives. From these strategies, a program for implementation has been developed as described below.

2.6 PROJECT COMPONENTS

From practical considerations, the program is assembled in four sub-programs: three national sub-programs, and one regional sub-program.

2.6.1 Ethiopian Sub-Program

The following project elements are not ordered according to priority. Table 2-1 provides an overview.

1-E Flood Risk Mapping

Additional work is required to improve flood risk mapping for the high flood-risk areas adjoining Lake Tana. The work includes acquisition and analysis of satellite imagery to develop more accurate topographic and land use data. Preliminary hydrological and hydraulic modeling studies to provide flood risk mapping for planning floods of known probabilities can be initiated, but full development of hydraulic modeling should be undertaken in proposed feasibility studies for irrigation projects for these rivers. The mapping undertaken for the Baro-Akobo during Project Preparation) should also be refined. Requirements for this project element are under Goal 1 of the strategic log-frame of Appendix A.

Table 2-1: Ethiopian Sub-Program Summary

Item	Description	Remarks
1-E	Flood risk mapping	Lake Tana district. Acquire, analyze satellite imagery for digital topographic data and exposure to flood hazard. Develop DEMs in selected areas incl. hydrology/hydraulic analysis, Review Baro-Akobo mapping.
2-E	Network of reporting river gauging & rain gauge stations.	>50 rain gauges, almost 30 river gauging stations. Assume rehabilitation of ~15 stations, ~8 new stations, satellite data transmission. All sites require digital data logging and data transmission equipment.
3-E	Establishment of flood forecasting center in Addis Ababa	Building renovation, IT equipment, communications; development of forecasting models for Ribb, Gumera, Megech and Baro Rivers; training; specialist supervision for 2 y.
4-E	Capacity building at DPPA	Guideline procedures for DPPA +training. New unit for flood emergency response planning.
5-E	Capacity building at regional & woreda levels	Guideline procedures +training for woreda staff. L.Tana area only (Fogera, Libo Kemkem, Dembiya). NGOs to assist.
6-E	Capacity building at MWR	Training, equipment at H.O. to increase productivity of hydrological data management services. Field equipment.
7-E	Capacity building in NMA / MWR regional offices	Staff training, computers, equipment, communications.
8-E	Community education and training for awareness and preparedness	Guidelines for developing community self-reliance +training trainers, who will then educate / train communities for self-reliance and self-organization. Support for community-driven action plans for flood preparedness and self-management.
9a-E	Flood protection works, Gambella	Preliminary survey & investigations.
9b-E		Design & construction of levees, drainage works for urban flood risk area.
10-E	Land management planning	Technical assistance, Bahir Dar

The estimated costs of Project element 1-E are US$0.28 M. The Project input assumes 8 man-months of international consulting inputs and 8 man-months of national consulting inputs. Three months of Ethiopian government input are also included to allow for assistance and supervision, and training and awareness after mapping has been accomplished.

2-E Network of Reporting River and Rain Gauge Stations

A network of 53 rain gauges and almost 30 river gauges is proposed to transmit real-time data to a central receiving station in Addis Ababa to support national and regional flood forecasting efforts. Means of transmitting data from remote sites will need to be decided early in Project implementation, however for costing purposes satellite communications are assumed. On-site data logging at all sites and use of manual observations at selected key sites is proposed to ensure adequate back-up. This project element is included under Goal 2 of the strategic log-frame of Appendix A.

The estimated cost of Project element 2-E is US$3.54 M. It assumes 106.5 man-months of consulting inputs, including 35.5 man-months of international inputs.

This Project element would require significant national inputs from both NMA and MWR personnel. During the 5 years of Phase 2 it is estimated government inputs of 196 man-months will be required, including 108 man-months from field technicians. It is proposed that government (or private) staff would work alongside contractors engaged to install, commission and maintain the network during Phase 2 so that after Phase 2 is complete there would be skills and knowledge transfer adequate to sustain network operations. Ongoing costs would then be an estimated $20,000 per annum for satellite service (assumes satellite data transmission and 2006 values), $25,000 per annum for system management plus $36,000 per annum for maintenance and site servicing.

3-E Establishment and Support of a Flood Forecasting Center in Addis Ababa

This project element proposes a new office be set up for a semi-autonomous specialized flood forecasting unit under the jurisdiction of the Ethiopian Minister for Water Resources. Costs of equipment, training and study tours are assumed to be funded from FPEW, and for the duration of the second phase of Project implementation consulting specialists would be provided as needed to assist establishment, technical administration and development of flood forecasting models/procedures, and to provide technical training and support. This project element is included under Goal 1 of the strategic log-frame of Appendix A. Associated development of skills/experience is also included under Goal 2 of the strategic log-frame.

The estimated costs of Project element 3-E are US$2.01 M during the second five-year phase, with recurring annual costs of $117,000 to be contributed in kind by Government to sustain the initiative thereafter. The Project input assumes over 48 man-months of international consulting inputs and 42 man-months of national consulting inputs in the second five-year phase.

4-E Capacity Building for Flood Emergency Response at DPPA

Flood emergency response planning in Ethiopia is properly a role of the DPPA, however there is virtually no capacity for this role at the moment. The FPEW Project should build the necessary capacity by working with DPPA to produce operational and planning guidelines, followed by a training program. A small new unit should also be set up within DPPA committed full-time to flood emergency response planning, with a subsidiary role to compile and manage a flood intelligence database to provide sound planning and management data for the future. Involving both capacity building and improving skills/experience, this project element is included under Goals 1 and 3 of the strategic log-frame of Appendix A.

The estimated costs of Project element 4-E are US$0.80 M. The Project input assumes 15 man-months of international consulting inputs and 8 man-months of national consulting inputs. This Project element would require significant national inputs from DPPA personnel. During the course of the five-year second phase of Project implementation it is estimated that 171 man-months are required for training and operations, particularly associated with the proposed flood emergency response

planning unit. To sustain the planning unit beyond the five-year phase, ongoing contributions in kind of $96,180 are estimated.

5-E Capacity Building for Flood Emergency Response at Regional and Woreda Levels

The capacity building in 4-E above was directed at DPPA at national level. To be effective, particularly given the relatively short flood warning lead times applicable around Lake Tana, regional and especially woreda staff who are close to the flood risk areas also require operational and planning guidelines, followed by a training program. Requirements for this project element are included under Goal 3 of the strategic log-frame of Appendix A.

The estimated costs of Project element 5-E are US$0.44 M, focusing initially on the rural woredas of Fogera, Libo Kemkem and Dembiya in Amhara Region. The Project input assumes just under 10 man-months of international consulting inputs and 26 man-months of national consulting inputs, and assumes volunteers from an NGO would be enlisted and supported.

6-E Capacity Building at MWR

In addition to their existing work, MWR will be responsible for ongoing operations and maintenance of the standard hydrological equipment to be installed for the network of reporting river gauge stations. To be able to cope with the extra demands, the capacity of the Hydrological Services Department within MWR will need to be strengthened. The assistance proposed includes provision of new equipment to increase productivity for both office tasks and field work, together with appropriate training as necessary. Requirements for this project element are included under Goals 1 and 3 of the strategic log-frame of Appendix A as it involves both building institutional capacity and improving skills/experience.

The estimated costs of Project element 6-E are US$0.92 M, including $497,000 for equipment related to field work and station operation and maintenance, and $25,000 for head office equipment. The Project input assumes 15.5 man-months of inter-national consulting inputs and 10.5 man-months of national consulting inputs. Government contributions in kind of 21 man-months are estimated.

7-E Capacity Building at regional MWR/NMA Branches

It is proposed to strengthen the Regional (joint) branches of MWR and NMA, particularly at Bahir Dar and potentially at Gambella, by the provision of training, equipment and facilities. If the Regional branch office(s) could undertake more of the routine data checking and data entry tasks it would increase the productivity of MWR head office staff and improve data management. This project element is included under Goals 1 and 3 of the strategic log-frame of Appendix A as it involves both building institutional capacity and improving skills/experience.

The estimated costs of Project element 7-E are US$0.96 M. The Project input assumes 9 man-months of international consulting inputs and 7.5 man-months of national consulting inputs. It includes a budget of $221,000 for equipment and software. Government staff commitment of 288 man-months is assumed during the five years of Phase 2. It further assumes an ongoing commitment of $180,000 per annum to sustain the increased staffing levels at the regional offices beyond the 5-year phase, plus occasional cost for replacement or updating of IT equipment and software.

8-E Community Education and Training for Awareness and Preparedness

To complement the training provided to DPPA and local agencies described above, a program is proposed to provide training and practical education to the communities at risk, initially in the Lake Tana districts, and potentially extending to Gambella Region in subsequent years. Initially, there will need to be a program for training trainers, who will then train field workers (volunteers) to educate community groups and encourage self-organization, self-reliance and awareness of opportunities to take advantage of available services and funding. National and regional governments do not have the resources to extend this training to community level, so it is considered that there is a role for a suitably trained and motivated NGO to play an important role. Preliminary discussions were held with Ethiopian Red Cross officers. Communities will be encouraged and assisted to prepare their own community action plans for flood preparedness and self-management, and a system for approving applications for funding, and financial support to implement community-driven plans, are included. Further details of this key Project element are presented in chapter 3 following. It is included under Goal 4 of the strategic log-frame of Appendix A.

The estimated costs of this Project element are US$2.98 M. The Project input assumes 39 man-months of international consulting inputs and 403 man-months of national inputs, relying strongly on one or more NGOs to provide the manpower to work actively within remote communities. The budget includes $181,000 for equipment, $91,600 for in-country travel, and $850,000 for expenditure by communities to undertake on-ground works and planning initiatives. It is estimated that 22 man-months of contributions in kind from government would be required to assist in training of trainers and to integrate the community program within government programs and financial management systems.

9-E Flood Protection Works at Gambella.

Gambella is located on the Baro River and is the capital of Gambella Region. In 1988 it was extensively flooded from the Baro River.

In brief, the proposals for Gambella include:

- levees along the right bank of the Baro River in the urban precincts with bank protection [lengths ~1.7 km];
- levees on both banks of the lowest reaches of the Jejebe River, a tributary to the Baro with its confluence within the urban area, connecting with the Baro River levees upstream and downstream [lengths ~0.7 km] including bank protection;
- an embankment and diversion drain on the northern side of the city precincts on the right bank plain of the Jejebe River, the embankment connecting with the downstream end of the Baro levees and the drain outfall to the Baro River just downstream [length ~1.4 km];
- a main stormwater drainage canal within the protected area downstream of the Jejebe River confluence [length ~1 km], draining to an excavated storage sump equipped with a pumping station to evacuate local runoff to the Baro River.

This project element is included under Goal 5 of the strategic framework of Appendix A.

Preliminary survey and investigations should first be undertaken to verify the extent of works necessary, more accurately estimate quantities and rates, costs and benefits, and review the socioeconomic and environmental consequences and identify mitigating measures. The estimated cost of preliminary investigations are $188,400, and assumes 5 man-months of international consulting inputs supported by 12.5 months of local inputs. Government contributions in kind of 5 man-months are estimated, mainly to deal with resettlement issues arising.

Contingent upon positive outcomes from the preliminary investigations clearly justifying the works, design and construction would proceed after an adequate interval for government authorizations. The estimated costs of design and construction are US$2.26 M, requiring 13 man-months of international consulting inputs supported by 14 man-months of national consulting inputs. Another 6 man-months of government inputs are estimated, again primarily related to resettlement of any citizens displaced by the works. Costs of resettlement are assumed to be $14,000 although this needs to be estimated accurately during preliminary investigations. It is estimated that contracts for construction and survey will amount to $1.82 M. Recurrent expenditure of $750 per annum is estimated beyond the five years of Phase 2 for regular (annual) inspection of works condition, with intermittent financial commitments necessary for repairs to flood damage and drainage pump replacements.

10-E Technical Assistance for Land Management Planning, Bahir Dar

Although the main flooding problems in Bahir Dar do not derive from river or lake flooding, many of the problems from flooding may be addressed by stormwater drainage and land management planning. The former is a relatively simple technical problem that is already being addressed adequately in the municipal master plan. Land management planning is more difficult to implement and enforce, and technical assistance is proposed to strengthen the capacity of the municipal office to apply this aspect of its master plan. Requirements for this Project element are included under Goal 5 of the strategic framework of Appendix A.

The estimated costs of Project element 10-E are US$0.29 M. The Project input assumes 7 man-months of international consulting inputs and 12 man-months of national consulting inputs. Government contributions in kind of 12 man-months are assumed for training and participation in land management planning, plus a study tour to learn how effective land management planning is applied to flood risk areas in other countries.

2.6.2 Sudanese Sub-Program

The following project elements are not ordered according to priority. Table 2-2 provides an overview.

1-S Flood Risk Mapping.

Identification of flood risk areas is an important deficiency in the Sudan that limits the effectiveness of flood emergency response planning and preparedness. An initial step should be the acquisition of accurate digital topographic data. In conjunction with digital topographic maps, flood imagery should be used to delineate historical flood extents along the Blue Nile and the Main Nile. A pilot study is proposed to test the

Table 2-2: Sudanese Sub-Program Summary

Item	Description	Remarks
1-S	Flood risk mapping	Acquire & analyze satellite imagery. Undertake pilot test. Acquire accurate topographic data. Delineation of inundation extents. Identify exposure to flood hazard.
2-S	Hydrology & hydraulic modeling	Hydrology & hydraulics of planning floods to determine planning flood levels.
3-S	New reporting river gauging stations	Assume 3 new stations on Atbara, + 1 replacement cableway + 1 AWLR; 2 new stations on Dinder& Rahad.
4-S	New reporting weather stations	15 stations, with new data transmission + 2 laptops to download data from on-site digital data loggers.
5-S	Capacity building at MIWR	Reinstate flood forecasting system. Upgrade computer hardware, GIS software, rehabilitate materials testing laboratory.
6-S	Community education and training for awareness and preparedness	Guidelines for developing community self-reliance +training trainers, who will then educate / train communities for self-reliance and self-organization. Support for community-driven action plans for flood preparedness and self-management.
7-S	General capacity building for MIWR	Equipment and training to support regional offices and field programs of data measurements. Data management.
8-S	Capacity building at SMA	Upgrading SMA facilities – PCs, mass storage devices, software upgrade, training: assume 1-month on-site training by 2 specialists.
9-S	Capacity building for CDO	Guideline procedures for CDO + training, at national and state levels. New unit for flood emergency response planning.
10-S	General capacity building at CDO	Equipment, vehicles, communications.
11-S	Capacity building for HAC	Guideline procedures for HAC + training at national and state levels.
12-S	General capacity building at HAC	Equipment, communications. Establish office in Dongola.
13a-S	Flood protection levees, Dongola	Preliminary survey & investigations. Undertake structural, geotechnical audit.
13b-S		Design & construction. Reconstruct flood protection works where necessary.
14-S	Land Management planning, Khartoum	Technical assistance.
15-S	Investigations of river hydraulics, sediment transport and channel morphology	Program of field sampling, Khartoum rivers – bathymetry, sediment sampling, velocity profiles, materials sampling, etc. over a period of 16 months commencing July. Hydraulic modeling of flows & sediment transport, Khartoum.
16-S	Pilot study on bank erosion	Investigate & trial appropriate waterway management techniques to combat *haddam*.

accuracy of a low-cost technique for estimation of terrain elevation from satellite imagery analysis in a blind trial against high-accuracy digital topographic data available from the Merowe Dam Project. If that proves unsatisfactory, digital topographic data should be acquired and analyzed for all reaches that are not or will not be covered by data from other sources. The GIS unit of MIWR should be strengthened and trained to undertake essential tasks of flood risk mapping in association with RSA and

technical consulting assistance. Requirements for this project element are included under Goal 1 of the strategic framework of Appendix A.

The estimated costs of Project element 1-S are US$1.74 M, requiring 14 man-months of international consulting inputs and 13 man-months of national consulting inputs. Government contributions of 108 man-months are assumed as, after initial intensive training and subsequent training on the job, the mapping tasks can be undertaken in house. The budget includes allowances of $890,000 for acquisition of digital data, $121,200 for cross-section and other field survey, and $97,500 for map production costs.

2-S Hydrology and Hydraulic Modeling for Planning Floods.
To support the flood risk mapping tasks under 1-S above, technical studies are required to establish planning flood discharges for the Blue Nile, Main Nile and tributaries, and to undertake hydraulic modeling to determine planning flood levels along the main rivers. Requirements for this project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 2-S are US$0.30 M, requiring 12 man-months of international consulting inputs and 9 man-months of national consulting inputs.

3-S New Reporting River Gauging Stations.
Additional reporting river gauging stations are required on tributaries to the Blue Nile and Main Nile to improve flood forecasting and early warning. Requirements for this project element are included under Goal 2 of the strategic framework of Appendix A.

The estimated costs of Project element 3-S are US$0.31 M during the second five-year phase, requiring less than 3 man-months of international consulting inputs and 18 man-months of national consulting inputs (including technicians). Included in the budget is $172,000 for field equipment and installation. Government contributions of 8 man-months are assumed during the 5-year second phase for management and technical assistance and training, with recurring annual costs of $1,500 beyond those 5 years for operations and maintenance, plus intermittent costs for repairs or replacements if the benefits are to be sustained.

4-S New Reporting Weather Stations.
Rehabilitation is required of the existing network of real time reporting weather stations in those parts of the Sudan near the Blue Nile, Main Nile and tributaries, including new automatic weather stations and communications equipment. Requirements for this project element are included under Goal 2 of the strategic framework of Appendix A.

The estimated costs of Project element 4-S are US$0.40 M, requiring less than 3 man-months of international consulting inputs and 9 man-months of national consulting inputs (including technicians). Included in the budget is $274,000 for field equipment and installation. Government contributions of 7 man-months are assumed during the second phase for management and technical assistance and training, with recurring annual costs of $4,500 to be contributed by Government for operations and maintenance beyond the initial 5 years, plus intermittent costs for repairs or replacements if the benefits are to be sustained.

5-S Capacity Building for MIWR.

The Project should reinstate and rehabilitate the FEWS flood forecasting system that has been neglected over the past decade, taking the opportunity to update and upgrade hardware and software and refine and recalibrate the forecasting procedures. The Project should also purchase GIS software and supporting hardware to support the flood risk mapping effort, and rehabilitate the MIWR laboratory for materials testing to support sediment sampling. Technical assistance is also proposed at a later stage to upgrade flood forecasting procedures with additional data that should be available from Ethiopia. Requirements for this project element are included under Goals1 and 3 of the strategic framework of Appendix A as it involves both building capacity and improving skills/experience.

The estimated costs of Project element 5-S are US$0.77 M, requiring 19.5 man-months of international consulting inputs and 1.5 man-months of national consulting inputs. Government contributions of 12 man-months are assumed during the second phase for management assistance, attendance at a specialist course on flood forecasting procedures, training on GIS procedures and equipment operations and maintenance procedures, *etc*. The budget includes $110,000 for equipment and software. After the initial 5 years, recurrent annual expenditure of $37,000 is estimated to staff and supply the materials laboratory, plus intermittent financial commitments to update or upgrade computer hardware and software for the flood forecasting and GIS units.

6-S Community Education and Training for Awareness and Preparedness

To complement the training provided to CDO and HAC, a program is proposed to provide training and practical education to the communities at risk along the Main Nile, Blue Nile and tributaries. Initially, there will need to be a program for training trainers, who will then train field workers (volunteers) to educate community groups and encourage self-organization, self-reliance and awareness of opportunities to take advantage of available services and funding. National and State governments do not have the resources to extend this training to community level, so it is considered that there is a role for a suitably trained and motivated NGO to play an important role here. From preliminary consultations, the Sudanese Red Crescent Society (SRCS) appears to be very well suited to this role. Communities will be encouraged and assisted to prepare their own community action plans for flood preparedness and self-management, and a system for approving applications for funding, and financial support to implement community-driven plans, are included. Further details of this key Project element are presented in chapter 3 following. It is included under Goal 4 of the strategic log-frame of Appendix A.

The estimated costs of Project element 6-S are US$9.09 M. The Project input assumes over 40 man-months of international consulting inputs and 1 123 man-months of national inputs, relying strongly on one or more NGOs to provide the manpower to work actively within remote communities over the five-year period of the second phase of Project implementation. The budget includes $348,000 for equipment, $58,000 for in-country travel, and $5.92 M for expenditure by communities to undertake on-ground works and planning initiatives. It is estimated that 22 man-months of contributions in kind from government would be required to assist in training of trainers and to integrate the community program within government programs and financial management systems.

7-S General Capacity Building at MIWR

This Project element is required to support routine data management in Khartoum and to provide equipment for MIWR branch offices to properly support field programs for discharge measurements, and station operation and maintenance. These needs are included under Goals 1 and 3 of the strategic framework of Appendix A, involving both building of capacity and improving of skills/experience.

The estimated costs of Project element 7-S are $0.46 M. It assumes 3.5 man-months of international consulting inputs supported by 5.5 man-months of local consulting inputs, and includes a budget of $302,000 for equipment and vehicles. Government contributions in kind of 5 man-months are estimated primarily for training purposes.

8-S Capacity Building for SMA.

Specialist training for SMA staff is proposed to enhance skills in dynamic (short-term) weather forecasting, and other facilities are to be provided or upgraded to increase productivity of staff in Khartoum. Requirements for these project elements are included under Goals 1 and 3 of the strategic framework of Appendix A, involving both building of capacity and improving of skills/experience.

The estimated costs of Project element 8-S are US$0.11 M, requiring over 3 man-months of international consulting inputs and 1 man-month of national consulting inputs. Government contribution of 4.5 man-months would be required for training. A budget component of $31,000 was allocated to equipment and software.

9-S Capacity Building for Flood Emergency Response Planning at CDO

Flood emergency response planning in Sudan is the role of the CDO. The FPEW Project should build the necessary capacity for CDO to perform this role by working with CDO to produce operational and planning guidelines, followed by a training program. A small new unit should also be set up within CDO committed full-time to flood emergency response planning, with a subsidiary role to compile and manage a flood intelligence database to provide sound planning and management data for the future. Requirements for this project element are included under Goals 1 and 3 of the strategic framework of Appendix A, involving both building of capacity and improving of skills/ experience.

The estimated costs of Project element 9-S are US$0.52 M. The Project input assumes 11 man-months of international consulting inputs and 1 man-month of national consulting inputs. This Project element would require significant national inputs from CDO personnel. Government contributions of 143 months over the 5 years of Phase 2 implementation are estimated to include training on the operational and planning guidelines, and training and staffing of the flood emergency response planning unit. Beyond the 5 years of Phase 2, recurrent in kind expenditure of an estimated $82,460 per annum would be required to sustain the planning unit within CDO.

10-S General Capacity Building at CDO

CDO experience difficulties in adequately performing their active flood emergency response activities over the very extended area of the Blue Nile and Main Nile. Government services to communities would improve if national and state CDO offices were better equipped to access communities at risk and maintain communications with each other and with other agencies. The Project element would provide and upgrade

communications and other essential equipment, and provide appropriate training as necessary. It is included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 10-S are US$0.89 M. The Project input assumes 4.5 man-months of international consulting inputs and 3 man-months of national consulting inputs, and includes a budget allocation of $655,000 for equipment and vehicles. Government contributions of 5 man-months plus $122,500 for operations and maintenance of equipment within the timeframe of the 5-year Phase 2 implementation are estimated, then ongoing recurrent expenditure of $61,250 per annum.

11-S Capacity Building for Flood Emergency Response Planning at HAC

Post-flood relief and recovery in Sudan is the role of the HAC. The FPEW Project should build the necessary capacity for HAC to perform this role by working with HAC to produce operational and planning guidelines, followed by a training program. It is included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 11-S are US$0.19 M. The Project input assumes over 7 man-months of international consulting inputs and 6 man-months of national consulting inputs. Government contributions in kind of 5 man-months are estimated, mainly for training on the operational and planning guidelines.

12-S General Capacity Building at HAC

HAC experience difficulties in adequately performing their post-flood relief and recovery activities over the very extended area of the Blue Nile and Main Nile. Government services to communities would improve if national and state HAC offices were better equipped to access communities at risk, and if HAC were able to operate an office for Northern State in Dongola. The Project element would provide and upgrade computer equipment and communications and other essential equipment, and provide appropriate training as necessary. It is included under Goals 1 and 3 of the strategic framework of Appendix A, involving both building of capacity and improving of skills/ experience.

The estimated costs of Project element 12-S are US$0.56 M. The Project input assumes 5 man-months of international consulting inputs and 4.5 man-months of national consulting inputs. A budget allocation of $250,000 is provided for equipment. This Project element would require significant national inputs from HAC personnel – 83 man-months is estimated, mainly for training and staffing an office in Dongola.

13-S Flood Protection Works, Dongola.

A large proportion of the city would be subject to inundation in large Nile floods except for the protection afforded by a number of levees. The main town levee is over 12 km long, but has not resisted floods in the years of highest floods, and is therefore not performing its intended function. Failures are not always due to overtopping, and may occur because of structural failure. The FPEW Project proposes to reconstruct the levee to good engineering standards. Requirements for this project element are included under Goal 5 of the strategic framework of Appendix A.

(a) Preliminary survey, structural and geotechnical audit and investigations should first be undertaken to verify the extent of works necessary, more accurately estimate quantities and rates, costs and benefits, and review the socioeconomic and

environmental consequences and identify mitigating measures. The estimated cost of preliminary investigations are $251,000, and assumes 7 man-months of international consulting inputs supported by 14.5 months of local inputs. Government contributions in kind of 6 man-months are estimated, mainly to deal with resettlement issues arising.

(b) Contingent upon positive outcomes from the preliminary investigations clearly justifying the works, design and construction would proceed after an adequate interval for government authorizations. The allowed costs of design and construction are US$2.49 M, requiring 11.5 man-months of international consulting inputs supported by 15 man-months of national consulting inputs. Another 3 man-months of government inputs are estimated, again primarily related to resettlement of any citizens displaced by the works. Costs of resettlement are assumed to be $16,800 although this needs to be estimated accurately during preliminary investigations. It is estimated that contracts for construction and survey will amount to $2.08 M. Recurrent expenditure of $1,300 per annum is estimated beyond the five years of Phase 2 for regular (annual) inspection of works condition, with intermittent financial commitments necessary for repairs to flood damage and drainage pump replacements.

14-S Land Management Planning, Khartoum.
Technical assistance is proposed to advise on application of land use planning in Khartoum with the emphasis on riparian or floodplain lands. This would assist local agencies prevent inadvisable development that may encroach upon floodplain and river channel conveyance capacity. Requirements for this project element are included under Goal 5 of the strategic framework of Appendix A.

The estimated costs of Project element 14-S are US$0.36 M, requiring 11 man-months of international consulting inputs and 18 man-months of national consulting inputs. Government contributions of 8 man-months are estimated to include training and a study tour to learn how effective land management planning is applied to flood risk areas in other countries.

15-S Investigation of River Hydraulics and Sediment Transport, Khartoum.
A field sampling program is proposed to collect data on flow distributions, sediment transport and fluvial geomorphology of the rivers in Greater Khartoum. The data would then be used to calibrate and develop detailed hydraulic and sediment transport models to provide good scientific information for evaluation of riparian interventions. Requirements for this project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 15-S are US$0.64 M, requiring 17 man-months of international consulting inputs and 73 man-months of national consulting inputs (including technicians).

16-S Pilot Program for Bank Stabilization.
River bank erosion is a major threat to village communities along the Blue Nile and Main Nile and is a direct impact of floods. A pilot program is proposed under Project implementation to investigate methods that may be effective to combat bank erosion in the Sudan by adapting techniques that have been applied elsewhere and using

locally available materials or low technology. Requirements for this project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 16-S are US$0.47 M, requiring 12 man-months of international consulting inputs and 54 man-months of national consulting inputs. Government contributions in kind of 6 man-months are estimated to ensure adequate transfer of knowledge.

2.6.3 Egyptian Sub-Program

The following project elements are not ordered according to priority. Table 2-3 provides an overview.

Table 2-3: Egyptian Sub-Program Summary

Item	Description	Remarks
1-EG	Upgrade NFC	Upgrade computer equipment, software, training
2-EG	Studies related to flood forecasting	Studies to determine effectiveness of improved flood forecasting procedures, related to HAD operations.
3-EG	Revise flood forecasting procedures	When expanded data network comes on line.
4-EG	Assistance with flood risk mapping	Technical assistance and study tour.
5-EG	Sediment transport modeling of pilot reach	Technical assistance for field sampling program and sediment transport modeling.
6-EG	Land use management	Technical assistance for pilot Land Use Management Plan in flood risk area, and study tours.

1-EG Capacity Building for Nile Forecast Center.

This project element proposes support to the NFC in Cairo by upgrading facilities with appropriate training. Upgrading is necessary not only to modernize computer and data display facilities, but also to equip the NFC to receive and analyze data from a new generation of data communications satellite. There is provision under FPEW Phase 1 implementation to redress the more pressing needs at NFC Cairo, however within the 5-year duration of Phase 2 further upgrading will be necessary. Provision is made to undertake this upgrade during Year 4 of FPEW Phase 2 implementation, prior to which a revised assessment of needs will be necessary. Requirements for this project element are included under Goal 1 of the strategic framework of Appendix A.

The estimated costs of Project element 1-EG are US$0.12 M, requiring 2.5 man-months of international consulting inputs and 3 man-months of national consulting inputs. Government contributions in kind of 2 months are estimated for coordination. The budget includes a preliminary allocation of $40,000 for equipment and upgrades.

2-EG Studies Related to Flood Forecasting.

Studies are proposed to examine the benefits of improved flood forecasting with the additional data that should come on-line as a result of the improvements to the reporting gauge network, particularly in Ethiopia. This would entail amendment of flood forecasting models to integrate the new data, comparisons of forecasts with and without new data, and use of the DSS for HAD to investigate the implications for operations of HAD and the socioeconomic benefits to be derived. Requirements for

this project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 2-EG are US$0.41 M, requiring 10 man-months of international consulting inputs and 26 man-months of national consulting inputs. Potentially, the national consulting inputs could be used by government to employ contract staff, and no extra Government commitment is proposed.

3-EG Revise Flood Forecasting Procedures.
When new data from the expanded reporting gauge network comes on line, the suite of flood forecasting model software will have to be recalibrated and tested. Requirements for this project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 3-EG are US$0.13 M, requiring less than 3 man-months of international consulting inputs and 8 man-months of national consulting inputs. In addition to the national consulting inputs, a government contribution in kind of 4.5 months input is assumed to ensure coordination with NFC procedures and government objectives.

4-EG Technical Assistance for Flood Risk Mapping.
The Nile Research Institute (NRI) have embarked on a program of floodplain mapping. This needs to be benchmarked against good international practice, with development of flood risk mapping for a set of planning floods. Identification of land use, buildings and infrastructure should then be undertaken to determine the exposure of people and property to the flood hazard as a foundation for future flood emergency response planning and floodplain risk management planning. Requirements of this project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 4-EG are US$1.04 M, requiring 21.5 man-months of international consulting inputs and 68 man-months of national consulting inputs. Potentially, the national consulting inputs could be used by government to employ contract staff. The best mode of delivery for knowledge transfer will be for international consultants to work alongside national staff (*e.g.* in NRI) in joint planning, technical activity and progress reviews. The studies would also require 4 months of Government contribution in kind d for appropriate staff to participate in overseas study tours to learn how flood risk mapping is accomplished and applied for best effect. The budget includes allocations of $16,500 for computer hardware and software, and $40,000 for travel and costs associated with a study tour.

5-EG Sediment Transport Modeling of Pilot Reach.
A field sampling program is proposed to collect data on flow distributions, sediment transport and fluvial geomorphology in a pilot reach of the Nile River. The data would then be used to calibrate and develop detailed hydraulic and sediment transport models to provide good scientific information for evaluation of bank erosion and scour problems that are an important source of flood damages in Egypt. The requirements for this project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 5-EG are US$0.74 M, requiring 19 man-months of international consulting inputs and 24 man-months of national consulting inputs.

Potentially, the national consulting inputs could be used by government to employ contract staff. The studies would also require government commitments from the MWRI, and 5 man-months is estimated for coordination and training purposes. It is assumed that two persons should attend a specialist training course on river hydraulics and sediment transport modeling overseas. There are budget allocations of $36,000 to cover travel costs and course fees, and $87,500 for field sampling equipment and computer hardware and software.

6-EG Pilot Land Use Management Plan.

To make good use of the flood risk mapping being developed in Egypt, management plans to control future land use and development in floodplains should be commenced. A pilot reach is proposed for development of a pilot Floodplain Risk Management Plan (FRMP), and the Project would provide technical assistance, and support study tours and visiting specialists. Requirements of this project element are included under Goal 5 of the strategic framework of Appendix A.

The estimated costs of Project element 6-EG are US$1.02 M, requiring 31 man-months of international consulting inputs and 36 man-months of national consulting inputs. The studies would also require government commitments in kind so that appropriate government staff can participate in development of the pilot plan. Provision is also made for five government officers to participate in study tours to learn how effective land use planning is undertaken in flood risk areas internationally. An allocation of $56,000 has been made in the budget for travel and associated costs for this purpose.

2.6.4 Regional Sub-Program

The following project elements are not ordered according to priority. Table 2-4 provides an overview.

1-R Management Unit Support, ENTRO.

ENTRO's proposed Regional Flood Coordination Unit will require support to be able to manage such a large undertaking as the FPEW Project and undertake the Regional sub-program. It may anticipate that its management tasks will escalate as the Project moves from Project Preparation to Project implementation. Requirements for this Project element are included under Goal 1 of the strategic framework of Appendix A.

Table 2-4: Regional Sub-Program Summary

Item	Description	Remarks
1-R	Management unit support for ENTRO	Capacity building, funding support for RFCU.
2-R	EN flood management interest group in NBCBN	Facilities, management, travel budget over 5 y. Website establishment.
3-R	Annual conferences	Annual post-flood conferences, biennial technical conferences – travel, accommodation, venues, etc
4-R	Special topic seminars	Travel, accommodation, venues, etc over 4 y for 3 seminars with 8 participants from each country
5-R	Joint study tours	Assume 20 persons: Fees for institutions providing time/services.
6-R	Visiting specialists	Assume 6 persons
7-R	Joint studies	Assume 4 joint projects

The estimated costs of Project element 1-R are US$2.01 M, requiring 2 man-months of international consulting inputs and 311 man-months of ENTRO inputs. The budget includes an allocation of $25,000 for office and IT equipment.

2-R EN Flood Management Interest Group in NBCBN.
It is recommended to establish an Eastern Nile sub-group within the NBCBN flood management research cluster and then support its future activities that are related to FPEW objectives and needs. Jointly with the RFC U in ENTRO, it would also organize and support a range of other initiatives described below to foster a shared learning environment for technical development. Requirements for this Project element are included under Goal 1 of the strategic framework of Appendix A.

The estimated costs of Project element 2-R are US$0.41 M, requiring 3 man-months of international consulting inputs and 23 man-months of national inputs, primarily from universities that would associate with the Eastern Nile sub-group of the NBCBN flood management research cluster. Four months of local consulting inputs are estimated to maintain a research group sub-group website, and $2,500 is allocated separately for its establishment. Government contributions in kind of 45 months are estimated, assuming 3 persons from each of the EN region countries contributing one month towards sub-group activities per annum. The budget also includes an allocation of $25,000 towards equipment for a management office to be established somewhere within the region.

3-R Annual Conferences.
Annual post-flood conferences are proposed to enable professionals active in the fields of flood emergency response, weather and flood forecasting to compare experiences, learn from each other and be better prepared for their future roles. Biennial technical conferences are also proposed to bring together a more diverse mix of academics and other professionals with an interest in flood management, from whatever perspective. Requirements of this Project element are included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 3-R are US$0.56 M, requiring 12.5 man-months of national consulting inputs. Government contributions in kind of 54 months are estimated to facilitate attendance by government staff at conferences. The budget includes allocations for travel, accommodation and venues of $306,000.

4-R Special Topic Seminars.
Smaller meetings of specialists should be convened to exchange knowledge and ideas in relation to topical issues for flood management that may be prominent at some particular time. This Project element is included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 4-R are US$0.24 M, requiring 16 man-months of national consulting inputs. Government contributions in kind of 16.5 months are estimated to facilitate attendance by government staff at seminars. The budget includes allocations for travel, accommodation and venues of $90,300.

5-R Joint Study Tours.
Study tours should be sponsored for practicing professionals from each of the regional countries to travel together to other parts of the world to study how their particular

aspects of flood management are planned and undertaken elsewhere. This Project element is included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 5-R are US$0.43 M, assuming 4 man-months of national inputs, and 12 months for government inputs in kind to facilitate participation in the study tours. The budget includes allocations of $368,000 to fund travel costs and services provided by overseas hosting institutions.

6-R Visiting Specialists.
It is proposed that the Eastern Nile sub-group within the NBCBN flood management research cluster, or alternatively the RFCU within ENTRO, sponsor visits by international specialists to meet current technical needs. As a supplement or alternative to joint study tours, specialists could be brought to regional countries to advise on planning and implementation of specific aspects of flood management. This Project element is included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 6-R are US$0.19 M. 6 man-months of international consulting inputs are assumed, supported by 1.5 months of regional inputs.

7-R Joint Studies.
Investigations may be funded into subjects of joint interest to one or more regional countries. These investigations may be more specifically project-related than the program of research routinely supported by the NBCBN flood management research cluster. This Project element t is included under Goal 3 of the strategic framework of Appendix A.

The estimated costs of Project element 7-R are US$0.75 M, assuming 1.5 man-months of international consulting inputs and 80 man-months of national consulting inputs. Furthermore, government contributions in kind of 40 man-months are assumed to enable government staff to participate and facilitate the orientation towards the real needs of regional governments.

2.7 DISTINGUISHING FEATURES OF PROJECT DESIGN

The Project will strengthen capacities of government agencies to assist communities in flood risk areas, and at the same time strengthen the capacity of communities for self-organization and preparedness. In the course of Phase 2 implementation, many communities should have gained the knowledge to initiate community-driven projects that initiate on-ground works and planning initiatives that complement government services in the management of flood risk.

The Project is consistent with the strategic objectives of the Eastern Nile Subsidiary Action Program (ENSAP) under the Nile Basin Initiative (NBI), which are:

- To ensure efficient water management and optimal use of the Nile resources through equitable utilization and causing no significant harm.
- To ensure cooperation and joint action between the Eastern Nile countries through win-win gains.
- To target poverty eradication and promote economic integration.
- To ensure that the ENSAP results in a move from planning to action.

The FPEW Project contributes to optimal use of Nile resources by reducing damages and economic losses due to flooding. It will strengthen regional cooperation and involve implementation of coordinated programs in the management of flood risk. It will target poor urban and rural communities located in flood risk areas and improve livelihoods by reducing damages and economic losses in those communities. Implementation of Phase 2 will advance the movement from preparation and planning to effective action that will have been initiated during Phase 1.

2.8 PROJECT COSTS AND BUDGET

The total cost of the Project at 2006 values is US$40.6 M. Table 2-5 presents a summary of the cost estimates.

Table 2-5: Summary of Project Cost Estimate by Components

Component	US$ Million	% Total
1. Ethiopian Sub-Program		
1.1 Flood risk mapping	0.282	
1.2 Network of reporting river gauging & rain gauge stations	3.537	
1.3 Establishment of flood forecasting center in Addis Ababa	2.006	
1.4 Capacity building for DPPA	0.803	
1.5 Capacity building at regional & woreda level	0.439	
1.6 Capacity Building at MWR	0.923	
1.7 Capacity building at NMA /MWR regional offices	0.960	
1.8 Community education & training for awareness & preparedness	2.976	
1.9 (a) Flood protection works, Gambella: preliminary investigations	0.188	
(b) Gambella Flood Protection Works, design & construction	2.259	
1.10 Land management planning, Bahir Dar	0.292	
Sub-Total, Ethiopia:	**14.665**	34.72%
2. Sudanese Sub-Program		
2.1 Flood Risk Mapping	1.744	
2.2 Hydrology & Hydraulic Modeling	0.297	
2.3 New reporting river gauging stations	0.308	
2.4 New Reporting Weather Stations	0.396	
2.5 Capacity Building at MIWR	0.768	
2.6 Community education & training for awareness & preparedness	9.086	
2.7 General capacity building at MIWR	0.465	
2.8 Capacity building at SMA	0.114	
2.9 Capacity building for CDO	0.522	
2.10 General capacity building for CDO	0.890	
2.11 Capacity building at HAC	0.188	

Component	US$ Million	% Total
2.12 General capacity building for HAC	0.556	
2.13 (a) Dongola Flood Protection Works, preliminary investigations	0.251	
(b) Dongola Flood Protection Works, design & construction	2.494	
2.14 Land Management Planning, Khartoum	0.355	
2.15 Investigations of river hydraulics, sediment transport and channel morphology	0.636	
2.16 Pilot program: appropriate technology for bank stability	0.473	
Sub-Total, Sudan:	**19.540**	46.26%
3. Egyptian Sub-Program		
3.1 Update for Nile Forecasting Center	0.120	
3.2 Studies related to flood forecasting	0.413	
3.3 Revise flood forecasting procedures	0.128	
3.4 Assistance with flood risk mapping	1.042	
3.5 Sediment transport modeling of pilot reach	0.740	
3.6 Land use management	1.018	
Sub-Total, Egypt:	**3.460**	8.19%
4. Regional Sub-Program		
4.1 Management unit support for ENTRO	2.007	
4.2 EN flood management interest group in NBCBN	0.407	
4.3 Regular conferences	0.563	
4.4 Special topic seminars	0.238	
4.5 Joint study tours	0.427	
4.6 Visiting specialists	0.185	
4.7 Joint studies	0.752	
Sub-Total, Regional:	**4.579**	10.84%
TOTAL :	**40.578**	

Yearly scheduling of the budget is presented in Table 2-6.

Table 2-6: Annual Cost Breakdown

Sub-Program	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
Egypt	718,140	839,897	764,487	693,255	444,545	3,460,325
Ethiopia	3,029,851	4,566,258	4,341,761	1,625,738	1,101,116	14,664,725
Sudan	1,883,952	3,283,873	6,778,146	3,472,296	4,121,430	19,539,698
Regional	395,588	822,409	1,172,409	1,066,200	1,121,909	4,578,515
TOTAL	6,027,531	9,512,439	13,056,804	6,857,489	6,789,000	42,243,262
Percentages	14.3%	21.4%	31.6%	16.4%	16.2%	100%

A breakdown of costs into labor and non-labor costs, and by international, national (EN region) and national government inputs, is presented in Table 2-7. Further details are presented in Appendix D.

Table 2-7: Cost Summary

Sub-Program	International		Regional		Government Contribution	
	Labor	Non-labor	Labor	Non-labor	Labor	Non-labor
Egypt	1,663,250	351,000	991,500	333,450	121,125	0
Ethiopia	3,624,250	5,395,250	1,843,450	1,668,675	1,948,000	185,100
Sudan	3,252,750	4,756,000	2,643,750	7,541,548	1,092,650	253,000
Regional	273,000	428,000	2,688,290	561,100	628,125	0
TOTAL	8,813,250	10,930,250	8,166,990	10,104,773	3,789,900	438,100
Percentages	20.9%	25.9%	19.3%	23.9%	9.0%	1.0%

NOTE: Costs in US$ (2006) over 5 years of FPEW 2

2.9 ECONOMIC EVALUATION

2.9.1 Rural Riparian Villages in Sudan

Damages for rural villages riparian to the Blue Nile and Main Nile in Sudan incurred in a flood of 5% AEP are estimated to be US$132.4 M, comprising $109.3 M direct damages and $23.1 M indirect damages. Total damages incurred in a flood of 1% AEP are estimated to be US$215.2 M. This led to an estimate of Average Annual Damage (AAD) in riparian rural villages of Sudan of US$25.77 M.

The costs of the measures in FPEW Phase 2 that will reduce these damages is $18.51 M at 2006 prices, and their PV assuming an opportunity cost rate for capital of 10% is $15.10 M.

Considering all factors, it appears reasonable to assume that a reduction of only 10% of potential damages is realistic – although it could be greater if the programs are very successful and there is some risk it could be less if they are particularly unsuccessful. Assuming attainment of 10% reduction in flood damages, the average annual value of the benefits from the relevant measures are estimated to be $2.577 M. Assuming an opportunity cost rate of capital of 10%, over a project duration of 30 years the PV of these benefits is $24.295 M. Compared to the PV of Project inputs required to achieve this outcome, the benefit:cost ratio is 1.61.

In order to reduce the benefit:cost ratio to unity, it would be necessary to achieve only 60% of the benefits assumed from the analysis – *i.e.* only a 6% reduction in the damages currently incurred – and benefits of that magnitude seem easily achievable. Alternatively, the damages themselves would have to be over-estimated by a factor of 1.61, which is improbable according to the information available. Another way of looking at it is that, if the estimates of the benefits are sound, expenditure of 1.61 times the estimated Project cost, or up to $29.8 M, could be justified [particularly considering that there are intangible benefits (non-monetary benefits) such as loss of life, business confidence, *etc.*, that will be

derived]. These deliberations go towards demonstrating that the ratio of benefits to costs is robust.

2.9.2 Rural Areas Adjoining Lake Tana in Ethiopia

Damages are estimated for the two worst affected areas around Lake Tana that were the focus of the current study: the Fogera and Dembiya plains. Flooding of these areas derives from the Gumera and Ribb Rivers in the case of Fogera plains, and from the Megech River in the Dembiya plains; and flooding in both areas can be aggravated by backwater from high lake levels. Woredas affected are Fogera and Libo Kemkem (Fogera plains), and Dembiya. Damages incurred in a flood of 1% AEP are estimated to be US$26.5 M, comprising $20.0 M direct damages and $6.4 M indirect damages. Total damages incurred in a flood of 5% AEP are estimated to be US$9.6 M. Based on these figures, AAD in the Fogera and Dembiya plains adjoining Lake Tana is estimated to be US$5.54 M.

The costs of relevant flood risk management measures in FPEW Phase 2 at 2006 prices is $11.09 M, and their PV assuming an opportunity cost rate for capital of 10% is $10.67 M.

Considering all factors, it appears reasonable to assume that a reduction of 15% of potential damages is realistic in these rural areas – although it could be greater if the programs are very successful, and there is some risk it could be less if they are particularly unsuccessful. This is a higher percentage than assessed for Sudanese rural areas primarily because the rural areas at risk around Lake Tana currently receive virtually no assistance in pre-flood planning, flood forecasting and warning, and although warning times are shorter, in these circumstances greater potential for improved future outcomes are expected.

Assuming that the AAD would be reduced by 15%, the average annual value of the benefits from the relevant measures are estimated to be $0.831 M. Assuming an opportunity cost rate of capital of 10%, over a project duration of 30 years the PV of these benefits is $7.832 M. Compared to the PV of Project inputs required to achieve this outcome, the benefit:cost ratio is 0.73. In order to exceed a benefit:cost ratio of unity, it would be necessary to achieve greater benefits, or to achieve the same benefits at lesser cost.

However, the benefits to be derived from the recommended measures are expected to be derived not just from the districts of the Fogera and Dembiya plains that were the districts subject to flood damages assessment analysis. Unquantified benefits would also arise from flood forecasting for the Baro-Akobo sub-basin, and for other districts at risk around Lake Tana. Moreover, several of the measures also enable Ethiopia to develop its services for other flood risk areas in the nation, including for example the Awash and Omo river basins – and even if that would entail some additional effort and cost beyond the scope of the EN FPEW Project to apply flood forecasting techniques and install extra stations in the data network, the expenditure involved in the FPEW project to set up a national flood forecasting center, develop flood forecasting procedures appropriate to Ethiopia, and establish a flood emergency planning unit, *etc*. substantially contribute to the benefits that would derive from such extensions to the current proposals. Although estimation of those benefits falls outside the scope of the current study, it can readily be appreciated that such an extension of benefits would project the benefit:cost ratio well above unity. An unofficial report on the 2006 floods in Ethiopia reported 700 lives lost nationally, 242 000 people displaced and very extensive agricultural damage.

More directly, the campaigns on public education and training for awareness and community preparedness (item 8-E in Table 11-10) will not be limited to the districts of the Fogera and Dembiya plains. Although that is where they are proposed to begin, as the program expands year by year, and within the 5-year time-frame of FPEW Phase 2, the program will be introduced to other communities surrounding Lake Tana, and possibly introduced in the Baro-Akobo region.

Finally, there are intangible, non-monetary benefits that will be derived in addition to the quantified reduction in tangible direct and indirect damages. These include reduced loss of life, and personal trauma; increased community confidence and future business investment, greater productivity deriving from lower incidence of malaria and other water-borne diseases (human and livestock), *etc*.

The Ethiopian sub-program is advocated on the grounds that in the national, regional and community interests the benefits may be confidently expected to justify the necessary costs.

2.9.3 Dongola, Sudan

This relates to mainly urban flood damages in the provincial city of Dongola in Northern state of Sudan. Damages incurred in a flood of 1% AEP are estimated to be US$25.24 M, comprising $15.9 M direct damages and $9.3 M indirect damages. Total damages incurred in a flood of 5% AEP are estimated to be US$4.52 M. Based on these figures, AAD in Dongola is estimated to be US$1.215 M.

The estimated cost of flood protection works in Dongola at 2006 prices is $2.494 M, and their PV assuming an opportunity cost rate for capital of 10% is $1.910 M.

The benefits to accrue from this measure include the value of all damages up to the design standard of the structure. As the incremental depth of flooding between floods of 1 in 25 and 1 in 100 annual probability is less than one meter, and the damages escalate rapidly beyond AEP 5%, it is assumed that the structure should be designed to a 1% AEP standard. If damages only up to 1% are considered the estimated benefits are $1.089 M per annum on average. Over 30 years at an opportunity cost rate of capital of 10%, the PV of these benefits would be $10.27 M.

Compared to the PV of Project inputs required to achieve this outcome, $1.910 M as stated above, the benefit:cost ratio is 5.37.

From this analysis, the benefits derived would only need to be a small fraction of those estimated to justify the estimated expenditure. Alternatively, the damages themselves would have to be over-estimated by a factor of 5.371, which is very improbable according to the information available. Another way of looking at it is that, if the estimates of the benefits are sound, expenditure of 5.37 times the estimated Project cost, or up to $13.4 M, could be justified [particularly considering that there are intangible benefits (non-monetary benefits) such as loss of life, business confidence, *etc*., that will be derived]. These deliberations go towards demonstrating that the ratio of benefits to costs is robust.

Despite this convincing outcome, preliminary investigations are very strongly recommended in advance of firm commitment of Project funds. Among other matters identified for investigation, it will be essential that a geotechnical audit and topographical survey be undertaken during the preliminary investigations, followed by a preliminary design sufficient to estimate and quantify the extent of works with acceptable accuracy for cost estimation purposes. Provision has been made in the Project budget for expenditure of $251,000 on preliminary investigations.

2.9.4 Gambella, Ethiopia

Gambella is a provincial capital city of 30 000 on the banks of the Baro River in south-west Ethiopia. Damages incurred in a flood of 1% AEP are estimated to be US$7.10 M, comprising $4.3 M direct damages and $2.8 M indirect damages. Total damages incurred in a flood of 5% AEP are estimated to be US$1.13 M. Based on these figures, AAD in urban Gambella is estimated to be US$330,000.

Benefits derive from the single measure recommended for structural flood protection works separating the city from the Baro River and its tributary the Jejebe. The estimated cost of this measure in FPEW Phase 2 at 2006 prices is $2.259 M, and its PV assuming an opportunity cost rate of 10% for capital is $1.737 M.

The benefits to accrue from this measure include the value of all damages up to the design standard of the structure. As the incremental depth of flooding between floods of 1 in 25 and 1 in 100 annual probability is not great, and the damages escalate rapidly beyond AEP 5%, it is assumed that the structure should be designed to a 1% AEP standard. If damages up to only 1% are considered the estimated benefits are $0.295 M per annum on average. Over 30 years at an opportunity cost rate of capital of 10%, the PV of these benefits would be $2.777 M. Compared to the PV of Project inputs required to achieve this outcome, the benefit:cost ratio is 1.60.

From this analysis, the benefits derived are adequate to justify the estimated expenditure. Alternatively, the damages themselves would have to be over-estimated by a factor of 1.60. Another way of looking at it is that, if the estimates of the benefits are sound, expenditure of 1.60 times the estimated Project cost, or up to $3.61 M, could be justified [particularly considering that there are intangible benefits (non-monetary benefits) such as loss of life, business confidence, *etc.*, that will be derived].

Preliminary investigations are very strongly recommended in advance of firm commitment of Project funds. The preliminary investigations should include topographical survey, revised preliminary design and cost estimation, collation of more accurate property and flood damage data, review of environmental and social issues, and hydrological analysis. Provision has been made in the Project budget for expenditure of $188,400 on the preliminary investigations.

2.10 PROJECT FINANCING PLAN

The overall size of the Project, based on 2006 prices, is approximately US$42.2 M. Over a 30-year project life cycle, assuming a discount rate for opportunity by capital of 10%, the Present Value of investments in the Project is US$35.6 M. As shown in Table 2-8, the Project costs will be financed 5.0% by contributions from the Government of Ethiopia, 3.2%

by contributions of the Government of Sudan, 0.3% by contributions of the Government of Egypt, and 91.5% by international lending.

Table 2-8: Project Financing Plan

	International Lending	Government of Ethiopia	Government of Sudan	Government of Egypt
US$ M	38.64	2.13	1.35	0.12
Percentage	91.5%	5.0%	3.2%	0.3%

The key assumptions in calculating the project cost and financing plan are:

- Unit rates for works and equipments are based on estimates derived from various sources, including rates for recently completed works in the Sudan and supplier costs adjusted for international delivery.
- All unit costs for consultancies include per diems, management fees, office renting, consumables and other overheads. Travel costs were estimated separately.

Further details are included in Appendix D.

3. Community-Based Flood Preparedness and Action

3.1 INTRODUCTION

An important emphasis of the FPEW Project is to assist people at risk at the community level; and to promote and implement modest-scale but widespread works and activities on the ground that will directly benefit communities at risk, particularly rural and village communities. To that end, the awareness, basic skills and practical knowledge of communities needs to be developed and enhanced. That will require, in the first instance, a program of public education and training that will raise their awareness of flood risk, improve their skills and enhance their knowledge of what they can do to reduce or manage the flood risk to which they are exposed.

Training in community-based flood preparedness and action aims to strengthen resilience of communities at risk from flooding by developing capacity locally, and through partnerships. The program aims to develop skills in a range of capabilities with regard to flood preparedness, flood risk management and post-flood recovery; as well as to strengthen institutional linkages of households to community/village and local government authority structures, and to NGOs, and public services at regional and national levels.

Training will focus initially on selected strategic localities. Through a rigorous process of monitoring and evaluation, it will be progressively refined and extended to incorporate a large number of communities within the flood-prone target areas.

The program is designed as a participatory exercise through which active involvement in trial design of building and construction activities as well as non-structural risk management measures are combined with training in sanitation and health care, *etc*. in order to provide the basis for joint development of sustainable, community-driven action plans to manage and reduce the flood risk to which communities are exposed. Pilot projects implemented within the training program and during implementation of community action plans will be tested *in situ*, and will thus be developed to cater to divergent physical conditions and needs, capacities and potentials of people within the overall Project area.

To support the program, funding must be made available to enable and empower people at community level to implement measures they include in their community action plans for flood risk management and preparedness. Institutional arrangements and management procedures will be necessary to ensure accountability for the disbursement and application of funds made available.

3.2 COMMUNITY DEVELOPMENT NEEDS

Consultations conducted over a six month period, during which several field excursions were undertaken, identified the needs of flood risk communities in the localities visited. These needs are expected to be representative of the needs of communities overall, with the mix of needs for each community varying dependent on the specific features of each locality.

The consultations focussed on flood risk areas in Ethiopia and Sudan that had been identified in previous reports. It is significant that there was widespread acceptance of flooding amongst rural communities as the benefits derived from inundation of agricultural land were seen as outweighing the adverse effects experienced from flooding. In urban areas flooding was seen as an inconvenience to the community which brought with it many adverse effects and very little benefit.

The flood risk and vulnerability of communities due to flooding was seen to be generated from the sources depicted in Figure 3-1.

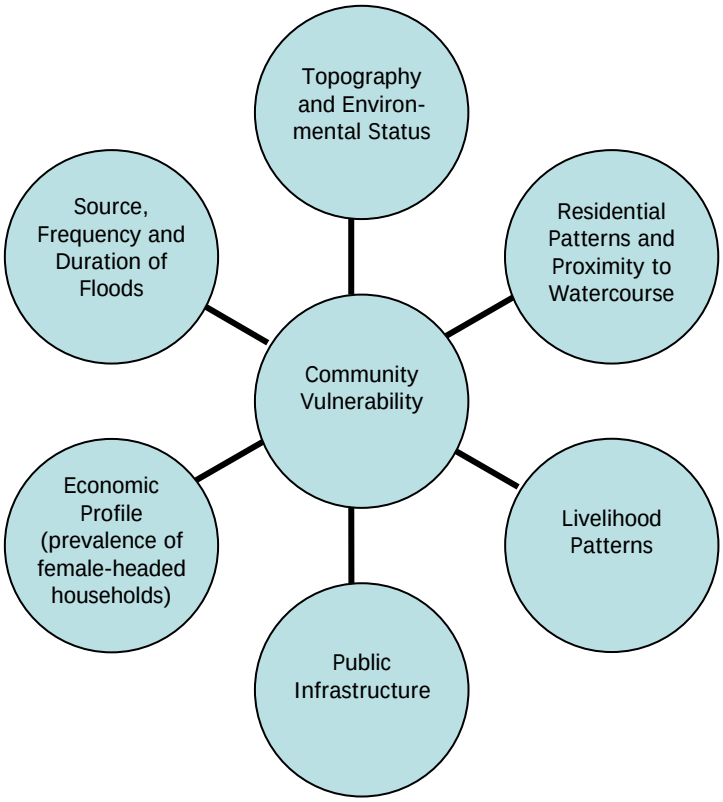


Figure 3-1: Community Vulnerability

A number of drivers were identified in the areas of flood preparedness, flood damage and post-flood recovery that influenced the ability of individuals and a community to respond to floods. These included:

- Flood preparedness
  - local knowledge on the history of flooding;
  - community organisation;
  - household preparation (for example, high beds, food silos);
  - early warning systems based on local knowledge;
  - communications infrastructure; and
  - structural preparedness, such as terraces, drains and levees.
- Flood damage
  - loss of lives, properties and businesses;
  - damage to property, food stocks and businesses

- physical isolation and displacement
- damage to public infrastructure, such as roads and telecommunications;
- loss of economic productivity;
- human and animal diseases; and
- environmental damage (for example, *haddam*, river channel instability, islands).

- Post-flood recovery
  - access to public relief and rehabilitation assistance;
  - rehabilitation of residential buildings;
  - rehabilitation of public facilities and services;
  - rehabilitation of crops and lands;
  - recovery of local businesses;
  - management of water-borne diseases and other disease vectors; and
  - voluntary resettlement (which may generate other social tensions in the immediate or longer term).

It is expected that the community-driven program would provide the community with the awareness, knowledge and skills to undertake actions that would enhance preparedness, limit the damage that arises from flooding and accelerate recovery through self-help and locally-driven initiatives and flood preparedness planning, rather than waiting for the response of relief agencies.

Needs identified in Ethiopia included:

- local early warning systems to enable rapid assessment of potential flood events;
- reliable communications systems to facilitate information sharing, speedy transfer of information and early warning regarding imminent flood events;
- training and education to raise awareness of flood preparedness, community-organized coping strategies during floods and access to post-flood relief;
- disease prevention and health care with a focus on vector-borne and water-borne diseases;
- water and sanitation issues relating to location and operation of water and sewage systems during and after flooding and maintenance of fresh water supply during those times;
- increasing self-reliance within local authorities and communities through institutional strengthening and capacity building;
- small-scale structural interventions to provide flood protection, improve local access and stabilize river channels and stream banks;
- management of post-flood conditions through local provision of resources to meet those requirements;
- better penetration of government and NGO flood management and emergency relief services, particularly to remote areas/communities;
- development of refuge platforms (e.g. earth-fill areas above flood levels) for emergency use during floods;
- development of sustainable house design and construction using local materials and capacity, appropriate technology techniques and raised flooring; and
- innovation of water harvesting/irrigation/cropping systems to allow better exploitation of floods.

The interests of groups within the community in Sudan vary depending on economic capacity and the types of inconvenience experienced: the trend is that lower income groups require livelihood support while higher income groups are looking for preventative interventions.

Needs recognised in the Sudan include:

- building of capacity within regional and local government targeted to the needs of specific local communities, as the disparity between localities is quite marked – some are better prepared, others are ill-prepared;
- communication systems to facilitate information flow and early warning;
- disease control, especially vector-borne and water-borne disease;
- water and sanitation management to address location of facilities, their preparation for flooding, provision of alternative systems during flood events and post-flood interventions to ensure safe water supply and functional sanitation systems;
- building capacity in district and local authority offices to assist in flood preparedness and relief through provision of resources, communication infrastructure and training in disaster relief and management;
- provision of more effective access to flood management and relief services for the community, particularly where access is limited through inundation;
- training to improve the quality of structural interventions implemented at community level;
- development of low cost, post-flood drainage interventions to reduce the impact of waterlogging;
- identification of locations where interventions beyond the capacity of local communities would be more effective (for example, all-weather roads, stream bank stabilization and local drainage systems);
- complementary efforts of the community and government to better utilise resources and improve the technical quality and effectiveness of flood protection measures and access to resources for post-flood rehabilitation;
- structural interventions focused on the improvement of food security through protection of productive lands and the safe storage of food stocks;
- enabling rapid recovery of access to markets;
- development of sustainable house design and construction using local materials and capacity, low technology techniques and better flood-proofing; and
- development of small-scale, low technology water harvesting and irrigation techniques to harness floodwaters and limit the impact of drought in the dry seasons.

The focus of community-driven development is expected to be directed at meeting these needs.

3.3 FRAMEWORK FOR COMMUNITY PROGRAMS

The framework for the programs to work with communities at risk from flooding to prepare and implement community flood risk Management Action Plans (community flood MAPs) can be summarized as follows:

- convening of a specialist group (specializing in flood risk management, disaster management and preventative health care management) – referred to as the expert group;
- preliminary preparation by the expert group of training materials;
- training of extension training teams;
- dispatch of extension training teams to raise awareness and skills of communities at risk and local authorities;
- selection by extension training teams of community Flood Preparedness Action Groups (FPAGs) in each community;
- joint preparation by FPAGs and extension teams of community flood risk Management Action Plans (community flood MAPs);
- training of selected local authority staff in administrative procedures for reviewing and approval of applications for funding;
- preparation by FPAGs, assisted by extension teams and local officials, of applications for funding of implementation of measures included in community flood MAPs;
- a fund administered by ENTRO – or national finance ministries where funds derive from bilateral loans instead of grants through international aid agencies – for disbursement to communities of funds necessary to support the program and implementation of community flood MAPs;
- annual reviews by the expert group in conjunction with extension teams for monitoring and evaluation of the program;
- other administrative and management arrangements to ensure accountability, as explained below;
- revision of training materials to capture lessons learned and practical experience, in the interests of longer term sustainability.

The framework is further elaborated in the log-frame in Table 3-1, and in the following sections of this chapter.

3.4 TRAINING REQUIREMENTS

3.4.1 Community Education and Training Programs

Training in Community-based Flood Preparedness and Risk Management aims to strengthen community resilience in the face of flood risk by developing capacity locally and through partnerships. The program aims to develop skills in a range of capabilities with regard to flood preparedness, flood risk management and post-flood recovery, to strengthen institutional linkages of households to community/village and local government authority structures; and to NGOs, and public services at regional and national levels.

Training in flood preparedness and risk management will be practical and take the form of 'learning by doing'. Because of the high levels of illiteracy in the affected areas, manuals will be prepared pictorially and in local languages, and will become the standard community-based flood preparedness guidelines to be applied throughout all flood-prone regions of the EN countries.

Table 3-1: LogFrame: Strategic Planning for Community-Driven Program

Activity descriptions	Performance indicators	Means of verification	Important assumptions
GOAL: The long-term program goal is to build capacity at community – and local authority – levels in flood preparedness, risk management and post-flood recovery	Improved community capacity to respond to serious flooding with decreasing levels of risk of target groups by management of flood hazard, exposure and vulnerability. More effective community recover y in the aftermath of serious flooding.	Verification based on practical measurement of experiences in relation to indicators of: • Flood preparedness • Flood damage • Post-flood recovery • Flood benefits Rigorous annual evaluation will shape amendments to training programs and training materials to accommodate regional specificities.	**Support of the program by national governments** **Support of the program and cooperation of local authorities** **Partnership between government authorities and NGOs** **Adequate funding support and technical assistance to engender community participation and maintain** community interest and enthusiasm.
PURPOSE: Communities will build self-reliance in flood preparedness and risk management through coordinated practical action and local partnerships. This will relieve dependency on state emergency flood response and post-flood relief services.	Field appraisals will take place at the end of every flood season within the 5-year roll-out of Phase 2 to monitor practical outcomes and community preparedness. Monitoring directed by expert group in association with extension trainers and FPAGs.	Annual evaluation reports by expert group in association with extension teams.	**Coherent specialist expert group can be maintained during the program.**
OUTPUTS: To equip communities and their local authorities with a flood risk Management Action Plan (MAP) to reduce community exposure and vulnerability to flood risks according to the following outputs: FPEW Phase 2: * With assistance of extension training teams, establish Flood Preparedness Action groups (FPAGs) in selected flood-prone communities;	Community flood risk MAPs will provide framework of action. These may be expected to include most or all of the following measures or objectives: • Raised awareness of the services the State has to offer so that communities can better avail themselves of those services to manage their risk; • Strengthen communications infrastructure between affected	Annual evaluation by ToT group in association with Extension Trainers and FPAGs. Implementation of community flood MAPs will be monitored by expert group according to evidence-based appraisals of community actions annually after seasonal floods. Performance indicators will be monitored against baseline	**Effective joint action by FPAGs and extension teams in the preparation of community flood MAPs.** **Adequate training of local authority officials to review and approve applications for funding.** **Willing participation by local authorities and adequate allocation of resources for**

Activity descriptions	Performance indicators	Means of verification	Important assumptions
* FPAGs will assist extension teams to undertake more systematic socio-economic baseline data acquisition in their respective communities; * FPAGs and extension teams will jointly prepare community flood MAPs in which they will identify a plan of action for on-ground works & non-structural risk management initiatives that can be funded by the FPEW Project for implementation by the communities; * Communities prepare applications for funding of small-scale projects to be assessed and implemented in FPEW Phase 2.	communities, local authorities and central agencies to ensure information flow and effective flood warning; * Build culturally appropriate flood-resilient houses and food storage facilities based on low-technology construction methods from locally available natural resources; * On-ground works to modify flood hazard or exposure to flood hazard; * Non-structural measures to modify exposure or reduce vulnerability * Develop effective home-based preventative disease measures and develop primary healthcare knowledge and capacity for post-flood situations; * Strengthen home-based knowledge in basic water and sanitation measures; * Develop low-technology structural mechanisms to minimize loss of income during flood season and to protect agricultural assets.	data collected at the inception of the training program. Numbers of community flood MAPs prepared. Progress on implementation of community flood MAP measures.	**review & approval processes.**
ACTIVITIES: The training program for community-based flood preparedness and action is designed as an incremental program that will be rolled out over a 5-year period. Training scheduling, resources and coordination will be managed by a consultant Project Manager in each country, collaborating with NFPI and relevant national government agencies, and accountable to ENTRO. Training will be achieved by way of a	**INPUTS:** Year 1: * Specialist group for Training Program appointed and set up by consultant Project Manager subject to approval by ENTRO; * Expert group convene to formulate training materials and work plan; * Expert group appoint and train extension trainers; * Extension trainers dispatched to establish FPAGs in designated communities; * Extension trainers appoint and establish first FPAGs & commence	Training focuses on low technology, practical activities (e.g. building of experimental housing/food + water storage facilities, agricultural terracing, refuges, etc.) Methodologies developed result in progressively more comprehensive assessments and implemented more widely at local and national levels A two-part training manual will	**Adequate funding, technical support and administrative efficiency for communities and local authorities to embrace the Program.**

Activity descriptions	Performance indicators	Means of verification	Important assumptions
three-tiered structure: 1) Expert group: comprising cross-sectoral team of local and inter-national disaster management experts. Expert group design the training program and workplan. Expert group in each country will reconvene after each flood season to undertake a comprehensive assessment of training outcomes from the previous flood season; 2) Expert group train extension training teams. Extension teams selected by the expert group from health/disaster management officers from the SRCS or ERCS, respectively; and from local authority offices (mahaliya/ woredas). Extension teams dispatched to designated flood risk communities; 3) Extension teams working in communities select Community-based Flood Preparedness and Action groups (FPAGs). Groups comprise max. 12 volunteers, each of whom represent special interest or action groups within community: women's associations, health groups, agricultural officers, religious leaders, etc.	preparation of community flood MAPs. Year 2: * Training activities and outcomes monitored by expert group who will reconvene soon after the flood season. Monitoring based on evidence-based site inspections, community interviews, feedback from FPAGs and extension trainers, and review of community flood MAPs. Training materials will be amended according to lessons learned from previous year. * Expert group will liaise with extension teams who will then be dispatched to expand training with more FPAGs. Year 3: As above: Training activities and outcomes will be monitored by expert group who will reconvene after flood season. Training materials will be revised according to lessons learned from the previous years. Year 4: As above: Training activities and outcomes will be monitored by expert group who will reconvene after flood season. Training materials will be amended according to lessons learned from the previous year. Year 5: Training will expand to full capacity: 36 communities in Ethiopia and 92 communities in Sudan will be preparing &/or implementing community flood MAPs.	be written by an appointed agency in association with members of the 3-tiered training team at the end of Year 3 / start of Year 4. The manual will focus on: 1) training of trainers, and 2) community-based floor preparedness and action.	

The training framework is proposed for capacity building at the community and local authority levels only. The framework revolves around a participative training process based on knowledge sharing, research and information transfer. The training will focus on community vulnerabilities identified in the knowledge-sharing process and seek to identify low-technology solutions to the needs of communities and individuals/families within those communities, and to identify appropriate planning measures for preparedness and risk reduction.

Expert Group

The experiences gained in the training will be built into a training manual initially prepared by a group of specialists and local professionals with a range of skills and experience in flood management and the management and organization of disaster relief programs (the expert group) who will also be responsible for training extension teams that will work in the field with communities at risk. The community training program will primarily be coordinated by ENTRO with assistance/support of a consultant Project Manager, and the international or regional specialists and local professionals to be included in the expert group and referred to above will be engaged by the implementing consultant on behalf of ENTRO. However, the expert group should include a representative from CDO in Sudan and from DPPA in Ethiopia, as these government agencies will have responsibility at national level for coordinating and administering the public education and community preparedness programs. Specialists from other government ministries may be included in the expert team as appropriate. These experts will spend one month preparing background training materials and prototype micro-mitigation projects to be presented to teams of extension trainers. They will spend a further 1½ months training the teams of extension trainers in the respective countries.

Figure 3-2 illustrates the concept.

Figure 3-2: Training Framework Concept

The international specialists will include individuals with skills in:

- appropriate alternative/sustainable technologies for developing communities;
- flood preparedness and flood risk management; and
- social/environmental development.

The international specialists can be included in the expert groups for both Sudan and Ethiopia.

Input will be provided by the Sudanese Red Crescent Society/Ethiopian Red Cross Society (or alternative) as these agencies have experience in dealing with post-flood relief in their respective countries, and they also undertake community training in the target localities. In Sudan, the SRCS has already initiated a community program, ProVision, directly aimed at community flood preparedness. If the connection can be made with the training programs proposed under FPEW it would reduce risks of duplication and enhance prospects of success.

Specialist local skills will be provided by the CDO in Sudan and DPPA in Ethiopia to enable the local and national institutional arrangements to be linked into the program. However, it is recognized that the commitments involved in delivering the training and awareness programs on the scale envisaged outstrips the resources available to government agencies. A partnership between government agencies and NGOs is therefore proposed as the most effective means of delivering the programs and relieving local and other government agencies of the burdens entailed. Appropriate staff from the NGOs may be included in the expert groups at national level, and if so they would be engaged as part of the implementing consultant team.

Role of Extension Teams

It is expected that many members of the extension teams will be drawn from existing staff of NGOs – particularly the Red Crescent Society in Sudan, and potentially the Red Cross in Ethiopia. Alternatives to NGO staff will include young recent graduates with appropriate qualifications who are willing to spend much of their time working in remote communities with local communities in order to gain career experience. Lower rates of remuneration are assumed for extension team members compared to local consultants who are experienced specialists. Members of the extension teams will be engaged by the implementing consultant.

Training by the extension teams will initially target selected strategic localities. Through a rigorous process of monitoring and evaluation, training will be progressively refined and extended to incorporate an increasing number of communities within the main flood risk areas. In Sudan, where the geographic locations of main flood risk areas are more widely distributed, a larger initial selection of target communities is appropriate.

Community participation through active involvement in trial design, construction and building will provide the basis for a sustainable, community-driven program. Pilot projects implemented within the training program will be tested *in situ*, and will thus be developed to cater to the divergent needs, capacities and potentials of people within the overall Project area.

As the community training program proceeds, communities will be encouraged and assisted to nominate community flood preparedness action groups (FPAGs) or committees, and to prepare community flood risk Management Action Plans (community flood MAPs). These plans should embrace:

- practical measures to reduce community vulnerability caused by exposure to flood hazard considering both non-structural and small-scale structural measures;
- action plans for flood emergencies including early warning provisions, moving damageable portable goods and livestock, protection of water supply and sanitation facilities, hazardous materials, evacuation to appointed refuge sites, liaison with local government services, *etc.*; and
- post-flood recovery measures, including rehabilitation of damaged buildings, general clean-up, repairs to community infrastructure, access to local government assistance and funding sources, NGO support, *etc*.

During their time with communities, extension teams should also tap local knowledge and experience to develop flood intelligence based on past floods that will inform flood risk management planning by both the community and by government agencies (e.g. CDO/DPPA) to anticipate how future floods will happen and when predictable impacts will occur. The flood intelligence data should be entered into a national flood intelligence data-bank maintained by the specialist flood emergency response planning units to be trained and established in CDO (Sudan) and in DPPA (Ethiopia).

Monitoring and Evaluation

In addition to developing and presenting an initial training program, the expert group will return annually after each flood season to evaluate the previous year's community and local training and flood preparedness activities, and to refine the training program based on accumulated experience.

Training Manuals

The training will result in preparation of a community flood preparedness, risk management and post-flood recovery manual based on the input of specialists and the practical knowledge gained from the sharing of information by the trainers and the communities. One part of the manual will be used to capture practical experience of the program as a guideline document for knowledge transfer to future trainers. A second part of the manual will provide communities and families with strategies and guidance on how to manage flooding and minimise the adverse effects of floods applying the knowledge gained during the training.

During Phase 2 of FPEW Project implementation, the training program will be divided into five one-year phases, each building on the previous phase (see section 3.5).

3.4.2 Extension Teams

Extension teams will be selected for each of the flood-affected mahaliyas or woredas initially identified by the Project (see Figure 3-3). Team members may be selected from SRCS/ ERCS branches or from other NGOs. Alternatively they may be drawn from university graduates in Ethiopia and Sudan (for example from Bahr Dar University and the Africa University) whose academic courses have focussed specifically on disaster

management and whose interest lies in this area. Selections will be made by the expert group and the implementing consultant in cooperation with ENTRO and local officials.

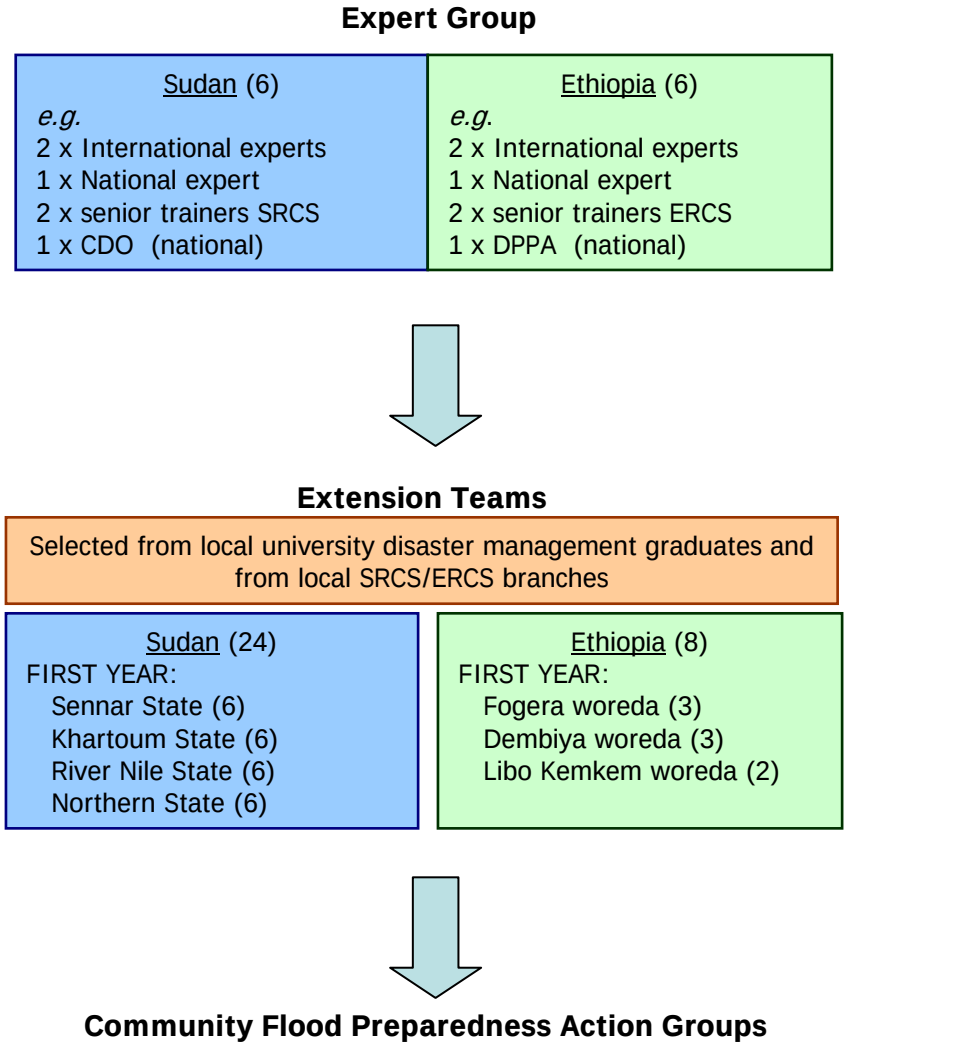


Figure 3-3: Preliminary Program

- Sudan: Due to the large distances between flood-affected areas in Sudan, as well as the high number of affected areas within the 4 target States, it is suggested that 24 extension workers from Sudan be selected to work in eight communities in the first year; and
- Ethiopia: In Ethiopia, where three woredas in Amhara Region will be the initial target of community programs, it is suggested that 8 extension workers will be sufficient to service these areas.

Members of extension teams will undergo training from the expert group for a period of 1½ months in their respective countries. They will then be dispatched to selected communities to work with communities and develop 'Flood Preparedness Action Groups' (FPAGs). These volunteer groups could comprise members of the local district and popular committees, Development Agents, women's groups, school teachers, youth groups, religious leaders, and other members of civil society.

One role of the extension teams will be to identify local skills that are available to provide extension advice to communities wishing to proceed to community-driven development. Where there is a lack of local skills, the trainers will identify with the community leaders where such skills are available outside the community, or will provide those skills in the interim until skills can be developed within the community or hired externally.

3.4.3 Preliminary Training Program

The training teams described above will be formed to enable the training of communities and local government officials in four States of Sudan in the East Nile basin and the woredas in the Abbay River sub-basin around Lake Tana in Ethiopia. They will be trained by the ToT group, a group of international and local specialists, and government and NGO specialists with expertise in flood risk management and disaster relief, as well as the range of skills required to bring community capacity for self-help to a level that will enable communities to prepare and manage their own community flood management action plans and develop their own post-flood recovery mechanisms to enable more rapid response to community needs in each phase of a flood event. Refer to Figure 3-3.

The initial target communities in Ethiopia will be from the Fogera, Dembiya and Libo Kemkem woredas in the Amhara Region. It is not proposed to target any communities in the Gambella Region in the first year or two due to current problems of access, communications and security.

In Sudan, the initial target communities should include Eldaba (Dongola), Dinder, Singha, Atbara and North Khartoum mahaliyas. It is expected that one or two specific communities within each of these mahaliya will be identified for initial training at the inception of the program, and this training will be extended to other communities in subsequent years. The target communities will be identified having consideration for the existing flood risk, community needs and attitudes, institutional infrastructure in the region and the capacity of local public institutions to support the potential demands of the community and the training programs. The institutional capacity building to support the project outcomes is described in Section 4 of the PIP.

3.4.4 Proposed Content of Community Training

Within the main flood risk areas, identification of localities for training will be informed by exposure and vulnerability to flood risk; social development indicators, which include education, health, shelter, employment, transport and communications, energy and water access profiles; as well as institutional capacity within the locality. The training

process will attempt to introduce new techniques while also taking into consideration gender-sensitive needs and traditional wisdoms. [1]

The training objectives are to develop skills and capabilities around flood preparedness, management and post-flood recovery, such as the following which should be captured in the community flood MAPs:

- Knowledge sharing and research
  - intelligence on past floods, their development and impacts;
  - socioeconomic and environmental data;
  - preliminary flood risk mapping;
  - indigenous flood knowledge and warning systems; and
  - participatory community problem-solving.
- Early flood warning and preparedness systems
  - identifying and strengthening existing community capacities and strategies;
  - developing linkages to upstream communities and correlations with river gauges;
  - providing indicator mechanisms to support indigenous knowledge (*e.g.* community staff gauges / peak level indicators);
  - river protection strategies; and
  - micro-mitigation procedures and actions (terracing, house wall fortification, preparation of safe food storage facilities, drainage, *etc.*) ; and
  - communications and flood warning procedures.
- Emergency response and evacuation
  - development of relief request mechanisms;
  - establishment of temporary refuge locations;
  - provision of emergency shelter;
  - building and reinforcing institutional linkages.
- Preventative health care
  - malaria and water-borne diseases and vector control strategies; and
  - water and sanitation safeguard procedures.
- Post-flood recovery and rehabilitation
  - community capacity building and mobilization;
  - establishment of local relief supplies;
  - development of relief request mechanisms;
  - building and reinforcing institutional linkages.
- Development of sub-projects for implementation (community-based small-scale mitigation measures)
  - identifying social and environmental issues;
  - preparation of community-driven sub-project applications;
  - preparation of mitigation plans, as per ESMF; and
  - establishment of a project approval mechanism.

[1] See: Thornton, I (ed.) 1998. "Sourcebook of alternative technologies for freshwater augmentation in Africa". Osaka: The international environmental technology centre of the UNEP.

3.4.5 Training Delivery Mechanisms

The delivery of the training is expected to be undertaken using a range of techniques including:

- exploration of community knowledge using techniques such as community mapping (to become familiar with the various groups within the community, their main periods of activity and their availability to attend training);
- historic timelines (to gain intelligence on the history of flooding in the locality);
- transect walks and sketching of flood inundation maps (to identify the extent of flooding on specific occasions);
- action planning to identify community projects and prepare community flood MAPs; and
- use of a ranking matrix to identify priorities in the work program for implementation of the community flood MAP.

Much of the delivery of the training should be by demonstration and discussion on site, rather than sitting in an unfamiliar classroom-type situation, as this environment is not conducive to learning for village people. The focus would be on 'training by doing' where techniques are demonstrated by the trainer, done jointly by the trainer and trainees, then completed independently by the trainees.

It is proposed that the training will be delivered to each community for a period of one week in every four weeks over the eight months outside the 'wet' season. It is expected that the training will target different groups within the community and the training of target groups will need to be programmed around village activities – that is, when people are not engaged in other livelihood activities, such as food production or child rearing.

The training delivery will be staged to enable the progressive refinement of the training techniques and the identification of communities with the institutional capacity and best social organization and structure to commence development of their awareness and knowledge, and to elicit a willingness to put into action the preliminary plans developed during the initial training.

For this reason, in Ethiopia it is planned to focus on one village in each of the selected woredas with a dedicated extension training team in the first year, which it is assumed could be the second year of Phase 1 implementation of the FPEW Project. The training programme would then expand into another village in the second year and another two villages in the third year, so that up to four villages per extension team should be undertaking training and/or be receiving assistance by the first year of Phase 2 of FPEW Project implementation. The training program should then be expanded by two new villages per extension team, together with follow-up reviews and assistance to previously-trained communities, in each of the remaining years. By the end of Phase 2 implementation of FPEW, with three extension teams, there should be 30 villages that have been trained and have developed and be implementing community flood preparedness and action plans[2]. This expansion will be commensurate with the familiarity of the

[2] This assumes one year overlap between FPEW 1 and FPEW 2.

trainer groups with their materials and techniques required; it also recognizes that much of the training materials and aids required will be developed and tested in the first year or two. By then the trainers will also have conducted one full cycle of training, reviewing the outcomes after the following flooding season, be assisting with the preparation of the first round of sub-project applications and monitoring the implementation of those sub-projects.

It is expected that the training outputs will enable this process to be rapidly expanded in the future phases of the project as the institutional needs are provided and societies recognise the benefit of participation and become conducive to its introduction in their neighbourhood. (In some areas, such as Gambella, other societal issues will require resolution before a training program of this nature can be successfully introduced to communities there.)

In the Sudan a similar development and progression of the training program is proposed. With four larger extension training teams training two communities per team in the first two years (assumed commencement in Phase 1 Project implementation), and then extending to four new communities in the final 5 years of Phase 2 implementation of the FPEW Project, the program would reach 80 communities at risk by the conclusion of Phase 2. See Figure 3-4.

3.4.6 Training Outputs

The following outputs from the training process are proposed:

- training of trainers manual;
- a manual describing the requirements for community-based flood preparedness and action; and
- including guidelines for preparation of sub-project applications and associated planning documents.

3.4.7 Training Outcomes

The training outcomes are expected to be the following:

- An awareness of the mechanisms for resolution of issues identified by the community as requirements for better preparation, management and re-adjustment associated with flooding.
- Confidence within the community that it can manage all the primary actions necessary to minimise the risk of flooding to individuals, families and the community when floods occur.
- The knowledge necessary for the community to make decisions with a degree of certainty that the outcomes of the decision will have a positive outcome on the community.
- Demonstration or pilot projects implemented at village level.
- Techniques for reducing flood risk to productive land, property and living essentials.
- Development of preventative health care systems (such as clean water supply, flood-proofed sanitation systems and biological and physical disease vector controls).

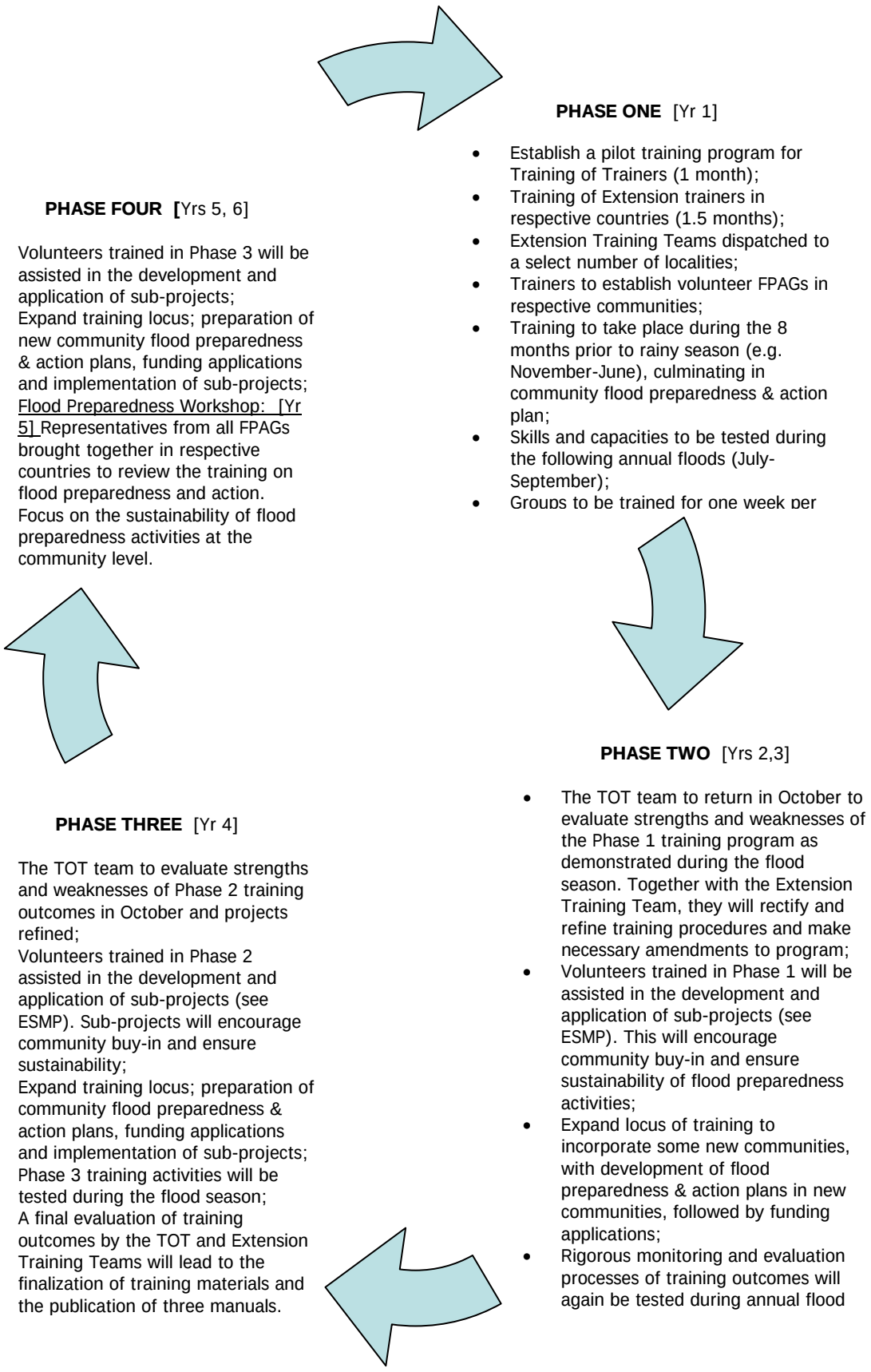


Figure 3-4: Program Development

- Development of local early warning and communications systems.
- Preparation of community flood risk management action plans, with active FPAGs to sustain and implement them.
- The ability of the community to identify, plan and implement projects made possible through outside funding and/or government assistance.
- Greater awareness of government services available for emergency response and post-flood recovery, and how best to avail themselves of the benefits of those services.

3.4.8 Monitoring and Reporting

The progress of training in each community will be monitored from three respects:

- the level of response of the community to the training identified in the post-wet season review;
- the performance of the FPAG in leading the community to address the actions required over the 'wet' season; and
- progress in development by FPAGs of community flood MAPs, and their implementation.

Based on the results of monitoring by the expert group in conjunction with extension training teams, the training framework and/or procedures may be adjusted to improve future outcomes.

3.5 PROGRAM COORDINATION AND MANAGEMENT

3.5.1 Management Arrangements

A fund will be established and administered by ENTRO to support implementation of community-driven flood management action plans, including implementation of on-ground works and flood management planning initiatives at local scale. Applications for funding of initiatives would pass from communities (FPAGs) to Project Coordination Units at State or Region level, then to a National Implementation Unit where approved applications would be forwarded to ENTRO. There is also provision for review of funding applications (and community flood MAPs) by Steering Committees at both State/Region and national level. Greater detail of the procedures proposed for applications, approvals and accountability are presented in following sections of this chapter.

The institutional context for management of the FPEW Project Phase 2 is described under chapter 4 of the PIP, however with respect to management of the programs for public education and community training, Figure 3-5 illustrates the proposed arrangements in broad terms. Where funds are available from bilateral loans rather than grants, the national finance ministry will administer the funds instead of ENTRO.

This model is based on/adapted from successful models used in community-driven development programs elsewhere in the region. For example, other successful community-driven development programs include the Pastoral Community Development Project in Ethiopia, the Sudanese Red Crescent Society's ProVision program, and the ongoing South Kordofan Development Project in rural Sudan. Management arrange-

ments are closely modeled on management arrangements in place for those projects, and in particular on those of the South Kordofan Development Project.

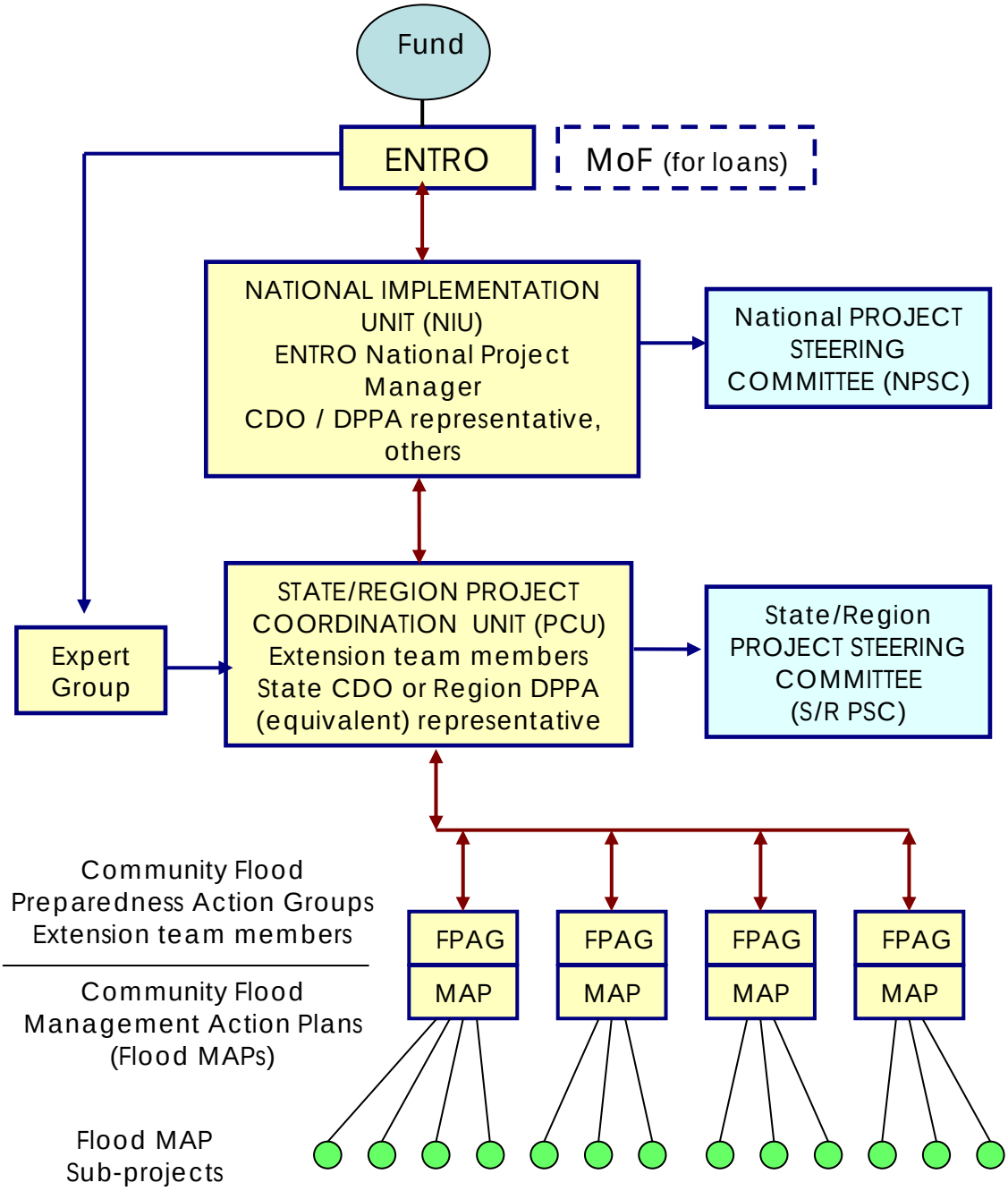


Figure 3-5: Management Arrangements

Project Coordination Unit

The Project Coordination Unit (PCU) at State/Region level will comprise all extension team members working with communities in that State/Region, plus a representative from CDO/DPPA at State/Region level. Their principal function will be to review applications for funding of sub-projects under community flood MAPs, approve or

request modifications, refer applications to the State/Region Project Steering Committee, and pass approved applications on to the National Implementation Unit (NIU). A secondary role of the PCU will be to either provide or facilitate any kind of assistance (technical, financial, environmental, equipment hire, etc.) that communities (FPAGs) may require either in the preparation of their plans and proposals or in implementation of their sub-projects. The PCU will operate a bank account with multiple signatories in which funds released by ENTRO will be deposited for disbursement to FPAGs to implement their sub-projects. In turn, the PCU can receive any assistance it requires from the expert group, which will review performance of the PCU (including management of its accounts) and the work of extension teams in communities annually.

State/Region Project Steering Committee

Members of the State/Region Project Steering Committee (S/R PSC) will comprise local officials at mahaliya or woreda level, plus a representative from CDO/DPPA at State/ Region level. Applications for funding would be referred to the S/R PSC by the PCU for their review. The primary purpose of referral is to keep local authorities informed of planned initiatives so that community-based programs complement their own local programs. A S/R PSC could only object to an application and request its rejection or modification on grounds that it conflicts or is incompatible with its own programs, or if they can raise valid environmental objections. They could, of course, offer advice to the PCU as they see fit.

National Implementation Unit

The National Implementation Unit (NIU) will be chaired by the national Project Manager appointed and engaged by ENTRO (refer to chapter 4). Other members will include the National Flood Coordinator – presumably a representative of the NFPI for the FPEW Project; and a representative of the national agency responsible for disaster management and emergency response (i.e. CDO or DPPA). The national Team Leader of the implementing consultant should also be invited to attend all NIU meetings. An important function of the NIU will be to review and approve applications for funding forwarded to it by PCUs in the States/Regions. They may also request modifications to proposals in applications if they see fit. Applications approved by the NIU will be referred to the National Project Steering Committee before forwarding to ENTRO for release of funds. The NIU will operate a bank account in which funds released by ENTRO will be deposited for subsequent disbursement to PCUs.

National Project Steering Committee

Members of the National Project Steering Committee (NPSC) will comprise government agency officials at national level. These should include as a minimum the National Flood Coordinator (representing the NFPI for the FPEW Project, a representative from CDO/ DPPA at national level, a representative of the national finance ministry, and representatives from other agencies as appropriate (e.g. for review of compliance with environmental, rural development and other policies). The National Working Group (NWG) appointed for the broader FPEW Project implementation could assume the role of the NWIU if appropriate (see chapter 4 for description and role of NWG). Applications for funding would be referred to the NPSC by the NIU for their review. The primary purpose of referral is to keep national government authorities informed of planned initiatives so that community-based programs complement government programs and policies. A NPSC should only object to an application and request its rejection or

modification on grounds that it conflicts or is incompatible with government policies. They could, of course, offer advice to the NIU as they see fit.

The formal procedures are depicted schematically in Figure 3-6.

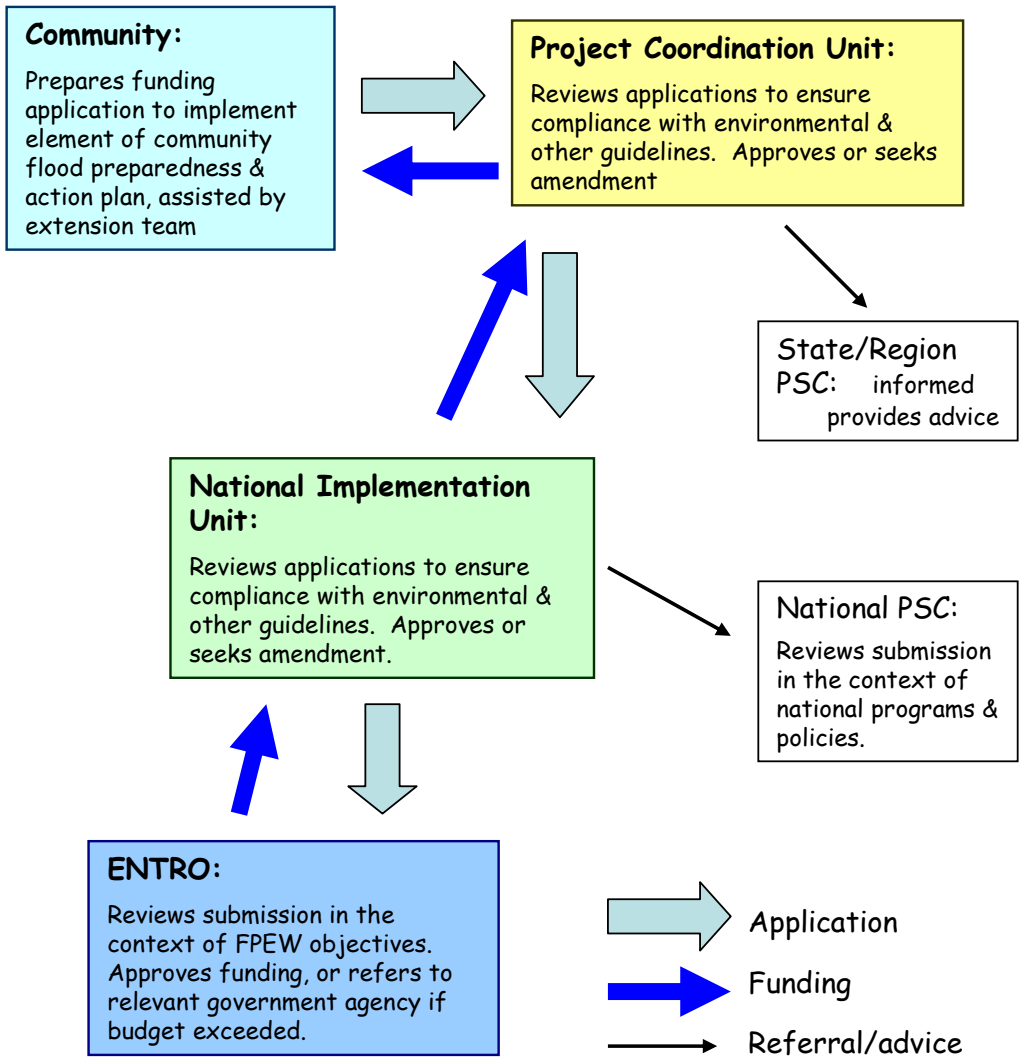


Figure 3-6: Proposed Procedures for Approval and Funding

Accountability would be ensured through requirements for progress reporting by the PCUs and NIU, and accounting for expenditure by communities to their PCU. Further details of the procedures proposed are included in following sections, and in the ESMF.

Other institutional strengthening works will also be undertaken under FPEW Phase 2 implementation to build capacity and initiate adequate management systems and communications between national, state/region and mahaliya/woreda levels of government to complement community-driven programs, and so that flood warnings issued by governments are disseminated effectively to communities at risk.

3.5.2 Review and Approval of Community-Driven Projects

The training process described above will jointly prepare with communities flood risk Management Action Plans, which will generate a prioritised list of sub-projects within communities which the community consider will most assist their flood preparedness, and self-management during flood events and post-flood recovery. The community flood MAP is expected to be more community-driven, with on-ground works and non-structural flood management planning initiatives being identified at community level by the FPAGs.

With the assistance of the extension teams, the communities with prepare sub-project applications to request funding for sub-projects to be undertaken. These applications will explain the purpose of proposed sub-projects, and be accompanied by planning documents to meet the requirements of the ESMF and any other planning requirements that may apply.

Projects will be planned in consultation with village authorities. The project applications will then be reviewed by local officials on the S/R PSC and be approved by the State/ Region PCU. Prior to approval of a project, the PCU comprising members of all extension teams and a State/Region representative of CDO/DPPA or equivalent would review the project and the planning documents provided with it to ensure the sub-project satisfies all the legislative requirements for environmental protection at district, regional and national levels and addresses all the relevant environmental safeguard policies of the WB or other funding agency. This process is described more fully in the ESMF.

3.5.3 Sub-Project Preparation, Approval and Implementation

This section describes the process to be used to provide the assurance that flood risk reduction/management objectives are met, and environmental and social concerns are properly addressed in sub-project preparation and take account of institutional arrangements and procedures both in-country and applied by funding agencies. The background training documents prepared in advance by the expert group will include information on eligibility of projects being sought.

Preparation and Application

During sub-project preparation, jointly with their extension teams, communities will address environmental and social concerns. The extension teams will comprise people who have been working with the communities to build awareness, knowledge and capacity to address flood risk management issues at a community level. The focus of the sub-projects will be flood risk management, with the environmental and social effects of the sub-project, particularly in relation to safeguard policies of funding agencies and national, regional and local environmental and social policies, legislation and regulation.

A checklist is provided in the ESMF. This checklist provides communities and extension teams with some keys to identify potentially adverse environmental and social effects of the sub-project.

The role of the extension team is to facilitate the development of the sub-project application and to provide the community with expert advice on flood risk management

techniques and mitigation of adverse environmental and social effects. The extension team will assist the community to prepare additional planning documents (*e.g.* EMP, RAP, IPP) to accompany sub-project applications.

The Environmental Assessment checklist and its accompanying documentation should be attached to the sub-project application as an annexure to the main document. In some cases, it may be appropriate to gain approval in-principle for the project (from the NIU) prior to preparation of additional planning documents, thus avoiding an investment in time and resources for a project that did not fit other criteria of application. However, funding for the sub-project will not be provided until all planning documents are provided, approved and disclosed, as described in the ESMF.

Where it is considered additional planning documents are required (following completion of the checklist), the community leaders and extension team should consult with the local authorities to confirm the need for and secure resources to carry out the work. They should also confirm the process for approval of the planning document, as this may require involvement of other agencies at state/regional and national levels (*e.g.* for an EMP which triggers an issue of significance identified by the national environmental protection agency).

Preparation of planning documents may require resource material and community participation in preparation of the documents.

There may be situations where project-funded technical assistance may be required. In these situations, sub-project funding may need to be multi-staged. Initially funds may be sought for specialist technical assistance. Such assistance may be available through the local specialist teams working with the implementation consultant, for example, or from national specialists. These situations would include, for example:

- where land must be acquired for the sub-project, or someone's access to resources they are accustomed to using is changed (the need for a RAP must be identified);
- a sub-project involves changing access to resources in a park or protected area (the involvement of affected people influenced sub-project planning and the benefits they derived);
- a sub-project may affect a protected area or a natural habitat (describe how the project will avoid causing adverse effects on the area/habitat);
- an indigenous group may be adversely affected by a sub-project, or benefit from it (prepare an IPP);
- the use of pesticides is included in a sub-project (PMP is required).

Appraisal And Approval

The appraisal of a sub-project application will be undertaken by the PCU which includes a State/Region representative of CDO or DPPA (or its Region equivalent), and will be reviewed by the PSC including staff members of local authorities. The procedures used by the PCU and PSC need to take into account approval requirements by higher levels of authority, at region/state and national levels in relation to environmental and planning approval/permitting procedures. These requirements will also need to be reviewed when the sub-projects are aggregated at national level by the NIU and NPSC.

As a guide to the institutional interests that may have approval requirements for sub-projects, a summary is provided at Table 3-2.

Table 3-2: Referrals

Institutional Interest Area	Referral for Approval
Agriculture	Pesticide Management Plan (agro-chemicals)
Communications	Telephone and radio communications
Cultural affairs	Indigenous Peoples Plans
	Management of archaeological materials
Environmental protection	Environmental management plan
	Trigger items for EA provided in national/regional guidelines for assessment, waste management
Health	Pesticide Management Plan (disease control), waste management
Land use planning	Resettlement, master planning
Transport	Roads, water transport
Water resources	Water supply, stream and river bank erosion, levees, drainage
Wildlife conservation and management	Works in protected areas or in areas with threatened species, access to protected areas

To clear a sub-project application for approval, the PCU should:

- Conduct a desk-top appraisal to ensure the minimum required information has been provided to describe the measures proposed, their location, intended purpose in relation to flood risk management, anticipated outcomes, *etc.*; and that potentially adverse effects have been considered and that measures are provided to address them adequately;
- Refer any project for consideration to higher authorities where the project triggers an interest of those authorities (*e.g.* pesticides are proposed for use in disease control, or the project is listed on the environmental protection agency list of trigger projects; see also Table 3-2);
- Identify projects that require field appraisal before the application can be considered further (criteria for field appraisal are described in Table 3-3). Where projects trigger the interest of another authority, it is appropriate to include that authority in the field appraisal process, as well as representatives of the PSC and the FPAG and extension team submitting the application;
- Following receipt of external clearances from institutional interests, refer the applications to the NIU.
- Draft recommended approval conditions and implementation supervision requirements for consideration by the NIU and NPSC.

Table 3-3: Institutional Interests

Criteria	Field Appraisal
1. Land must be acquired for a sub-project, an individual or community's access to land or available resources is restricted or lost, or any individual or family is displaced	A field appraisal determines the scale and level of impact. A Resettlement Action Plan (RAP) may then be required according to procedures detailed in Section of the ESMF.
2. A sub-project may restrict the use of resources in a park or protected area by people living inside of outside of it, and affect their livelihoods	A field appraisal determines if sub-project planning is adequate to ensure that the livelihoods of potentially affected people will not be adversely affected, as provided for in Section of the ESMF.
3. A sub-project may affect a protected area or a natural habitat	A field appraisal determines if the sub-project will adequately avoid adverse effects on the protected area or natural habitat, as provided for in Section of the ESMF.
4. A sub-project may have an impact on ecologically sensitive ecosystems (e.g. wetland or marshes)	A field appraisal determines the scale and level of impact. The application may need to be revised to describe how the sub-project will avoid or minimize adverse impacts to ecologically sensitive areas. This may require a distinct Environmental Management Plan (EMP) as outlined in Section of the ESMF.
5. Indigenous people may be adversely affected by a sub-project, or could benefit from it	A field appraisal determines the potential impacts and benefits to these people. An Indigenous Peoples Plan (IPP) may be required for avoiding negative impacts to these people and for including them in the benefits of the sub-project, according to the requirements described in Section of the ESMF.
6. A sub-project will involve or introduce the use of pesticides	A field appraisal determines the scale and level of the concerns. If needed, a Pest Management Plan is prepared according to the requirements of Section of the ESMF.
7. A sub-project may involve, or result in: • Diversion or use of surface waters; • Construction and/or rehabilitation of latrines, septic or sewage systems; • Production of waste (e.g. slaughterhouse waste, medical waste, etc); • New or rebuilt irrigation or drainage systems; or • Small dams, weirs, reservoirs, wells, or water points.	A field appraisal determines the scale and level of potential impact. The application may need to be revised to avoid or minimize potential adverse effects, and may include an Environmental Management Plan as outlined in Section of the ESMF.

Having approved a program of sub-project activities, the NIU will forward it to ENTRO for funding. ENTRO will have a budgeted allowance for the community sub-project program. The community sub-projects funded will be based on the funding available and those projects with highest priority will be funded immediately. ENTRO may seek supplementary funding from other funding agencies for specific classes of sub-project that may be well received by a funding agency and attract specific purpose funding, or ENTRO may refer these proposals to the National Working Group of the FPEW Project (refer to chapter 4) or National Focal Point Institution (NFPI) for funding from national or donor fund sources.

Tiers of Funding

The following tiers of funding are tentatively proposed:

- up to $5,000
- $5,000 - $50,000
- over $50,000

It is proposed the funding provided to communities is limited to $5,000 in the first year of funding for a village, and that funding is progressed tier by tier annually if the villages demonstrate a capacity to use and manage the funds effectively.

Sub-Projects Eligible for Funding

The expert group should establish prototype sub-project activities at the inception of the program. However, the following projects are proposed now as funding candidates:

- village level early warning systems – gauging posts, flood markers, with the potential to be linked to flood forecasting and flood risk mapping developed under other FPEW Project activities;
- low-technology stream bank protection,
- levees (terraces) less than 500 m in length and one metre in height,
- earth platforms elevated above natural ground level for storage of grain and livestock, placement of homes, and for temporary refuge,
- reinforcing earth-walls of houses,
- provision of corrugated iron and collection drains to promote water harvesting,
- elevated access ways for access during periods of inundation, not exceeding 500 m in length,
- local communications systems – mobile/satellite phones and radios,
- drains and terraces,
- voluntary resettlement of homes affected by stream bank erosion,
- engineered stock watering points in areas susceptible to bank erosion,
- access to and secure water supply points for use during periods of flooding,
- secure food storage facilities,
- secure refuges for people affected by flooding,
- village land use plans reflecting flood risk management and security against the impact of flooding,
- water harvesting and conservation for use in household water supply during periods of inundation,
- flood-proofed sanitation systems,
- household water purification systems,
- land-forming to promote drainage of ponded water,
- creation of ponds capable of use for aquaculture, whilst managing mosquito breeding by biological control,
- boats for use in emergency evacuation.

Sub-Projects Not Eligible for Funding

The following types of sub-projects are expected to be excluded from funding:

- activities already covered in programs for which other sources of funding have been provided, or those already included in other national, regional or local public development programs;
- acquisition of equipment for government services;
- administrative buildings,
- religious infrastructure; and
- local headquarters for groups, cooperatives or executing organizations.

Sub-projects for which local capacity would need to be demonstrated prior to financing include:

- local or secondary roads;
- dams and weirs;
- use of pesticides and agro-chemicals; and
- sub-projects which may affect sensitive ecosystems, such as wetlands, forests and other unique habitats.

A summary of main project types that would be eligible is presented in Table 3-4; however, the table is a preliminary guide and should not be interpreted prescriptively to preclude other initiatives that may derive from community consultation provided initiatives have merit in flood risk reduction or management.

Table 3-4: Summary of Small-Scale Flood Preparedness Projects that may be Developed Within Community Programs

Place	Program	Activities + Materials	Budget Threshold per item
All flood-risk areas	Human Resources	Information sharing: baseline data and social and environmental risk mapping; Identify vulnerable households/ individuals (pregnant, elderly, young children); Formalise community-based plan of action for flood preparedness.	$1,000
	Communications:	Based on access to telephones and mobile phone radius, develop or improve access through introduction of mobile phones to key people or expand access of kebele satellite telephone system(Ethiopia) or to more members of the community. Similarly, distribute (wind-up?) radios to key people who will be responsible for monitoring broadcast weather/flood forecasts and communicating information to the FPAG. Introduce system of village flood markers & gauging posts to enable villagers to monitor flood development and correlate to upstream river gauges.	$5,000
	House construction [including internal furnishings: *e.g.* high beds]	Directed by expert in Alternative/Sustainable Building (ToT team), build a number of model houses based on appropriate and affordable technologies. Houses constructed from locally available materials, and designed to reflect local climate and culture. Focus on resource and energy efficient designs based on sustainable construction techniques. Participation by FPAG team (and other volunteers) in building process is essential. House	$5,000

Place	Program	Activities + Materials	Budget Threshold
		fortification with flood-proofing measures. Where *haddam* is prevalent in Sudan, may include model resettlement pilot programs to relocate homes from areas at greatest risk.	$20,000
	Food silos	As above, design + build experimental, effective elevated food storage facilities using local resources. In Sudan, dense settlement means that centralized food storage may be appropriate.	$5,000
	Small-scale elevated earth access ways	Design pathways along strategic land contours to enable community members to access vital social services during flooding.	$5,000
	Drains and terraces	Design & build small-scale structural interventions to maximize drainage of flood waters back into rivers, wadis or lakes. Pumps for relieving water-logging. Terraces may be considered as integral to rice production (Ethiopia); experiment with aquaculture and water harvesting.	$5,000
	Preparation of refuges	Construct earth platforms elevated above flood level for storage of grain, corralling of livestock, placement of homes, or reserved for temporary secure refuges during flood emergencies. Earthworks may be combined cut & fill to create fishponds, rice paddies, drains, *etc*.	$20,000
	Water conservation and health	* Build more effective wells to withstand serious inundation; * Experiment with water purification and storage techniques based on roof-catchment ferro-cement water-tanks to maximize domestic water storage capacity [save women from having to walk long distances to collect safe drinking water][3]; * Focus on home-based care will include introduction of simple water purification and conservation techniques; * Sanitation & health education (focus on water management for malaria and diarrhoea prevention); * Management of waste products/residual wastes during flooding.	$20,000

3.6 MONITORING AND REPORTING

3.6.1 General

An effective performance monitoring program should consist of the following elements:

- monitoring objectives;
- description of performance indicators with linkages to outcomes and outputs;
- description of parameters to be measured, methods to be employed, frequency of measurements, and definition of thresholds that will signal the need for remedial actions;
- institutional responsibilities, timing and timescales for monitoring;

[3] Roof tanks used in Laikipia District, Kenya, are large enough to store all domestic drinking, washing and cooking water for up to 2 months. See Rodda, Annabel, 1993. Women and the Environment. In Women and World Development Series, Zed Books.

- reporting arrangements (to the regulatory authorities and the WB); and
- costs and financing provisions.

Monitoring objectives must clearly spell out the questions to be answered by measurement activities. They also need some baseline from which assessment can take place. It is expected this baseline will be determined during the collection of baseline socio-economic data as part of the training needs analysis for each community (gathered during the knowledge sharing in the initial part of the community training program).

Once the monitoring objectives have been established, both the immediate outcome of the project (for example, reducing the loss of buildings and food supply) and the longer term effects (such as the reduced costs associated with flood recovery) should be monitored.

The monitoring program should clearly show the linkages between specific outcomes identified in the sub-project application and indicators measured to determine the effectiveness of implementing the sub-project (for example, do flood markers installed in the village improve the village response to the likelihood of flooding). These linkages should be demonstrated in a way that can be readily understood by decision-makers. It is not essential to report complete details of monitoring. In some cases further collection of baseline data may be necessary. Nevertheless, the sub-project application should describe the process through which monitoring arrangements will be agreed. Associated costs, funding and institutional needs (training, legislative or regulatory) required to complete the project should be identified. The costs (including need for specialised personnel, equipment and materials) are integral to the sub-project, and therefore will need to be factored into funding requests. In some instances, it may be identified that funding needs to be provided in two stages to enable the specialists to undertake their work prior to the community completing its tasks.

Any monitoring program requires assignment of responsibilities. The task of assigning roles can be aided by the use of the matrices developed to show linkages between outputs and monitoring. This can help establish the appropriate level of expertise for particular tasks, and in assigning functions to different organizations. Cross-checking can be facilitated by comparison of results from different communities.

The recipients, structure and intended usage of monitoring reports should be clearly identified. It is imperative that the reporting structure ensures that inadequacies are rapidly brought to the attention of the appropriate decision makers, to facilitate timely corrective actions. In addition, the structure, content and timing of reporting to ENTRO and the WB should be designed to facilitate supervision and provide background for WB missions.

Adherence to the monitoring and reporting schedule should ensure that the necessary additional training can be completed in a timely and satisfactory manner. It should also assist personnel involved in monitoring and supervision (particularly where responsibilities change), by providing a succinct summary of the agreed sub-project requirements. Refusal to disburse funds unless work is done in compliance with the sub-project plan should be a standard sub-project condition that can be added to the funding agreement.

Monitoring may also reveal unanticipated effects. Effective supervision ensures that corrective action is taken commensurate with the scale of such effects. This can significantly influence project costs, which underlines the importance of accurate and timely reporting. Thus redesign or mobilization of contingency funds may be required where deficiencies are observed or unforeseen conditions arise.

3.6.2 Annual Reviews

Annual reviews will be carried out. General reviews of the community training programs and community flood preparedness and action plans will be conducted by the expert group.

Annual reviews of specific sub-projects, their progress and outcomes may be conducted by a third party (*e.g.* an independent local consultant, NGO or other service provider) that is not directly involved in the sub-project.

Annual reviews should be undertaken after annual reports have been produced and before WB supervision missions visit the Project.

Objectives

The objectives of annual reviews of sub-project implementation are two-fold:

- to assess sub-project performance in complying with lodgement of applications and the approval procedures, learn from experiences gained, and improve future performance; and
- to assess the occurrence of, and potential for, synergistic sub-projects due to sub-project and other project activities.

The annual reviews are intended to be used by the project management team to improve procedures and capacity for integrating resources and management effort into all project tasks. They will also be a principal source of information to Bank supervision missions.

Performance Assessment

The overall scope of the performance assessment work is to:

- assess the adequacy of the sub-project approval process and procedures based on interviews with sub-project participants, examination of records, and the overall performance of a sample of approved sub-projects;
- ensure accountability for funds disbursed, compliance with good practice, and the integrity of the program implementation;
- assess the adequacy of roles and responsibilities, procedures, forms, information resource materials, etc.;
- assess the needs for further training and capacity building;
- identify key risks to the sustainability of sub-projects; and
- recommend appropriate measures for improving performance.

The following tasks will be typical during Performance Assessment:

- Review central and local (community and approval authority) records of sub-project preparation and approval (*e.g.* applications; screening checklists; EMPs, RAPs, PMPs and IPDPs; appraisal forms; approval documents), as well as related studies or reports on wider issues of resource management in the country;
- On the basis of this review, conduct field visits to a sample of approved sub-projects to assess the completeness of planning and implementation work, the adequacy of design, and compliance with required actions contingent with project approval. The sample should be large enough to be representative and include a substantial proportion of sub-projects that had (or should have had) a field appraisal during annual reviews. Sub-projects in sensitive natural or social environments should especially be included.
- Interview extension team members and local officials responsible for sub-project appraisal, approval and review to determine their experience with sub-project implementation, their views on the strengths and weaknesses of the approval process, and what should be done to improve performance. Improvements may concern, for example, the process itself, the available tools (*e.g.* guidelines, forms, information sheets), the extent and kind of training available, and the amount of financial resources available.
- Review the disbursement of funds and expenditure.
- Develop recommendations for improving performance of community-driven development sub-projects.

Cumulative Effects

This part of the annual review assesses the actual or potential cumulative effects of training and sub-project implementation with other sub-projects or development initiatives on the receiving communities. Cumulative effects can result from a number of individual activities that, together, generate a significant impact. For example:

- The integration of national flood warning systems with development of local communication networks set up through community developed sub-projects to expedite the transfer of information regarding flooding from the national forecasting centre to individual communities and households.
- The transfer of information gained in the knowledge sharing in the training process to provide flood intelligence to regional and national emergency response and relief agencies to improve the flood emergency planning and post-flood relief and recovery.
- The monitoring and recording of flood gauge levels during flood events and transfer of that information to national agencies for use in the flood management database.

The function of this assessment is primarily as an 'early warning' system for potential cumulative effects that might otherwise be passed over through lack of coordination. It will be largely based on the observations of people interviewed during the field work, and trends that may be noted by district or regional officials. Where cumulative effects are detected or suspected, recommendations will be made to maximize benefits to be gained, perhaps through more detailed study to clarify matters and what should or could be done with them.

Qualifications for Conducting Annual Reviews

The reviews should be undertaken by the expert group, assisted as necessary by individuals or small teams with training and experience relevant to the likely issues to be encountered. They should also be familiar with the methods and practices of effective community consultation, and with typical methods and processes for preparing, appraising, approving and implementing small-scale community development projects.

Timing

Annual reviews should be undertaken after the annual report has been prepared and before Bank supervision of the Project, at the closing of each year of the Project. It is suggested the review will form part of the post- 'wet' season assessment of the training program. It is expected that each review would require 3 to 4 weeks of field work (interviews, examination of sub-projects), and that the review report would be completed within two weeks of completing the field work.

Outputs

The principal output is an annual review report that documents the review methodology, summarizes the results, and provides practical recommendations. Distinct sections should address: a) sub-project performance; and b) cumulative impacts. Annexes should provide the detailed results of the field work, and summarize the number of approved sub-projects by district, and their characteristics according to an approved annual report format

3.6.3 Reporting

Communities are normally required to report annually on their sub-project activities during the preceding year. The content of these reports should include:

- A performance and compliance report which describes the performance and compliance with conditions placed on the project and implementation requirements prescribed; the report should include all implementation and financial monitoring reports, outcomes observed and a discussion of lessons learned in project planning, implementation and operation.
- Level of community involvement and contribution to the project, both directly and in-kind.
- Level of technical assistance from outside the community required.
- Lessons learned regarding management of environmental and social issues.
- A record of sub-project transactions and expenditure.
- A dissertation of experience and issues year-by-year.
- Information to assist the annual review process.

3.6.4 Public Disclosure

Public disclosure is a requirement of most funding agencies for all environmental and social documentation developed for a project. Before a sub-project is approved, EMPs, RAPs and IPPs are required to be made available for public review at a place accessible to local people (*e.g.* at a district administration office) and in a form, manner and language that can be understood by local people. They are generally also forwarded to the funding agency for disclosure at information centres in the relevant country offices and through the agency's website.

However, it is also good practice to disclose information about a sub-project progressively through the planning of the sub-project, including information regarding approvals and levels of funding obtained, and the role of the sub-project within the flood MAP program formulated by the community. Thus, there is benefit in disclosing the intent of the sub-project to the community early in its inception stage and receiving input from the community regarding the proposed sub-project. This enables feedback, not only about issues to be addressed in the required planning documents, which will assist in development of an improved project concept and community plan with greater acceptance and ownership within the community.

The disclosure process should also provide adequate time for people to receive information about the project prior to any opportunity to input into the project development process, thus enabling people to present informed considered debate on issues that arise.

3.7 CAPACITY BUILDING AND INSTITUTIONAL STRENGTHENING

3.7.1 Introduction

The sustainability of WB projects that involve funding multiple, small-scale sub-projects is highly and unavoidably dependent on the capacity of communities and local and national authorities to carry out the associated design, planning, approval and implementation work. Thus, to ensure that capacity, it is vital that a Project allocates sufficient resources to training, capacity building and technical assistance, especially in the early years. These efforts will not only benefit the Project and the communities at risk, but will also build local capacity to undertake other development initiatives funded locally or by other donors.

3.7.2 Institutional Capacity Assessment

The institutional capacity to address the community-driven sub-projects across the EN basin varies across and within each jurisdiction. All three national jurisdictions have formed agencies to address flood preparedness, management and relief in each country. Responsibility is generally spread across agencies rather than being the focused responsibility of one agency. However, there is only limited capacity below the national level of government to address sub-project approval and review requirements, although there are often laws promulgated at state/regional level to provide for local requirements.

Resources dedicated to project management are limited in all jurisdictions. As a consequence there is little capacity to monitor sub-project performance at local levels or across districts. Thus there is a need to support institutional groups to implement the intent of this community development initiative and to monitor the performance of the sub-projects. Accordingly, the national programs included for FPEW Project implementation rely strongly on extension teams to be engaged by the implementing consultant, and include elements for the training and development of institutional capacity at local (woreda/mahaliya or State/Region) level of government to enable these institutions to perform review functions consistent with the program for public training and community flood preparedness outlined above.

Outside of government, there is significant capacity within NGOs, private consultants and academic institutions to assist the community to develop and monitor sub-projects. The requirement for the Project will be to co-ordinate those resources to make them available to the community through extension teams and consulting inputs. This will also relieve the burden on poorly resourced local government agencies. Within the overall Project budget, resources have been identified to meet this need.

All jurisdictions have administrative procedures to assist the review and implementation of sub-projects. Many of these procedures are administered by ministerial interests, such as agriculture, water and mines, but can be co-ordinated into an approval process through Project Steering Committees working in liaison with PCUs at local levels and with the NIU at national level. Necessary institutional and administrative arrangements to adequately manage the program for public training and community flood preparedness within the context of FPEW Phase 2 implementation are included in the following chapter.

4. Institutional Framework

4.1 INSTITUTIONAL ARRANGEMENTS FOR PROJECT IMPLEMENTATION

4.1.1 General Introduction

The proposed Institutional Framework for project implementation is designed to deal with the range of policy, executive and operational actions needed for the effective and efficient implementation of the project. It takes into account the project management requirements for donor-assisted projects, typically for World Bank-financed projects. These are:

1. Steering arrangements at strategy/policy level; project management arrangements including progress monitoring and activity review; and procurement and accountability procedures at the implementation levels.
2. Coordination and cooperation arrangements among the implementing agencies in each country and between agencies in different countries.
3. A secretariat to provide a focal point and support for the project's administrative, financial accounting and documentation services.

Accordingly, the key institutional arrangements proposed are as follows:

- High level cooperation to be achieved among the three countries (Ethiopia, Sudan and Egypt) through a Project Steering Committee (PSC) to provide the necessary authority to realize the objectives of the Project as agreed and incorporated in the Project Implementation Plan (PIP);
- National Working Groups (NWG) appointed and coordinated by a National Focal Point Institution (NFPI) to provide close linkage, continuous interaction and effective co-ordination among the National Agencies and the State/Region Governments involved in each country in the implementation of the project;
- A Regional Working Group (RWG) to facilitate improved data access, sharing and partnership among all agencies associated with flood management in each country in the Eastern Nile Region; the intention is also thereby to enhance each other's capacity to better accomplish its organizational mandate.
- A Project Coordination Team, or project secretariat, to function as the administrative hub for project management and steering support by providing accounting, administrative and documentation support to the PSC and RWG.

The PSC and RWG/NWGs are intended to smooth the progress of the development of formal systems for flood mitigation planning, flood forecasting and warning, and flood preparedness and emergency response in accordance with Project objectives stated in the PIP; and

The PSC and RWG will also facilitate the development of professional exchanges to foster opportunities for cooperative actions among the three countries to merge national perspectives, increase mutual trust and confidence, and ultimately lead towards a cooperative regional agenda for water management in the Eastern Nile.

4.1.2 Project Coordination Team

The FPEW Project Coordination Team will be appointed by ENTRO and headed by its senior coordinator (presently the Regional Flood Coordinator). It will comprise members from the Regional Flood Coordinating Unit (RFCU) to be set up by ENTRO during Phase 1 of FPEW Project implementation, including as a minimum the RFCU manager; and will include at least one member from ENTRO's accounting and financial management team. The RFCU manager will be responsible for managing routine implementation of the Project, both at regional and national levels.

In future, subject to an internal institutional analysis, ENTRO may establish a Projects Implementation Coordination Unit (PICU). If and when this occurs, the PICU should be strongly represented on the FPEW Project Coordination Unit.

The RFCU is being set up during Phase 1 implementation, initially in Addis Ababa, and then to be established in Khartoum as soon as necessary agreements and institutional arrangements are completed. It is envisaged to have a core staff of three regional specialists, with support from local administrative and technical staff. The three regional specialists are to include the RFCU manager (or RFC), an IT/GIS specialist and a hydrologist. In Khartoum it will have a national accounting/ financial management officer working in liaison with ENTRO's accounting and financial management team in Addis Ababa. The RFCU should also have the services of a data communications specialist – either a full-time national, or available on contract – as data communications will be a key role related not only to establishment of a regional flood database, but also related to expansion of the real-time data acquisition network for flood forecasting.

The responsibilities of the RFCU will be to launch the FPEW Project and coordinate its implementation and management, to develop protocols and guidelines for data sharing, financial management and procurement at regional level, and to provide a platform for experience sharing and knowledge transfer. It will coordinate with national governments, implementing agencies, donors and implementing consultants in relation to the FPEW Project and in relation to linkages and common activities with other relevant regional projects; and coordinate flood-related data collection, information exchange and analysis.

ENTRO is established in Addis Ababa under a Headquarters Agreement with the Government of Ethiopia, which awards to ENTRO the legal personality, privileges and immunities of a regional organization. The ENCOM approved legal status of ENTRO (December 2002) invested ENTRO with the legal personality to perform the functions entrusted to it, including the power to receive and administer grant funding, in the territories of all three EN countries. ENTRO was designed as an NBI institution by Nile-COM (Extraordinary Nile-COM Meeting, Addis Ababa, Ethiopia, and September 12, 2003). In December 2006, ENCOM meeting no.20 confirmed that the proposed RFCU will be established in Khartoum.

ENTRO will be the recipient of the World Bank grant funds. ENTRO together with EN countries will manage Phase 1 and 2 of the FPEW project and thus be responsible for the coordination of all activities, procurement of equipment and consultants, and management of funds. ENTRO together with the EN countries will have final responsibility for the quality of outputs and will work in close cooperation with both the World Bank's Nile Team and with identified National Flood Coordinators (NFCs) in the MIWR (Sudan), MWR (Ethiopia) and MWRI (Egypt) in supervising the activities.

4.1.3 Implementing Agencies

The Project will cover all three Eastern Nile countries and comprise a multi-state, multi-agency project.

Activities at national level would be supported and coordinated by the NFPI, represented by national project coordinators. This is consistent with general ENSAP arrangements. Countries will provide counterpart staff to support project activities within their territories.

The RFCU manager in ENTRO will liaise with the nominated NFPIs, represented by national coordinators, who will manage and supervise the implementation mechanisms within their respected countries. As there are several national agencies in Sudan and Ethiopia that can be identified as implementing agencies (IAs), it is expected that in these two countries the national project coordinators will convene National Working Groups comprising representatives from those IAs.

The following implementing agencies (IAs) can be identified:

(a) Ethiopia

- Ministry of Water Resources (MWR)
- National Meteorology Agency, Ethiopia (NMA)
- Disaster Prevention and Preparedness Agency (DPPA) and
- the Bureaus, Departments and Desks with a role in flood mitigation, warning and emergency response at the regional and woreda levels in the Regions of Amhara and Gambella.

Other institutions with which coordination would be necessary during project implementation are: a) Ethiopian Mapping Agency, b) Ethiopia Electric Power Corporation (EEPCo), c) Ministry of Information, d) Federal and regional road authorities, e) municipalities, f) Ministry of Health and g) agricultural enterprises.

(b) Sudan

- Ministry of Irrigation and Water Resources (MIWR), particularly the Nile Waters Department (Khartoum) and the General Directorate for Planning
- Sudan Meteorological Agency (SMA), particularly the Forecast and Observation Branch
- Civil Defense Organ (CDO)
- Humanitarian Aid Commission (HAC), particularly the Planning, Coordination and Follow Up and Information & Training Units
- Khartoum State – Engineering Affairs Department
- Northern State – Engineering Affairs Department

(c) Egypt

- Ministry of Water Resources and Irrigation (MWRI), including the Nile Forecasting Center, Nile Research Institute and Nile Protection Sector.

4.2 OVERALL INSTITUTIONAL FRAMEWORK

The proposed management structure will facilitate management functions at the three levels:

- Strategy and policy;
- Project management, coordination and review, and
- Project implementation.

The overall institutional structure for implementing the project at the National and State level is summarized in Table 4-1.

Table 4-1: Overall Institutional Structure

Management Level	Regional (EN), National (Federal) & State
Strategic & Policy	Project Steering Committee (PSC)
Project Management, Co-ordination and Review	RWG, NWGs (in 3 countries)
Implementation	Project Secretariat, Implementing Agencies
Administrative support	Project Secretariat

The overall organization chart showing the institutional arrangement for implementing the project at the National and State level is given in Figure 4-1. The diagram assumes that funding is provided from donors to the EN region through the medium of The World Bank (the funding agency). A possible alternative is that some projects within the national sub-programs for FPEW 2 may be funded through bilateral agreements; that alternative is provided for in section 4.2.8.

As in Project Preparation, the RFC (or RFCU manager) will play a key leadership role. He/she will be supported by a National Flood Coordinator (NFC) in each country designated by the national government. It is assumed the NFC will be a representative of the NFPI.

In view of the activities involved and potential workload, ENTRO will also appoint and employ full-time a Project Manager in each country to be attached to the NFPI for the duration of the Project. Each of the three national Project Managers engaged by ENTRO will provide essential support to the relevant National Flood Coordinator (NFC) designated by the national government, and will play key roles in NWGs, as described below. Each national Project Manager will work within the NFPI to coordinate all activities in the national sub-program of FPEW implementation in cooperation with implementing agencies and implementing consultants, and will liaise with the RFC on regional aspects.

4.2.1 Project Steering Committee

This will be the apex level management body for the Project providing strategic and policy guidance for project implementation.

The requirements for PSC membership include:

a) authority to represent the national government in the areas of water resources, floodplain management and disaster prevention, preparedness, rescue and recovery; and

b) availability to participate in project monitoring as necessary and to attend steering meetings at least two times a year.

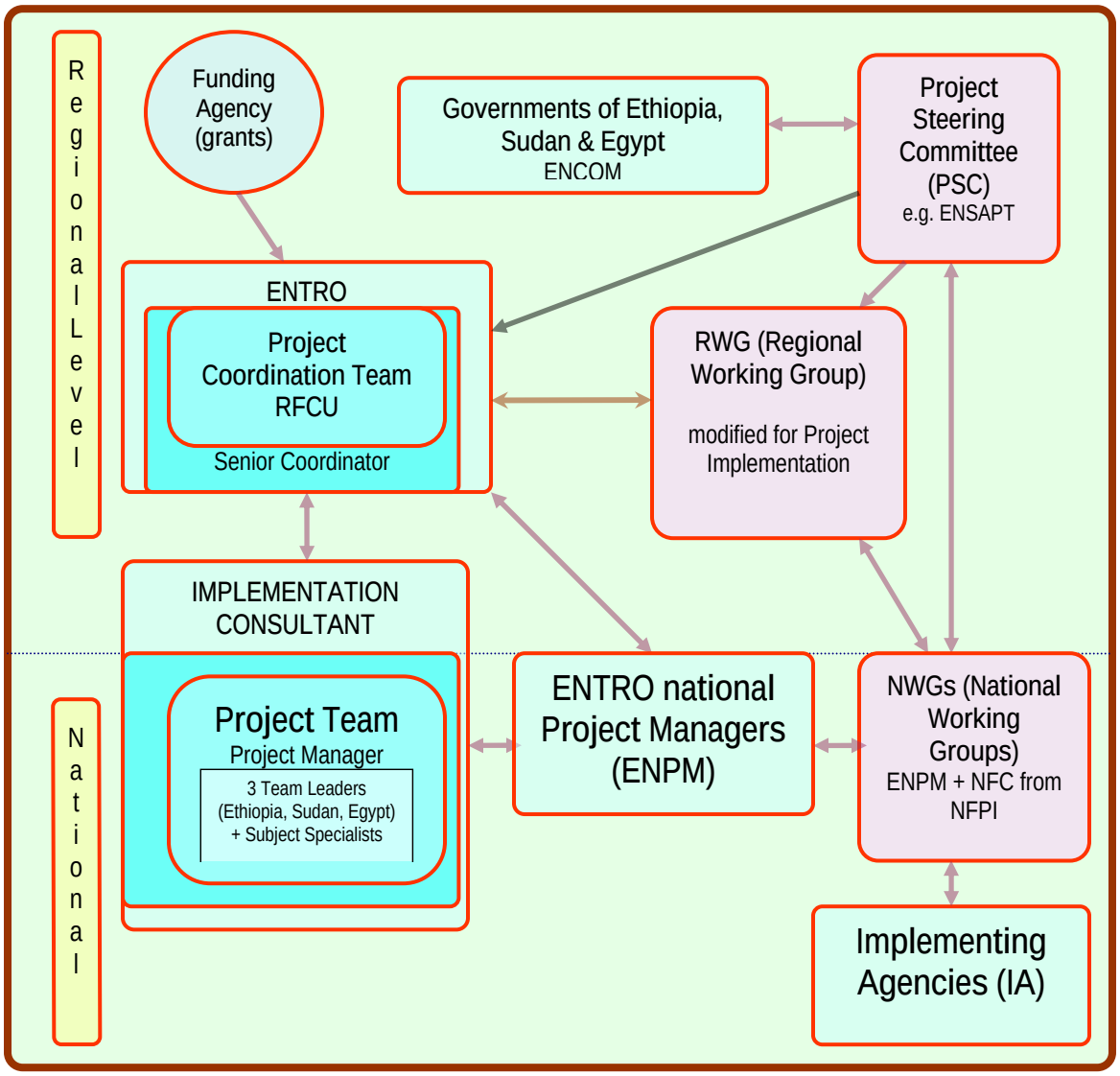


Figure 4-1: Overall Institutional Arrangements for Project Organization and Management

It is proposed that the ENSAP Team (or ENSAPT) undertake the role of PSC – or, alternatively, that the PSC be drawn from current members of ENSAPT. The PSC will meet as often as required but at least two times a year. It will report directly to national governments or ENCOM.

Key Roles

PSC will provide strategic supervision, policy guidance and steering support for to assure successful project implementation. The key roles are:

- To provide policy direction for project implementation
- To exercise overall administrative, management and financial control of the project through review of project progress

- To periodically review and approve the membership of the Regional Working Group (RWG)
- To consider and approve any changes/variations to the PIP
- To deliberate and ratify decisions not resolved at the level of the RWG

4.2.2 Regional Working Group (RWG)

The functions to be performed by the RWG are:

- Technical support to the PSC
- Reviewing and monitoring progress of project implementation for reporting to the PSC
- Recommending policy and standardization on implementation issues to the PSC
- Co-ordination of NWGs to achieve consistency in their activities.

The RWG will meet as often as required but will meet at least once in a quarter. It will report to the PSC. It must also liaise with the RFCU representing ENTRO.

It is recommended that the existing Regional Working Group be endorsed as the RWG for the Project Implementation. The make-up of the RWG should include members drawn from the National Working Groups (NWGs) in order to be able to represent their concerns at RWG meetings. It will comprise the following members:

- Three members from each country, one of whom must represent the Ministry dealing with water resources management, the second representing the peak disaster management agency and the third as decided by the respective NWGs. The NFC should be one of the three members.
- The RFC.
- Invitees to RWG meetings will include: other NWG members as necessary; the heads of the international movements and NGOs (e.g., Red Cross in Ethiopia and the Red Crescent in Sudan) contracted for community training and capacity building activities; the three ENTRO-appointed national Project Managers; and the Project Manager of the Implementation Consultant.

4.2.3 National Working Group (NWG)

The key role of the NWG will be to coordinate project activities among the various implementing agencies in each country. In view of the activities involved and potential workload, ENTRO will appoint and employ a Project Manager in each country to be attached to the NFPI for the duration of the Project. The national Project Manager engaged by ENTRO will provide essential support to the National Flood Coordinator (NFC) designated by the national government. It is assumed the NFC will be a representative of the NFPI. The NWG will be chaired and convened by the ENTRO-appointed Project Manager. The NFC will appoint other members of the NWG in consultation with all national implementing agencies and the Ministry of Finance (or its equivalent).

The functions to be performed by the NWGs are to:

- monitor physical and financial progress relating to technology and technical aspects of all project components; and suggest remedial /corrective measures;
- advise the RWG on policy, standardization and guidelines;
- review the annual work plan and report results to the RWG;

- consider changes/deviations to the planned national program, if any, and seek approval of RWG/PSC;
- interact with State Level agencies on project related activities;
- constitute special purpose Working Groups/Task Force/ Technical Advisory body(s) for specific technical/data aspects of project with clear defined time-bound program and deliverables;
- review the activities/deliverables of any specialist Task Forces/Working Groups set up by itself / RWG/PSC; and approve honorariums in respect of specialists who participate in them;
- review the work and recommendations of the Red Cross, Red Crescent and any other NGOs engaged for project activities;
- assist implementing agencies in screening and approving purpose-driven studies identified in the PIP;
- monitor and review, quarterly, the progress of such studies and report semi-annually their progress to the RWG/PSC;
- co-ordinate technical training.

The make-up of the NWG should be such that it comprises members drawn from the IAs in order to be able to report progress and to present their concerns about any difficulties that are being encountered in implementing project activities. there should also be a represent-ative of the Ministry of Finance or national equivalent. The NWG will report any issues that are unable to be resolved by it to the RWG and PSC.

4.2.4 Implementation Agencies (IAs)

Implementing Agencies (IAs) undertaking operational functions to implement project activities assigned to them; as well as to employ the IA's own project management systems to monitor and report financial and physical progress in accordance with the funding agency's requirements. The IA will also undertake procurement and contract management functions.

Thus, in addition to the direct implementation function of the project activities assigned to them, IAs will also undertake the following functions:

- Carry out procurement and contract management functions associated with the purchase of goods and services specified in the PIP
- Monitor physical & financial progress of the project activities assigned to it; report any slippage in the work program and remedial /corrective actions instituted
- Review conflicts, if any, in respect of detailed specifications, tender documents, tender evaluation etc and suggest way forward
- Consider changes/deviations to the planned project program, if any, and seek approval of NWG/PSC
- Constitute special purpose Working Groups/Task Force/ Technical Advisory body(s)for specific technical/data aspects of project with clear defined time-bound program and deliverables
- Review the activities/deliverables of the specialist Task Forces/Working Groups; and approve honorarium in respect of Experts who participate in the deliberations of Working Groups/Task Force/Working Group.

4.2.5 Project Coordination Team

The hands on day-to-day administrative, accounting and documentation support for the NWGs, RWG and PSC will be undertaken by a special-purpose Project Secretariat in ENTRO. An important member of the Project Coordination Team will be an Accountant familiar with World Bank requirements for Financial Monitoring Reports (FMRs), annual accounts and reimbursement applications.

On the accounting side, the Project Coordination Team will be supported by two accounts assistants who have experience in bookkeeping and auditing and familiarity with reporting of public finances in Ethiopia and/or Sudan. On the administration side, the Project Coordination Team will be supported by two administrative assistants who have experience in the organizational and clerical work of project offices in Ethiopia and/or Sudan receiving funding from multi-lateral or bilateral development agencies or international NGOs. Secretarial services, including documentation and library services, will be provided by an experienced operator of Microsoft Office software and an office assistant with printing, reproduction and binding skills.

Office equipment including photocopiers, fax machine, desktop computers and peripherals are budgeted for. Provision is also made for funds for an office vehicle and operation and maintenance costs for it, the office and office equipment. It is assumed that the Project Coordination Team will primarily be housed with the RFCU, however details of the accommodation can be left to the discretion of ENTRO.

ENTRO/RFCU will be accountable to the funding agency in relation to activities funded by grants from international lending agencies, and will also report to the PSC.

4.2.6 Implementation Consultants

The Implementation Consultants will be the principal providers of Technical Assistance recommended in the PIP. Technical Assistance will be provided in all areas where a gap of capacity will be bridged by hiring consultants who will assist ENTRO and the IAs in implementing the different Project elements. The consultancy support will not be just of an advisory nature but will include joint technical and management activities to provide adequate technical transfer, as well as actual execution of technical tasks in some areas where particular expertise will be required. However, in all cases, the methodologies to be adopted by the consultants will be such that there is effective transfer of technology and internalization of competencies within the IAs – or within ENTRO, as the case may be. The Implementation Consultants will be directly responsible to the RFCU in ENTRO, and will liaise closely with ENTRO-appointed national Project Managers.

The different consultancy supports required for project implementation are summarized in Table 4-2. Note that the table does not include every element of the program set out in section 2.6. There are several elements of the regional sub-program for which consulting inputs are minimal or absent.

Integration or Disaggregation

Ideally, because of the need for integration of the program for Phase 2 FPEW Project implementation, there should be one Principle Consultant that would work closely with ENTRO and the NFPIs to manage and coordinate the numerous Project elements. That would be desirable from several points of view:

Table 4-2: Consultancy Support Services

Cluster	Project Elements	Consultancies
A	1-R	Management unit support for ENTRO
B	1-E	Flood risk mapping, Ethiopia
	1-S	Flood risk mapping, Sudan
	2-S	Associated hydrological analysis & hydraulic modeling
	4-EG	Assistance with flood risk mapping, Egypt
C		
C1	3-E	Support for establishment of Flood Forecasting Center, Addis Ababa
	6-E	Capacity building at DPPA, Ethiopia
	7-E	Capacity building at NMA/MWR regional offices
	4-S	Capacity building at MIWR, Sudan – Reinstatement of flood forecasting system
	7-S	General capacity building at MIWR
	8-S	Capacity building at SMA
	1-EG	Upgrade Nile Forecasting Center, Cairo
	2-EG	Technical studies related to flood forecasting, HAD
	3-EG	Revision of flood forecasting procedures
C2	4-E	Capacity building at DPPA, Ethiopia
	5-E	Capacity building at regional & woreda levels for flood warning & response
	9-S, 10-S	Capacity building at CDO, Sudan
	11-S, 12-S	Capacity building at HAC, Sudan
C3	8-E	Project management & technical inputs for program of public education & training for community awareness and preparedness, Ethiopia
	6-S	Project management & technical inputs for program of public education & training for community awareness and preparedness, Sudan
D	2-E	Network of reporting river & rain gauges in Ethiopia to support national & regional flood forecasting
	3-S	New river gauging stations, Sudan
	4-S	New reporting weather stations, Sudan
E		
E1	15-S	Investigations of river hydraulics and sediment transport modeling, Khartoum
	5-EG	Field sampling program & sediment transport modeling of pilot reach in Egypt
E2	16-S	Pilot study on bank erosion and stabilization, Sudan
F	10-E	Land management planning, Bahir Dar
	14-S	Land management planning, Khartoum
	6-EG	Pilot land use management plan, Egypt
G	9-E	Flood protection works, Gambella
	13-S	Flood protection works, Dongola
Note:	Cross-reference to section 2.6, Tables 2-1 to 2-4	

(a) There are important linkages that need to be established between separate elements in the program for Project implementation in the interests of the integrated operation of the flood risk management strategy. This particularly concerns the elements relating to data acquisition networks, flood forecasting centers, capacity building for

flood emergency response arrangements and flood warning dissemination, capacity building for operations and maintenance of data acquisition networks, and flood risk mapping. These should become components of a well-integrated system, and there are clear advantages in having one Principal Consultant to coordinate implementation of these numerous Project elements.

(b) Project implementation would benefit from having an experienced international consultant with appropriate background in flood management and project management working alongside ENTRO's units responsible for project implementation, financial management and regional flood coordination and providing technical and administrative/management support.

Appointing one Principal Consultant should not preclude the appointment of other consultants for certain elements of the program for Phase 2 implementation where other specialist capabilities are required. Depending on skills/experience available, separate consultants or sub-consultants might be desirable for program elements relating to sediment transport modeling, land use management, waterway management and bank stabilization, field installation of rain and/or river stations, community consultation, *etc*., for example.

Although appointment of one Principal Consultant is preferred, implementation of the program will be dependent on availability of funding. In practice, all of the funding required may not be available at the outset, and it may prove necessary to implement Phase 2 in stages as funds are made available. Even if all the funding required is readily available, it may be derived from different types of sources – *e.g*. funding by international donor organizations channeled through the World bank; or bilateral funding agreements channeled through national governments. In these circumstances, it may be necessary to implement the complete Phase 2 program as a number of packages.

Practical means of packaging and/or sub-packaging the program elements are suggested in Table 4-2. For example, the table shows clusters such as A, B, C, *etc*.; and sub-clusters such as C1, C2, C3, *etc*.; and also shows national groupings within clusters and sub-clusters. This classification provides flexibility, and will be useful if it is necessary to implement the program in packages, and would then provide a sound basis for appointment of multiple consultancies.

Terms of Reference (ToR) have been prepared assuming that a Principal Consultant would undertake the work identified in clusters A and C as a minimum. Separate ToRs have been prepared for the other five clusters in Table 4-2.

4.2.7 Logistical Support

The project will provide logistical support to improve the working conditions and office environments of the IAs. This will include facilities for improved communication between IAs, under which electronic connectivity between the IAs will be established and their personnel trained on electronic messaging (e-mail), groupware and workflow systems. In addition, the provision of personal computers, fax machines, photocopiers and other equipment will also be included, and additional vehicles (purchase or hire) will also be financed. Structured MIS formats will also be designed for exchange of periodic information between participating agencies.

4.2.8 Bilateral Funding Arrangements

The prospect of different sources of funding was noted in section 4.2.6. At the beginning of section 4.2 and in Figure 4-1 the organization for Project implementation assumed funding by international donor organizations, with funding passing through The World Bank and ENTRO and subject to WB regulation consistent with WB operating procedures. Modified arrangements for implementation would be necessary if the Phase 2 program is packaged, and one or more packages is funded by bilateral agreement with funding passing through national government agencies and subject to regulation by the relevant Ministry of Finance and relevant ministerial operating procedures. This is an acceptable alternative, and modified institutional arrangements for Project organization and management are presented in Figure 4-2.

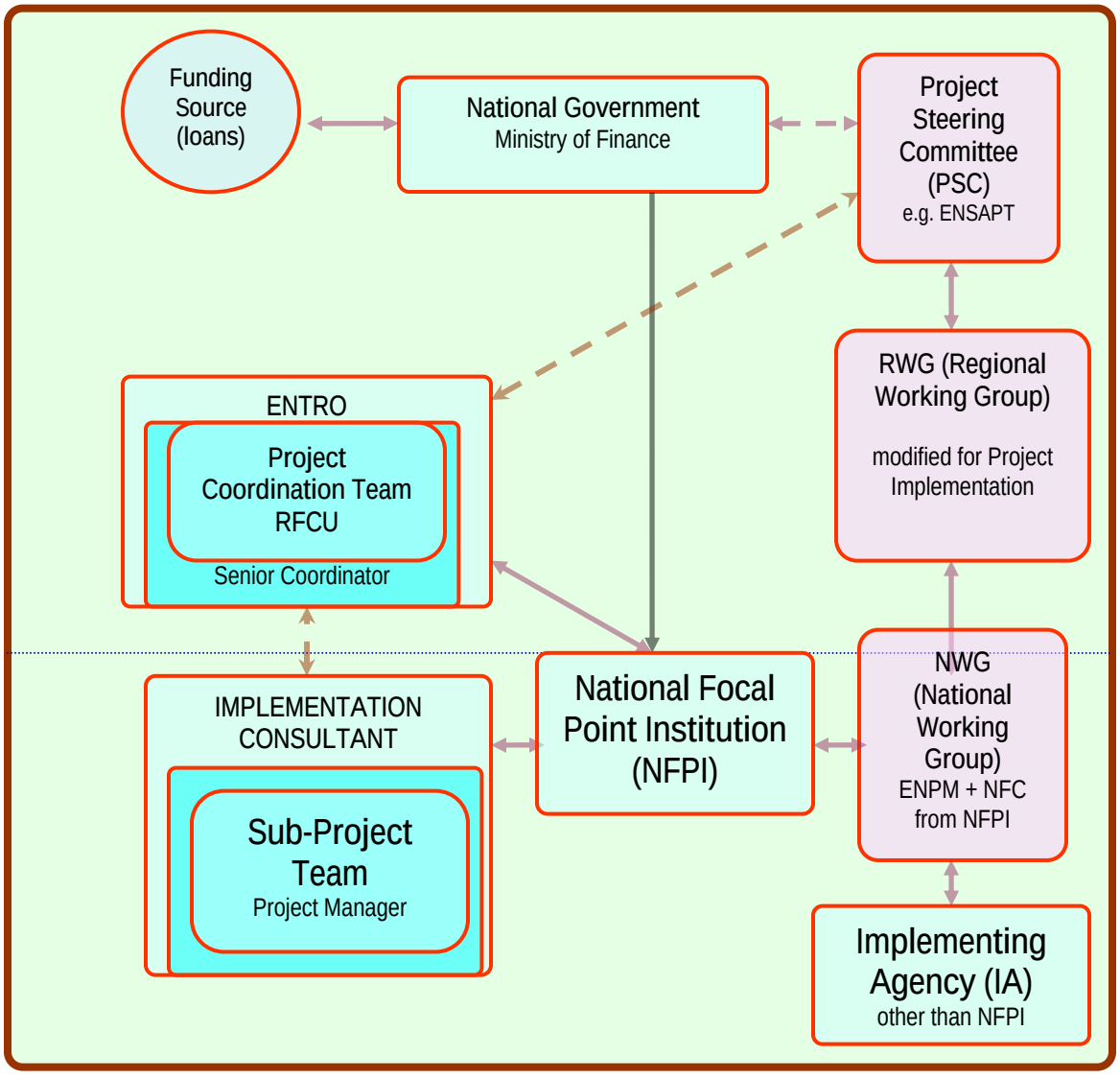


Figure 4-2: Alternative Institutional Arrangements for Project Organization and Management

In this model the national government through its Ministry of Finance (or national equivalent) reports to the funding source and accounts for expenditure of loan funds. The implementation consultant is responsible to the NFPI and reports to the NWG. The NWG reports to the RWG and the PSC. The NFPI is primarily responsible for reporting to the national government and accounting for progress. The NFPI should also be primarily responsible for keeping ENTRO (the RFCU) informed. The ENTRO-appointed national Project Managers on the NWG will provide another conduit for communications to the RFCU. Liaison should also occur between the RFCU and the PSC, and between the implementing consultant and the RFCU.

4.3 STRENGTHENING AND MODIFYING NATIONAL INSTITUTIONS IN THE REGION

Only one new institution, a flood forecasting center in Addis Ababa, is proposed in the PIP. The only changes proposed to existing institutions are the setting up of small but dedicated "flood emergency response planning units" in the Ethiopian Disaster Prevention and Preparedness Agency (DPPA) and in the Civil Defense Organ (CDO) in Sudan. No other major modifications to existing organizations are proposed. There are, however, wide-ranging capacity-building measures recommended; together with pilot programs and new institutional cooperation/coordination requirements to achieve the objectives of the project. (Refer to section 2.6.)

From an institutional viewpoint, the proposed project interventions may be classified on the basis of the principal beneficiaries from them:

1. *For implementing agencies*: Technical information and knowledge building activities that will enable the use of analytical tools (*e.g.*, land management plans, flood intelligence systems, flood modeling, *etc*.) to underpin decision-making processes at the various stages of flood mitigation planning and management.
2. *For floodplain communities:* Pilot activities to develop and strengthen floodplain communities' capacity for self-help to minimize the adverse consequences of floods.
3. *For vulnerable urban communities:* Structural measures to mitigate flooding of human settlements. (The "institutional" feature here is essentially direct technical assistance to strengthen the planning, investigation, design and management of levees.)

Matters of policy development can also be accommodated for policy makers under the regional sub-program using 'joint studies' or 'special-purpose seminars'.

The key points considered in the design and procurement of institutional proposals for the above four types, are as below:

- Capacity building in the institutions and staff development is the objective of the activities that fall under the first of the above four items. The delivery mechanisms for capacity building will be an appropriate mix of direct technical assistance, external providers from the public and private sectors in the EN Region and overseas providers as necessary.
- Pilot activities to work with floodplain communities are designed to promote self-organization and self-help towards developing and implementing community-based flood preparedness plans and to seek better liaison with and effective access to government services for flood management planning, emergency response and post-flood recovery.

- Structural measures are proposed only in Dongola, Sudan and Gambella, Ethiopia, where project assistance will be primarily to support adoption of design and construction standards that meet World Bank guidelines by working jointly with government agencies.

5. Financial Management

5.1 OBJECTIVES

It is proposed that the Project have a financial management framework that will ensure efficient and effective accounting procedures and accountability for all participating agencies. This Project financial management must ensure accuracy, prudence, accountability and transparency at by all participants.

5.2 FINANCIAL CONTROL

5.2.1 International Donor Grants

It is anticipated that international donor organizations will provide funds through the aegis of The World Bank to ENTRO. The World Bank has considerable experience in management of regional projects of this type, and has established operating procedures to ensure accountability and transparency. It is recommended that the implementing agencies adhere to The World Bank's standard recording and reporting system.

ENCOM has invested ENTRO with legal status including the power to receive and administer grant funding in the territories of the three EN region countries. ENTRO will be the recipient of the grant funds, and jointly with the EN countries will manage Phase 2 implementation and be responsible for coordination of activities including management of funds, and procurement of goods and services. ENTRO is responsible for financial management of FPEW Phase 1 implementation, and it should build upon the systems and accumulated experience from Phase 1 in the financial management of Phase 2 implementation.

During Phase 1 implementation, ENTRO will open a special account in US$ at a commercial bank on terms and conditions that are satisfactory to The World Bank. That account can be used for the extension of Project implementation in Phase 2; or alternatively, a second similar bank account can be opened specifically for Phase 2 funds if preferred. The account would be used for the receipt of grant proceeds and disbursement of Project funds to implement elements (sub-projects) of the program. ENTRO will communicate banking details to The World Bank.

ENTRO will be responsible for financial management of the special account. A financial management assessment of ENTRO was conducted by a WB Financial Management Specialist in July 2006, who certified that ENTRO's accounting and financial management systems are adequate for its present level of activity.

It is proposed that, prior to commencement of Phase 2 implementation and at least 12 months after commencement of Phase 1 implementation, that another financial management assessment (or review) be conducted by the WB in readiness for the increased level of financial management activity that will be associated with Phase 2 implementation, and any recommended remedial or strengthening measures arising from the review be acted on in advance of Phase 2 implementation.

During the latter half of 2006 ENTRO acquired new Project Management software with capabilities for management control of large, complex projects. A module is available for

financial management and control, and it is recommended that it should be evaluated, and, if it is well adapted to the purpose, it should be procured, implemented and applied in management of FPEW Phase 2 implementation.

Financial management and control functions will be the day-to-day responsibility of the RFCU, however with respect to these functions the RFCU manager will be accountable to the Financial Advisor to ENTRO and ENTRO's Finance and Administration Unit.

At the national level, the NFPI will be primarily responsible for financial management of project activities under its national sub-program, accountable to the finance wing of the Ministry of Finance (or equivalent). ENTRO will require that the NFPI opens a special account with a commercial bank for the receipt and disbursement of funds transferred to its control, and that all procedures will conform with the standard national procedures and regulations for financial accountability and transparency. As far as practicable, these should be consistent with those of The World Bank, and ENTRO and The World Bank will have the right to review any relevant procedures and regulations at any time.

5.2.2 Loans Through Bilateral Agreements

To complement the donor grants discussed above, there may be elements of national sub-programs that attract loans under favorable conditions through bilateral agreements. If so, modified financial management arrangements will be necessary. These funds would not be channeled through ENTRO (and The World Bank) but would come through the national Ministry of Finance (or equivalent).

In these circumstances, the Finance Ministry would dictate the operating procedures to ensure accountability and transparency, consistent with its standard procedures and regulations. A national implementing agency would be responsible for financial management, including receipt of funds and disbursement of funds to implement elements (sub-projects) of the national sub-program, and reporting to the Ministry of Finance according to its requirements. It is expected that the national implementing agency would usually be the NFPI nominated for the FPEW Project, however there may be particular circumstances or reasons justifying another government institution as the IA for certain sub-projects under the program. If this arises, in the interests of effective coordination and integration of program elements the NFPI should formalize arrangements in advance for the IA to communicate details of expenditure, implementation and progress to both the NFPI and to ENTRO.

Where the NFPI is appointed IA for sub-projects under the program, in the interests of effective coordination and integration of program elements ENTRO should formalize arrangements in advance for the NFPI to regularly communicate details of expenditure, implementation and progress to ENTRO. These reporting requirements should be finalized by ENTRO concurrent with Phase 1 implementation.

5.3 AUDITING

It is proposed that ENTRO will carry out the routine internal audits, with external audits by The World Bank as necessary.

The special account will be subject to regular annual external audit, to be conducted by an external, independent and qualified financial auditor. The audit will be carried out in accordance with international standards issued by the International Organization of Supreme Audit Institutions (INTOSAI) or the International Federation of Accountants (IFAC). The terms of reference for the audit and the selection of auditor shall be approved by The World Bank.

5.4 INFORMATION SYSTEMS

5.4.1 Maintenance of Records

A manual data entry system of recording and reporting expenditures is considered adequate to meet the reporting requirements during the project, but is proposed to be enhanced by a computerized Financial Management System (FMS). This software will be piloted in a one of the countries where the relevant departments have appropriate staff capacity. The system will be web-enabled and will link with the NFPIs in each country. The proposed FMS will meet the reporting requirements of all participating NFPIs, in terms of (i) government financial rules; and (ii) project management needs for monitoring and decision-making. If necessary, a Consultant experienced in establishment of financial management systems may be engaged to establish the FMS at the inception of the Project: the need for this can be established by experience during the implementation of Phase 1.

5.4.2 Financial Manual

If it is deemed necessary, a Financial Manual should be prepared for the participants. It will document a uniform set of policies, procedures and financial reporting arrangements, which will apply to all the participants. It is expected that such a manual would include a Chart of Accounts linking budget headings with the structure of the Project Cost Table; formats of various financial and other reports; internal control mechanisms; a budgeting system; and the auditing arrangements for the Project. The need for this can best be established by experience during the implementation of Phase 1.

5.4.3 Reporting and Monitoring

Financial reporting for the participants to ENTRO will be on a monthly basis. The format will be agreed to between ENTRO and The World Bank. It is proposed that ENTRO will forward half-yearly reconciliations to The World Bank.

5.5 DISBURSEMENTS AND FUND FLOW

It is proposed that ENTRO and the NFPIs will open appropriate special bank accounts, as noted above. The disbursements of funds will be established on appropriate milestones, to be established for each of the elements of the program. It is expected that the disbursement will be made in the traditional system of reimbursement, with full documentation, and against a Statement of Expenditure.

5.6 PROCUREMENT

5.6.1 Objective

This section outlines the procurement plan for the activities proposed in this PIP. Even though there is no firm indication of the funding agency for the work, the plan broadly follows the requirements of the World Bank in view of the reality that a pre-appraisal mission of the World Bank is scheduled to participate in evaluating the PIP along with ENTRO.

5.6.2 ENTRO Procurement Procedures

Procurement rules and procedures developed by ENTRO are consistent with best international practices and they address many of the funding agencies' requirements in principle, particularly those of the World Bank. Procurement actions under this project will follow appropriate World Bank guidelines and procedures. The Bank's latest editions of Standard Bidding Documents (May, 2004) and request for Proposals will be used where required.

A procurement assessment of ENTRO was conducted by the procurement specialist of the World Bank office in March 2006. Recommendations of the assessment have been addressed by ENTRO and are reflected in the Procurement Plan. Key ENTRO staff, including the Procurement Officer (PO) and the Accountant, have attended WB basic procurement training at the Country Office (September 2002). ENTRO is receiving advice and support on procurement actions through the World Bank's Country Office as and when needed and has hired a procurement specialist to assist the PO of ENTRO as per the recommendations of the World Bank. Moreover, a time-bound action plan for further procurement enhancement has been agreed with ENTRO.

Works, goods and services to be financed under the project will be procured in accordance with the guidelines for procurement of the funding agency, including the selection of consulting firms, NGOs and individual consultants. A procurement notice will be published in the appropriate on-line and print versions of journals such as UN Development Business (UNDB) following the finalization of funding arrangements.

The Executive Director of ENTRO will be listed as the contact. ENTRO will use any one or more of the following notification and advertising mechanisms as means for ensuring adequate competition for all procurements under the project:

- PQ (Prequalification Exercises)
- GPN (General Procurement Notice)
- SPN (Special Procurement Notice)
- RFP (Request for Proposal)
- RFQ (Request for Price Quote)
- Short Term Consultancy (Advertisement)

5.6.3 Procurement Methods

The project elements, for the purpose of procurement planning, may be classified under Technical Assistance, Goods and Equipment and Civil Works. Table 5-1 to Table 5-4 classify project activities under these categories:

Table5-1: Classification of Project Elements, Ethiopia

Ethiopia	Category of Activities		
Project Program Elements	**TA and studies**	**Goods & Equipment**	**Civil Works**
1. Flood risk mapping	X	X	
2. Network of reporting river gauging & rain gauge stations.	X	X	X
3. Establishment of flood forecasting center in Addis Ababa	X	X	
4. Capacity building at DPPA	X		
5. Capacity building at regional & woreda levels	X		
6. Capacity building at MWR	X	X	
7. Capacity building in NMA / MWR regional offices	X	X	
8. Community education and training for awareness and preparedness	X	X	X
9. Flood protection works, Gambella	X	X	X
10. Land management planning	X		

Table 5-2: Classification of Project Elements, Sudan

Sudan	Category of Activities		
Project Program Elements	**TA and studies**	**Goods & Equipment**	**Civil Works**
1. Flood risk mapping	X	X	
2. Hydrology & hydraulic modeling	X		
3. New reporting river gauging stations	X	X	X
4. New reporting weather stations	X	X	X
5. Capacity building at MIWR	X	X	
6. Community education and training for awareness and preparedness	X	X	X
7. General capacity building for MIWR	X	X	
8. Capacity building at SMA	X	X	
9. Capacity building for CDO	X	X	
10. General capacity building at CDO	X	X	
11. Capacity building for HAC	X	X	
12. General capacity building at HAC	X	X	
13. Flood protection levees, Dongola	X	X	X
14. Land Management planning, Khartoum	X		
15. Investigations of river hydraulics, sediment transport and channel morphology	X	X	
16. Pilot study on bank erosion	X	X	

Table 5-3: Classification of Project Elements, Egypt

Egypt	Category of Activities		
Project Program Elements	**TA and studies**	**Goods & Equipment**	**Civil Works**
1. Upgrade Nile Flood Forecasting Center	X	X	
2. Studies to determine effectiveness of improved flood forecasting procedures	X		
3. Revise forecasting procedures for new gauge network	X		
4. Assistance with flood risk mapping	X		
5. Field sampling and sediment transport modeling of pilot reach	X	X	
6. Pilot Flood Risk Management Plan	X		

Table 5-4: Classification of Project Elements, Regional

Regional	Category of Activities		
Project Program Elements	**TA and studies**	**Goods & Equipment**	**Civil Works**
1. Management Unit support for ENTRO	X	X	
2. EN flood management interest group in NBCBN	X	X	
3. Annual post-flood conferences	X		
4. Special topic seminars	X		
5. Joint study tours	X		
6. Visiting specialists	X		
7. Joint studies	X	X	

Technical Assistance, Studies, Training and Workshops

(Base cost: US$ 14.96 million)

Technical Assistance, studies, training and workshops will be undertaken through Consultancy Services for management support, implementation (technical) support, design and implementation of technical information and knowledge building activities that will enable the use of analytical tools (e.g., land management plans, flood intelligence systems, flood modeling, *etc*.) to underpin decision-making processes at the various stages of flood mitigation planning and management; these activities incorporate capacity building of staff. A consultancy contract will also be used for the supply, installation and commissioning of a data communications network to acquire and transmit digital data to a central processing station or stations, and the maintenance of that system for the duration of FPEW Phase 2.

Consultants will be selected following Quality Based Selection (QBS), Quality and Cost-Based Selection (QCBS), Single Source Selection (SSS), and on Consultants' Qualification (CQ) methods; where appropriate, individual consultants (IC) will also be hired.

Auditors will be selected following Quality and Cost Based Selection or Least Cost Method.

The World Bank will conduct a prior review of procurement documentation subject to services exceeding the thresholds identified in Table 5-5. All contracts not subject to prior review will be subject to post review.

Table 5-5: Thresholds for Prior Review of Consultancies

Selection Method	Prior Review Threshold
Firms: QBS, QCBS, CQ	$100,000
Individuals: CQ	$50,000, or >6 months
Individuals: SSS	all

Goods and Equipment

The PIP proposes the procurement of reporting river gauging and rain gauge stations, weather stations, laboratory equipment, office and training equipment, computer hardware and software, office furniture and audio-visual equipment, media equipment, transport vehicles, satellite imagery and GIS maps, remote sensing and topographic maps, *etc*. The following procedures will be adopted:

(i) International Competitive Bidding (ICB):

Contracts for goods estimated to cost US$100,000 or more per contract will be procured following ICB procedures and be subject to prior review by the WB; domestic preference will be available for all ICB contracts;

(ii) National Competitive Bidding (NCB):

Packages of goods and equipment estimated to cost more than US$50,000 per contract will be procured on the basis of NCB procedures in accordance with the WB Guidelines, and be subject to prior review by the WB.

(iii) Shopping:

Packages of goods and equipment, including vehicles, estimated to cost less than US$50,000 per contract, will be procured and contracts awarded on the basis of Shopping procedures in accordance with the WB Guidelines.

(iv) Direct Contracting:

Satellite imagery, maps and data, aerial photography, topographical maps, GIS maps, scientific books, periodicals, software, training materials (video, audio, *etc*.) and other proprietary equipment and spares, up to an aggregate of US$ 5.0 million, will be procured following Direct Contracting procedures in accordance with the WB Guidelines. All contracts exceeding US$50,000 shall be subject to prior review by the WB. Materials and small equipment costing less than US$500, up to an aggregate of US$ 0.5 million, will be procured through Direct Contracting procedures. Any or all purchases may be subject to post review.

Civil Works

(i) International Competitive Bidding (ICB):

Construction of flood protection works in Dongola and Gambella will be procured following ICB procedures and be subject to prior review by the WB; domestic preference will be available for all ICB contracts.

(ii) National Competitive Bidding (NCB)

Construction of new and upgrading river/rainfall gauging stations, weather stations, offices of any kind and other civil works estimated to cost more than US$30,000 per contract will be contracted via NCB procedures and be subject to prior review by the WB.

(iii) Shopping:

Small works such as new/upgrading of river/rainfall gauging stations, river augmentations *etc*. estimated to cost less than US$ 30,000 will be procured following shopping procedures in accordance with the WB Guidelines.

5.6.4 Review and Recording of Procurement Decisions

The proposed Procurement Plan for the project will be furnished to the World Bank for its review and approval. Procurement of all Works, Goods and Services will be undertaken in accordance with the approved Procurement Plan. Annual Implementation plans for works and Procurement Plans will also be submitted for review by the funding agency.

Thresholds for prior review of contracts for different categories of goods and services to be procured for the Project were identified in section 5.6.3. Contracts below the prior review threshold suggested above for Works, Goods and Consultancy contracts may be subject to post review if the funding agency so requires.

Procurement information will be collected, recorded and contract award information reported in:

- Comprehensive semi-annual reports by indicating:
  - Revised cost estimates of individual contracts and the total project;
  - Revised timings of the procurement actions, including advertising, bidding, contract award, and completion time for individual prior-review contracts; and
  - Compliance with aggregate limits on the specified methods of procurement;
- Completion report within three months of the Grant or Credit closing date.

5.6.5 Procurement for or by National Institutions

(a) Funding by Grant from International Agency Donor

(i) International Competitive Bidding (ICB):
Contracts for goods and/or equipment with estimated value exceeding US$100,000 will be subject to ICB, and ENTRO will undertake and be responsible for all ICB procurements.

All other procurement for national Implementing Agencies (IAs) will be done by the National Focal Point Institution (NFPI) in their respective countries under ENTRO's supervision and

approval. ENTRO will conduct in advance assessments of the procurement capacity of each NFPI.

The National Project Coordinator (NPC) within the NFPI will be given petty cash of $5,000, and this account will be replenished by ENTRO upon submission of relevant expenditure documents by the NFPI and subject to approval by ENTRO.

(ii) National Competitive Bidding (NCB)
NCB procedures will be adhered to for procurement of goods and/or equipment in contracts with estimated value less than or equal to US$100,000 and exceeding $50,000. Subject to satisfactory assessment of the procurement capacity of the NFPI, the NFPI will carry out these procurements using standard NCB documentation satisfactory to requirements of the World Bank. If standard procurement documents of the NFPIs are not satisfactory to the Bank, standard ICB documents shall be adopted and used for NCB procurement.

(iii) Shopping:
The NFPI will carry out all shopping procurement for goods and/or equipment in contracts not exceeding $50,000 in accordance with the WB guidelines, and under the supervision of and review by ENTRO.

(iv) Consultancies:
Procurement of consulting services shall be carried out by the NFPIs under the supervision of and subject to review by ENTRO. All procurement of consulting services shall be undertaken in accordance with WB guidelines, using standard documentation, and subject to the prior review thresholds identified in Table 5-5. All contracts not subject to prior review will be subject to post review.

5.6.6 Procurement with Bilateral Loan Funding

If funding is made available to a national government through a loan under bilateral agreement, the NFPI or IA will be responsible for all procurement under that loan. These procurements would normally be in accordance with required procedures of the national Ministry of Finance (or equivalent).

It is expected that, for this Project, procurement procedures will also be consistent with standard procedures documented by The World Bank.

ENTRO will seek an undertaking (*e.g.* Memorandum of Understanding) that regular reports on progress of implementation and expenditure on FPEW Project program elements funded under bilateral agreements will be forwarded to ENTRO for its review.

6. Project Scheduling

6.1 OVERALL PROJECT PHASING

It is proposed that the FPEW Project will be undertaken in at least three phases, extending over a period of 10 to 12 years. The first phase of Project implementation is expected to commence in 2007. Phase 1 implementation was introduced in section 1.4.4 and summarized in Table 1-1. An abbreviated form of the proposal for Phase 1 is appended at Appendix C. This PIP is for Phase 2 implementation. At this point in time, Phase 2 implementation is expected to commence about two years after commencement of Phase 1 implementation.

The second phase has been considered in detail, and is as described in section 2.6.

The two main emphases of the Phase 2 Project activities are (a) data acquisition, and (b) capacity building and training. The capacity building and training aims to build capacity and skills in government institutions and ENTRO, and also aims to equip communities at risk with sufficient knowledge and skills to prepare and undertake their own community-driven flood risk management action plans. There is also some technical assistance which can be classified as capacity building, and some civil works (works on the ground). It is proposed that Phase 2 activities be completed over a five-year period.

Third and subsequent phases of the FPEW Project will depend greatly on the outcomes and experience of the first two phases; however, there are directions that can be foreseen even at this preliminary stage:

- During the Phase 3 of the FPEW Project, it will be important to build upon the foundations of the data/information acquired, institutional strengthening, public education and community training. This will lead to practical outcomes that reduce/ manage flood risk.
- As one example, the flood intelligence data-bases developed in Phase 2 of the Project should by Phase 3 be populated with sufficient data to enable approaches to flood emergency planning, economic project evaluations, *etc*. to be developed with a more scientific underpinning.
- The Project should also move beyond flood risk mapping in Phase 3, and begin the development of comprehensive floodplain risk management planning, for both urban and rural areas.
- After the programs in Phase 2 designed to raise public awareness and community preparedness, communities should be organized and sufficiently aware to be able to initiate their own proposals for mini-projects that will reduce their vulnerability to the flood hazards to which they are occasionally exposed. The Project should continue to support these initiatives with practical technical and administrative advice, and provide or facilitate sources of funding so that community-driven floodplain management becomes a reality.

6.2 OVERALL PROJECT ACTIVITY MATRIX

The Phase 1 Project program will be implemented over a period of 3 years. The Phase 2 program will be implemented over a period of 5 years. It is expected that there will be some overlap of these two phases, probably by one year. Figure 6-1 illustrates the expected evolution of FPEW Project implementation.

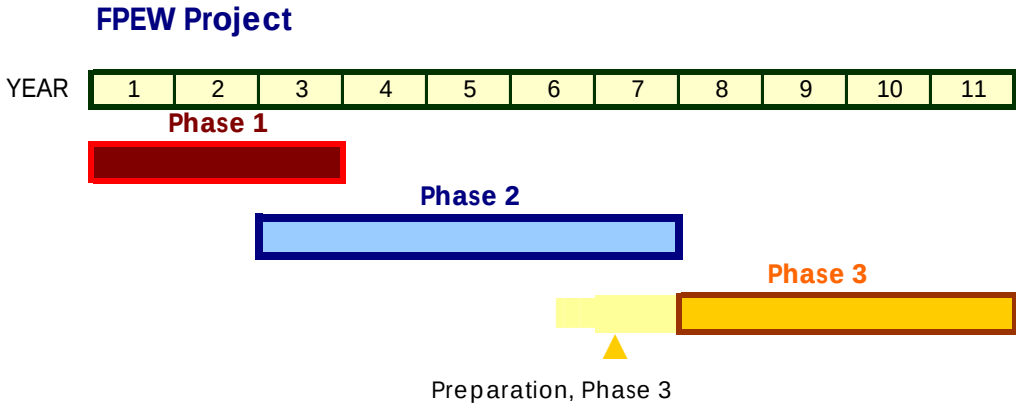


Figure 6-1: Phasing of Project Implementation

The duration of Phase 3 is nominal at this time, as the full content of the Phase 3 program should be determined after implementation of the first two phases are well under way. It is assumed here that Project Preparation for Phase 3 implementation would occur in parallel with the last 18 months of Phase 2, so that best use can be made of the experience gained and lessons learned from implementation of the first two phases.

6.3 DETAILED ACTIVITIES FOR PHASE 2 OF PROJECT IMPLEMENTATION

There are 39 elements of the full program proposed for Phase 2 of the Project. These activities were described in more detail in section 2.6. The proposed timing of implementation is illustrated in Figure 6-2.

The RFCU and other units for project operations and financial control within ENTRO will be fully functional during Phase 1 of the Project, and so will be adequately experienced and skilled to undertake preliminary tasks such as review of project documentation, tendering for consultant services, bid assessment and selection in advance of the 5-year program.

If progress is according to schedule, most of the elements or activities in the program will be either complete or be scaling down by the middle of Year 4 and Year 5, so there will be adequate opportunity for units in ENTRO to undertake or manage the Project Preparation for the third phase of the Project. To build upon the initiatives under Phase 2 and maintain momentum, implementation of Phase 3 should commence immediately after the end of the 5-year Phase 2 program.

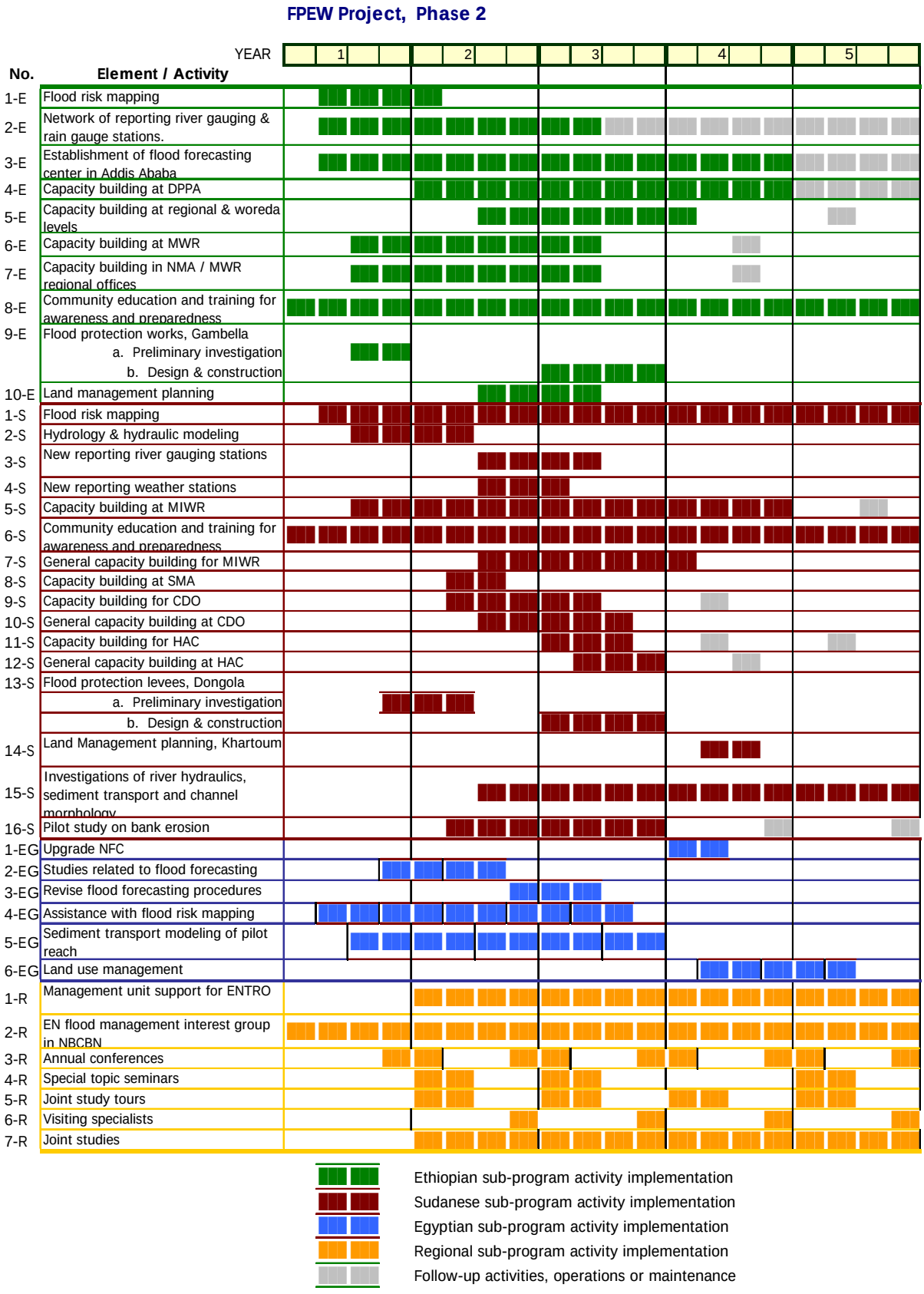


Figure 6-2: Schedule of Phase 2 Activities

7. Monitoring and Evaluation

7.1 OBJECTIVES

The proposed institutional arrangement for the project is a multi-national and multi-agency model. In order to achieve orchestrated performance by all the Implementing Agencies and ENTRO – which will be the co-ordinating agency – timely and accurate flow of information on all aspects of project implementation is critical for success. Continuous monitoring and incorporation of the learning from the project into the overall policy and regional vision of ENSAP and the regional governments will assume importance in achieving the longer-term goals of attaining more integrated and effective flood risk management.

7.2 COMPONENTS MONITORING

The project will monitor the outcomes and results of each of the activities and sub-tasks. This will cover:

- Financial progress;
- Staff development under the various institutional capacity building activities;
- Progress on implementation of data acquisition networks and upgrading of facilities;
- Programs for public education and community preparedness and the performance of NGOs supporting the programs;
- Technical assistance to existing or proposed government programs;
- Physical and financial progress of civil works under flood mitigation planning;

During the implementation of Phase 1 of the Project, ENTRO will engage a full-time specialist in project monitoring and evaluation (M&E) – refer to Phase 1 proposal in Appendix C. The ENTRO M&E specialist will work with Implementation Consultants in monitoring outcomes and results of activities and sub-tasks.

For each of the Project activities/elements, a separate M&E system will be developed under the project consultancies in collaboration with the ENTRO M&E specialist. These will be fully integrated into an overall MIS framework, and a M&E process covering required inputs, processes, outputs and outcomes will be developed by the Principle Implementation Consultant in collaboration with ENTRO, for use by ENTRO, NFPIs and national IAs.

7.3 RESULTS MONITORING

A comprehensive log-frame is presented in Appendix A identifying major goals of the Project Phase 2, associated purpose, outputs and activities. The log-frame also identifies indicators of progress towards the goals, outputs and activities, and means of verification (or key performance indicators).

Table 7-1 provides an alternative structure tailored to monitoring of results.

Table 7-1: Framework for Monitoring Results

OBJECTIVE	INDICATORS with [contributing program elements or activities]	KEY OUTCOMES / RESULTS
A.Development of institutional capacity, technical & human resources for delivery of effective government services in management of flood risk	Establishment of dedicated flood emergency response planning units [4-E, 9-S]	Active, functioning units in CDO, DPPA
	Establishment of new Flood Forecasting Center (FFC) in Addis Ababa [3-E]	Functioning FFCs in all national capitals of EN region
	Rehabilitation of FF system in Khartoum [5-S]	Working linkages between FFCs and emergency response agencies
	Strengthening/development of flood warning, emergency response and post-flood recovery services [4-E, 5-E, 7-E, 8-S, 9-S, 11-S]	Effective dissemination of flood warnings. Effective flood emergency response assisting communities at risk. Improved delivery to communities of post-flood recovery/relief services.
	Actions to produce flood risk maps [1-E, 1-S]	Flood risk maps for main flood risk areas.
	Support for RFCU [1-R]	Active, functioning unit in ENTRO
	Office & field equipment to support expanded tasks of data acquisition and data management [6-E, 7-E, 7-S, 8-S]	Greater capacity in MWR/NMA and MIWR, SMA to operate & maintain essential hydrometeoro-logical data services.
	Office & field equipment to support flood emergency response and post-flood recovery tasks [4-E, 10-S, 12-S]	Improved capacity by DPPA and CDO, HAC to undertake important tasks of flood emergency response and post-flood recovery.
	Support for EN flood management special interest group under NBCBN [2-R]	Establishment of active special interest group.
B. Access to adequate real-time rainfall & river gauging data to improve/enable flood forecasting and provision of sufficient flood warning lead times	Rainfall & river height data acquisition & communications network transmitting real-time data to FFCs. On-site data logging for back-up [2-E]	Adequate data to enable accept-ably accurate flood forecasts and adequate times of flood warning for appropriate action to reduce danger/damages in advance of imminent flooding.
	New reporting river gauges in Sudan [3-S]	Main network commissioned in Year 3, additional stations in Sudan by Year 4.
	New reporting weather stations in Sudan [4-S]	Maintenance contract in place beyond Year 3.
	Studies to determine effects of improved flood forecasting for HAD operations and downstream benefits in Egypt derived from improved data network [2-EG]	Study findings available in advance of commissioning of main network.
C. Raise levels of experience & skills in institutions to make good use of capacity & resources developed in A. above	Well skilled & experienced staff to under-take essential flood management activities and deliver effective services to communities at risk	New/improved flood management services – e.g. flood intelligence database, flood forecasting, flood warnings/alerts, response procedures – functioning with trained personnel capable of sustaining initiatives provided by Project.

OBJECTIVE	INDICATORS with [contributing program elements or activities]	KEY OUTCOMES / RESULTS
	Training provided to FFC personnel in Addis Ababa, Khartoum. Development of flood forecasting models /procedures [3-E, 5-S]	Communities at risk receiving real warnings, or in the absence of serious flooding, have been engaged in trials of warning/ response procedures.
	Revised/recalibrated flood forecasting procedures to utilize data from expanded data network [5-S, 3-EG]	
	Technical assistance to ongoing program of flood risk mapping in Egypt [4-EG]	Egyptian flood risk maps prepared for planning floods and benchmarked against /consistent with good international practice.
	Guideline procedures and training for flood emergency response procedures in DPPA and CDO/HAC [4-E, 5-E, 9-S, 11-S]	Operational & planning guidelines implemented by well trained staff. Linkages between local authorities and communities at risk.
	Training provided in data management/ processing operations & procedures [6-E, 7-S]	Trained personnel making good use of new resources made available under A. above in MWR and MIWR.
	Technical assistance to flood risk mapping in Sudan [2-S]	Hydrological analysis and hydraulic modeling to support flood risk mapping.
	Training to SMA in dynamic weather forecasting [8-S]	Trained personnel with enhanced short-term rainfall forecasting skills.
	Field sampling & technical investigations of river hydraulics, sediment transport and channel morphology in Khartoum and a pilot reach of the Nile in Egypt [15-S, 5-EG]	Calibrated hydraulic and sediment transport models. Scientific knowledge/tools for improved assessment of future flood management interventions related to bank erosion, scour and riparian development. Skills developed enable potential application to other river reaches.
	Pilot study on bank erosion management techniques in Sudan [16-S]	Pilot program to combat flood damage by bank erosion (*haddam*). Field guide manual to practical bank stabilization measures.
	Annual post-flood conferences and biennial technical conferences [3-R]	Sharing of knowledge/ under-standing.
	Special seminars on topical issues [4-R]	Foundation for greater future regional cooperation.
	Joint study tours [5-R]	
	Visiting specialist program [6-R]	Transfer of specialist knowledge/ skills.
	Joint technical studies [7-R]	Practical regional cooperation and applied research supporting government programs and policy/ technical needs.

OBJECTIVE	INDICATORS with [contributing program elements or activities]	KEY OUTCOMES / RESULTS
D. Assist communities at risk to be more independent, self-organized and prepared for floods by training and equipping communities with practical knowledge, technical/ administrative assistance and material support.	Guidelines for training. Training of extension teams. Public education campaigns and training of communities for self-reliance and organization by extension teams. Funding and technical support for preparation & implementation of community-driven flood risk Management Action Plans (MAPs). [8-E, 6-S]	Trained, organized Flood Management Action Groups active in communities at risk. Community flood risk Management Action Plans prepared &/or being implemented. Effective community-driven action to reduce/manage flood hazard, exposure to hazard, and community vulnerability: on-ground works, and non-structural planning measures. Improved liaison and joint action between communities at risk and local authorities. Improved knowledge of and capacity to avail themselves of strengthened government services. Manuals for training of trainers & communities, and for preparation & implementation of practical community flood MAPs.
E. Flood mitigation planning for certain urban areas to undertake measures to manage future flood risk where development cannot realistically be reversed/ relocated	Preliminary investigations to determine economic, social and environmental effects of proposed structural measures. [9-E(a), 13-S(a)]	Establishment of socio-economic benefits of implementation. Identification of measures to mitigate and adverse social or environmental effects.
	Subject to outcomes of preliminary investigations, design & construction of flood protection works in Gambella (Ethiopia) and Dongola (Sudan) [9-E(b), 13-S(b)]	Modification of flood hazard to urban communities in Gambella and Dongola. Major reduction in danger and damages.
	Pilot Floodplain Management Plan for selected flood risk area in Egypt [6-EG]	Management of future exposure to flood hazard. Reduced vulnerability of riparian community to flood risk. Reduced danger/damages if incorporated in land use planning.
	Technical assistance for land management planning in Bahir Dar (Ethiopia) and Khartoum [10-E, 14-S]	Trained staff with skills to introduce flood risk management criteria into urban master plans and planning schemes.

NOTE: Numbers/codes of **contributing program elements or activities in square parentheses relate to numbers/codes in section 2.6, Tables 2-1 to 2-4.**

7.4 PROJECT EVALUATION

The Implementation Consultants, supported by ENTRO's M&E specialist and other specialized consultants as necessary, will carry out the various evaluations during Phase 2 project implementation as described in Table 7-2.

Table 7-2: Project Evaluation

Name of Review	Timing	Nature of Review	Purpose
Mid term Review-1	After 21 months	Evaluation	To assess organizational development and improved capacity. To review progress on data acquisition and data sharing. To review preparations for community development, training programs, etc.
Mid term Review-2	After 42 months	Evaluation	To assess the improved technical capacity and facilities available and use being made of these facilities in data management and flood management.
Project Completion Review	End of the Project	Impact assessment	To assess the major outcomes and impact of project implementation

7.5 MANAGEMENT INFORMATION SYSTEM

At the inception of Phase 2 implementation, the Principle Implementation Consultant will develop and implement a comprehensive Management Information System (MIS) for meeting all the monitoring requirements of the project implementation, including financial progress. If appropriate software is being used in ENTRO at the time that can be readily adapted to this purpose, use will be made of that software platform. The ENTRO M&E specialist will participate in the development and specification of the MIS, and will review and approve M&E systems for all separate activities under the program for Phase 2 implementation developed by the Implementation Consultants.

The MIS will facilitate tracking of inputs, processes, progress, outputs and outcomes of project and sub-project activities, as well as facilitating monitoring of financial expenditures against budgets.

8. Environmental Management Framework

The Environmental and Social Management Framework is presented in Appendix E.

9. Resettlement Policy Framework

This chapter is presented in a format that may be used as a stand-alone document.

RESETTLEMENT POLICY FRAMEWORK (RPF)

1. Project Background

Implementation of Phase 2 of the Flood Preparedness and Early Warning Project (FPEW-2) entails a program of 39 separable activities that may be classified under the following five categories:

1. Capacity building of institutions with relevant management functions: provision of training, essential resources, and minor restructuring to enhance functional capability.
2. Development of an integrated real-time data acquisition network, improvements in data sharing, and enhanced flood forecasting capability, complemented by improved communications for effective flood warning.
3. Technical assistance to build technical skills and support national and regional flood management initiatives.
4. Programs of public education and training to raise community awareness of flood risk and equip communities with knowledge and skills to assist them organize and be prepared for floods.
5. In certain urban areas where substantial development already exists in flood risk areas that is irreversible, structural measures are recognized as a key measure for flood mitigation planning.

There will be no involuntary resettlement involved in the first three categories of FPEW-2 implementation program activities.

Small-scale structural works may be involved in the fourth category of program activities, as the campaigns to educate the public and train communities at risk will lead to the preparation and implementation of community-driven flood Management Action Plans. These community flood MAPs will be prepared and implemented in Ethiopia initially by communities in the Fogera and Dembiya plains adjoining Lake Tana, and in Sudan by riparian communities along the Blue Nile, Main Nile, Dinder and Rahad Rivers.

Because the management measures to be included in the community flood MAPs are to be community-driven, it is not possible to specify in advance what the measures to be implemented will be. The types of measures that are expected to be adopted are indicated in the Environmental and Social Management Framework (ESMF). For purposes of the RPF it is sufficient to emphasize that any structural measures will be small-scale, and will be community-driven. Given these factors it is unlikely that involuntary resettlement will be involved, although it is possible. If it does arise in any of the community flood MAPs, it will be small-scale, affecting only a few households.

Under the fifth category of program activities, the two urban areas where structural measures are proposed are Dongola in Sudan, and Gambella in Ethiopia. Construction activities, if they proceed, may displace some households. Both of these activities would only proceed following preliminary investigations early in the program for FPEW-2 implementation. The preliminary investigations will quantify the economic, social and environmental implications of the proposed works and will include detailed survey to identify households that would be displaced. Preliminary design required for more accurate cost estimation of the proposed works will also seek to minimize the social impacts and numbers of households affected.

Dongola

Flood protection levees (terraces) already exist at Dongola. The activity proposed in the FPEW-2 program entails rehabilitation of the main town levee, not construction of a new levee. Preliminary design of works required will follow geotechnical audit and topographic survey during the preliminary investigations – however, unless some realignment of the levee is essential it is unlikely that involuntary resettlement will be involved. Even if it is, it is expected that small numbers of households would have to be displaced.

Gambella

Flood protection works do not exist at Gambella, so construction of new works will be involved subject to outcomes of preliminary investigations. Unfortunately, due to communications and security problems it was not possible to visit Gambella and inspect the site during Project Preparation. The works proposed rely upon investigations undertaken almost 20 years ago. The numbers of households likely to be displaced will depend upon the density and distribution of dwellings on the top of the river bank. This will be determined during the preliminary investigations. It is possible that significant numbers of households would be affected.

2. Principles and Objectives

World Bank Operational Policy (OP 4.12) and Bank's Procedures (BP 4.12) on Involuntary Resettlement will serve as an operational guideline for FPEW Implementation.[1]

2.1 Resettlement Principles

a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs;
b) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons affected by the project to share in project benefits, affected persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs;
c) Affected persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement

[1] The Bank has no policy on Voluntary Resettlement. Consequently, persons who are "voluntarily" resettled have no procedural or substantive rights under the draft Bank policy (see: http://www.ciel.org/Ifi/volreslet.html)

levels or to levels prevailing prior to the beginning of the project implementation, whichever is higher. [2]

The Bank requires that:

Assets are valued at "replacement cost" to ensure amounts sufficient to replace lost assets and cover transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account for losses that cannot easily be valued or compensated for in monetary terms (e.g. access to public services, customers, and suppliers; or to fishing, grazing, or forest areas), attempts need to be made to establish access to equivalent and culturally acceptable resources and earning opportunities.

Affected persons are eligible for resettlement benefits if:

- they have formal legal rights to land (including customary and traditional rights recognized under the laws of the country);
- they do not have formal rights to land, but have a claim to such land or assets provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan; or
- they have no recognizable legal right or claim to the land they are occupying.

Compensation packages thus stipulate that

- All affected populations (APs) will be equally eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing, and any such factors that may discriminate against achieving the objectives outlined above.
- The rehabilitation measures to be provided are:
  - cash compensation for houses and other structures at replacement cost of materials and labour without deduction for depreciation or salvageable materials;
  - full title to replacement agricultural land for land of equal productive capacity acceptable to the AP;
  - full title to replacement residential and commercial land of equal size acceptable to the AP or, at the informed decision of the AP, cash for replacement land at replacement cost at current market value;
  - cash compensation for crops and trees at current market value; and
  - relocation allowances and rehabilitation assistance.
- Sufficient time will be allowed for replacement structures to be built before construction begins
- Existing cultural and religious practices shall be respected and, to the maximum extent preserved
- Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition and resettlement and rehabilitation within the agreed implementation period

[2] Environmental and Social Management Framework for World Bank Projects with Multiple Small-Scale Subprojects. A Tool kit. Africa Region. February 2005

- Complementary mitigation and enhancement activities shall be offered to protect socially and economically vulnerable groups such as women-headed families, children and elderly people without support structures and people living in extreme poverty
- Grievance procedures shall be established and in place and PAPs informed of them before any resettlement activities begin.

2.2 Cultural Property

Operational Policy 4.11 of the World Bank defines Cultural Property as both remains left by previous human inhabitants (e.g. middens, shrines) and unique natural environmental features such as canyons and waterfalls. The Bank does not support projects that will significantly damage non-replicable cultural property and assists only those projects that are sited or designated so as to prevent such damage.

3. Legal Framework

3.1 The Federal Democratic Republic of Ethiopia (FDRE)

The Constitution of the Federal Democratic Republic of Ethiopia (FDRE) has several provisions which have direct policy, legal and institutional relevance for the appropriate implementation of the resettlement programs.

Involuntary Resettlement

The Constitution of the Federal Democratic Republic of Ethiopia (FDRE) states that the right to ownership of rural and urban land, as well as all natural resources, is exclusively vested in the state and in the people of Ethiopia. Article 40 of the Constitution indicates that land is a common property of the nations, nationalities and the people of Ethiopia, and shall not be subjected to sale or to other means of transfer.

Resettlement and rehabilitation are recognized civic rights in the Ethiopian legislation. Article 44 of the revised Constitution of 1995 states that all persons who have been displaced or whose livelihoods have been adversely affected by a State Programme, have the right to commensurate monetary or alternative means of compensation including relocation with adequate state assistance.

The Constitution also guarantees people whose livelihood is land based (including pastoralists) have the right to have access to land as well as to protection against eviction (Article 40.4 and 40.5). Article 40.8 states that:

> *"Without prejudice to the right to private property, the government may expropriate private property for public purposes subject to payment in advance of compensation commensurate to the value of property."*

The "Proclamation to provide for the expropriation of land holdings for public purposes and payment of compensation" (No. 455/2005) contains several articles that outline the determination of compensation, compensation for displacement, valuation procedures,

establishing property valuation committees, and on complaints and appeals. The proclamation gives power to the Woreda and urban administrations to expropriate and use land for public services.

Part two, article 3, no.1 of the proclamation No. 455/2005 states that:

> *"A woreda or an urban administration shall, upon payment in advance of compensation in accordance with this proclamation, have the power to expropriate rural or urban landholdings for public purpose where it believes that it should be used for a better development project to be carried out by public entities, private investors, cooperative societies or other organs, or where such expropriation has been decided by the appropriate higher regional or federal government organ for the same purpose."*

Proclamation No. 455/2005 also provides displacement compensation for rural land holdings. Part Three of article 8 states that:

> *"A rural landholder whose land holding has been permanently expropriated shall, in addition to the compensation payable under Article 7 of this proclamation, be paid displacement compensation which shall be equivalent to ten times the average annual income he secured during the five years preceding the expropriation of the land."*

The proclamation also states that in urban areas, PAPs will be provided with a plot of land (land for land compensation) for their expropriated land to be used for the construction of house, and also be paid compensation for displacement.

3.2 Sudan

Involuntary Resettlement

Sudan has no formal policy on Involuntary Resettlement. However, in the wake of the serious flood in 1998, a decision was taken at Federal level to resettle some of the worst affected villages and islands along the Blue Nile and Atbara River. This decision was translated into a Federal 'plan' based on the concept of *voluntary* relocation rather than according to a formalized policy on involuntary resettlement.

Implementation of the resettlement plan is the responsibility of affected States. In each State, the Ministry of Physical Planning is responsible for the preparation of new settlements sites, and for registering and demarcating plots for basic services (health, education, water, mosque, market place, etc.). Once plots are allocated, Ministries from the relevant sectors (health, education, water etc.) are responsible for constructing the essential service infrastructure prior to resettlement.

In practice, however, this plan is rarely implemented. Communities that agree to relocate are not entitled to protections under a formalized resettlement policy. The Ministry of Physical Planning may undertake the surveying, demarcation and registration of plots, but communities are expected to use their own resources to build homes, schools, health care units, etc.

In the absence of a Policy on Involuntary Resettlement, the following sections of the Interim Constitution serve as guidelines for land rights and compensation in Sudan:

The Interim Constitution

Sudan is a federal country divided into 26 states with special consideration given to Southern Sudan according to the Interim Constitution of 2005. There are three levels of authority: national level, state level and locality level. The powers over land are divided among the various levels as follows:

- At the national level, the federal organs exercise the power of planning, legislation and execution on federal lands, natural resources, mineral and subterranean wealth, inter – state waters, national electricity projects, epidemics and disasters.
- The state organs within the boundaries of the state exercise power on state lands, natural resources, animal wealth, wildlife, non-Nile waters and electric power.
- There are concurrent powers where both federal (national) and state organs exercise power on education, health, environment, tourism, industry and meteorology.
- The Interim Constitution provides for the creation of commissions particularly, on land to assume among others planning and division of lands and forests between federal and state authorities.

Environment and social justice enjoy the protection of the Interim National Constitution of the Republic of the Sudan dated 10 July 2005 wherein:

Section 24 describes the Sudan as the decentralized State with four levels of government *i.e*.

1) the national level of government with the power to protect national sovereignty, and territorial integrity of the entire Sudan and to promote the welfare of its people,
2) the Southern Sudan level of government with the power to exercise authority in respect of the people and States in Southern Sudan,
3) the State level of government with the power exercise authority at the State level throughout the Sudan, and render public services through the level closest to the people, and
4) the local level of government, which shall be throughout the Sudan.

Section 12 requires the State:

- to develop policies and strategies to ensure social justice through insuring means of livelihood and opportunities of employment.
- to encourage mutual assistance, self-help, cooperation and charity.

The Interim Constitution has five Schedules (Schedules A-F), which more specifically state the powers of the various levels of government in respect of, among others, environment, land acquisition and conservation of cultural heritage. Such powers include:

1) Exclusive legislative and executive powers of the national level as stated under Schedule A:
   - Natural Lands and National natural resources (item no. 15)
   - Meteorology (item no. 19)

- Signing of International Treaties on behalf of the Republic of the Sudan (item no. 2 5)
- National Public Utilities (item no. 30)
- National Museums and National heritage Sites (item no. 31)
- National Economic Policy and Planning (item no. 32), and
- Nile Water Commission, the management of the Nile Waters and transboundary waters and disputes arising from the management of interstate waters between Northern States and any dispute between Northern and Southern States (item no. 31).

2) Legislative and executive competencies (concurrent powers) of the National Government, the Government of Southern Sudan and state governments under Schedule D:
   - Health policy (item no. 4),
   - Urban Development, planning and housing (item no. 5),
   - Delivery of public services (item no. 7),
   - Electricity generation and water and waste management (item no. 15),
   - Environmental management, protection and conservation (item no. 17),
   - Relief, Repatriation, Resettlement, Rehabilitation and Reconstruction (item no. 18),
   - Financial and economic policies and planning (item no. 20),
   - Water Resources other than interstate waters (item no. 27), and
   - Regulation of land tenure, usage and exercise of rights in land (item no. 32).

   Article 43 (2) of the Interim Constitution gives the national government the right to expropriate land for development purposes and to compensate owners. There are a number of articles related to natural resource management, protection of cultural heritage sites and respect of traditional and customary regulations related to land ownership. The Interim Constitution also specifies land issues which are under national powers (federal level) and those under the control of states as well as joint powers (concurrent powers) shared by federal and states. The States manage issues related to State lands which are not under national control. These include; management, lease and utilization of lands belonging to States, town and rural planning and agricultural lands within the State boundaries. The concurrent powers include matters related to urban development, planning and housing, electricity generation, waste management, consumer safety and protection, water resources other than inter-state waters and regulation of land tenure and the rights on land.

   Specific details and procedure on land are found in sectoral laws including:

   - **Land Registration and Settlement Act 1925** provides rules to determine rights on land and other rights attached to it and ensure land registration.
   - **** Land Acquisition Act 1930** gives the government the power to appropriate lands for development purposes. It also states detail formalities of acquisition and rules governing assessment and payment of compensation.
   - **Unregistered Land Act 1970** deems any unregistered land, before the enactment of this law, as being registered in the name of the government.
   - **The Civil Transactions Act 1984** regulates the different matters related to civil transactions with respect to titles on land, means of land acquisition, easement rights and conditions to be observed by land users.

- **Urban Planning and Land Disposal Act 1994** regulates designation of lands for different purposes and urban planning. With respect to land expropriation for public purposes Section13 of the Act recognizes the application of its predecessor – Land Acquisition Act, 1930

** **The Land Acquisition Act of 1930** outlines detailed procedures to be followed in the acquisition of land and rules governing payment of compensation for land for public purposes. The procedures for land acquisition in any locality are initiated with a notification by the People's Executive Council in a Gazette stating that it appeared to the President of the Republic to authorize the acquisition of land for public purposes (Section 4). It is only after such notification that it shall be lawful to enter into, bore, set out boundaries, mark or survey the land.

An appropriation officer appointed by the People's Executive Council would notify the occupant of land the declaration that a designated area of land is to be appropriated for public purposes; call upon persons claiming compensation to appear before him at a place and time (not earlier than fourteen days) and to state the particulars of their claims for compensation (Section 10). He must attempt to agree on the amount of compensation for the land. The Act provides for further steps to be taken with regard to assessment of compensation if agreement is not reached.

3) Compensation Policy
Policies on land compensation are to be found in the 1925 Land Settlement and Registration Ordinance (LSRO) and the 1930 Land Acquisition Ordinance (LAO). According to these ordinances, land belonging to cultivators who have certified land use rights has to be formally expropriated and the cultivators compensated for the loss.

The 1970 Unregistered Land Act declares that all unregistered land is government land. The declaration was made without recognition of the long established and existing usufruct rights communally enjoyed by village or pastoral communities. This change was an amendment of the 1925 LSRO.

All ordinances state that it is one of the powers of the Settlement Officer to make provision for public roads and rights of way as may be required in the public interest, without being subject to payment of such compensation. The Settlement Officer may, however, decide to award compensation in money or in land in respect to any alteration to boundary, alignment of property, or demarcation of right of way, as he may think appropriate to the circumstances of each case.

4. Population Displacement

As noted in Part 1 of this RPF, the numbers of households displaced by Project activities will be small. Most Project activities will not require any displacement of population. Of the few that will or may, the flood protection works at Gambella is the only activity in the program that may displace more than a few households, and unfortunately it was not possible to visit the site and make inspections to estimate how many households may be affected. This activity will be contingent upon outcomes of preliminary investigations scheduled early in the FPEW-2 program of activities, and will establish the scale of the resettlement activity that will be necessary. Of the other activities that may require displacement of small numbers of households: the flood protection works at Dongola will also be contingent upon

outcomes of preliminary investigations scheduled early in the FPEW-2 program of activities, and as this activity entails rehabilitation of an existing levee there may be no requirement for resettlement; and implementation of the community flood Management Action Plans will probably include (currently unspecified) structural on-ground works, but as these will be community-driven and small-scale works they are unlikely to displace households – or if they do, numbers will be small.

In the Project budgeting, the following preliminary allocations were made to allow for resettlement activities.

- Dongola: 9 person-months of input by government resettlement officers supporting inputs of consultant social assessment specialists, plus $16,800 costs assuming 40 dwellings at an average cost of $420.
- Gambella: 10 person-months of input by government resettlement officers supporting inputs of consultant social assessment specialists, plus $14,000 costs assuming 40 dwellings at an average cost of $350.

5. Valuing Affected Assets

A compensation committee including elders, a government representative, a project staff member, and two residents will be organized by the appropriate government agency or kebele/village administrator, and will visit the affected area. Each asset will be enumerated and inscribed on a register. Values for each type of asset will be pre-printed, shown to the affected person, and set against the type and number of such losses that the individual will sustain. The total compensation for that category of loss will be shown, and the total of all losses shown as well. The inventory and evaluation will be signed and a copy given on the spot to the affected person. The form will say, and the affected person will be notified, that the inventory will not be official until a second signed copy, verified by project supervisory staff, is returned to the affected person. At that time, a copy of the grievance procedure will also be given to the affected person.

6. Resettlement Action Plans

Structural Flood Protection Works

In the case of the proposed flood protection works, the national government will nominate one Resettlement Officer (RO) to advise the consultant preliminary investigation team. During the preliminary investigations, the consultant social assessment specialists will determine the needs and prepare any required RAP or abbreviated RAP, which will be reviewed by the RO. Should the RO require any training to perform their duties in implementation of the RAP, this will be provided by the consultant social assessment specialists during the preliminary investigations. Assuming the activity proceeds to design and construction, the RO would continue to make necessary arrangements for implementation of the RAP and the resettlement of affected households in the interval between preliminary investigations and works implementation, and would advise the consultant design and construction team when it is mobilized, during which stage implementation of the RAP would be completed and the households would receive compensation and be resettled.

Community Flood Management Action Plans

In the case of implementation of the community flood MAPs, members of training/extension teams will receive appropriate training at the inception of the community programs to equip them with the knowledge of organization, procedures and responsibilities related to resettlement. During the training that they conduct in communities at risk, the extension teams will not only be working with community Flood Preparedness Action Groups (FPAGs) in each community, but will also train local authority officials in the organization and procedures for review and approval of funding applications from community FPAGs for implementation of flood management measures in their community flood MAPs, and that training will include raising awareness and familiarity with the organization, procedures and responsibilities related to resettlement. During implementation of community flood MAPs, extension team members will determine the needs for any RAP or abbreviated RAP, and jointly with the trained local authority officials will assist community FPAGs in their preparation and implementation.

The RAPs will be submitted with applications for funding to the approval and review authorities (the Project Coordination Unit and the Project Steering Committee at State/ Region level. A second round of approval and review will take place at national level by the National Implementation Unit and the National Project Steering Committee (or National Working Group).

Criteria for RAPs

Sub-projects that will result in displacement or involuntary resettlement of people will require an abbreviated Resettlement Action Plan (RAP). The general rules for determining whether a sub-project will require a RAP or an abbreviated RAP are as follows:

- For projects that result in more significant impacts, i.e. physical displacement of more than 200 people, and more than 10% of their productive assets are lost, a RAP will be prepared based on up to date and reliable information about the proposed resettlement, its impacts on the affected population, and the legal issues involved in resettlement. Further details are supplied in Annex 2.
- If fewer than 200 people are affected, an abbreviated RAP may be prepared which includes the following:
  (a) a detailed census and a valuation of their assets;
  (b) description of assets and other assistance to be provided;
  (c) consultation with displaced people about their alternatives;
  (d) grievance mechanisms and institutional accountability for redressing them;
  (e) arrangements for monitoring and evaluation; and
  (f) time-table and budget.

RAPs must be:

- approved and disclosed to the public *before* overall subproject approval can be considered; and
- implemented *before* subproject activities can begin.

Annex 2 provides further guidance on preparation of RAPs.

7. Consultation with, and Participation of, Affected People

Community Flood Preparedness Action Groups (FPAGs) will be preparing the community flood risk Management Action Plans (MAPs) with support of the extension team assigned to that community. During preparation of their flood risk MAPs, the FPAGs will consult with any APs. Subsequently, during preparation of sub-projects for funding applications, consultation by the FPAG with APs will be required for sub-projects involving measures that involve resettlement or compensation. Kebele or village administrators will also be informed at each of these stages.

The compensation committee (see 5 above on Valuing Affected Assets) will also contact all affected people.

8. Schedule for Implementing Resettlement Provisions

A schedule for implementing resettlement provisions will be established during preliminary investigations for the structural flood protection works in Dongola and Gambella. Should any community-driven sub-projects entail resettlement, a schedule for implementing resettlement provisions should be prepared by the community FPAG with assistance of their extension support team during preparation of their community flood risk MAP.

9. Grievance Redress Mechanisms

In the first instance, grievances will be dealt with by the compensation committee established by the government at village/kebele level (see 5 above on Valuing Affected Assets). When disputes arise with APs, the preferred means of settling grievances is by arbitration with the village/kebele compensation committee.

Should an agreement not be reached at this level, the complaint may be referred to the administrator of the mahaliya/woreda/municipality. The administrator would convene a review committee to consider the appeal. Such a review committee should comprise at least three woreda/mahaliya/municipality officials (e.g. including representatives of local DPPA or CDO, rural development agency, land use/administration agency), the kebele administrator and a representative of the community FPAG or an extension team member. If the complaint is not resolved at this level, the aggrieved party has the right to appeal to a court of law.

10. Other Matters

Given the current lack of certainty about the scale of resettlement and the people to be affected, it is not possible to be more specific about other requirements of the RPF at this point in time – such as arrangements for budgeting and funding, and for supervision and monitoring. Accordingly, Annex 1 is included to outline the guidelines to facilitate elaboration of the RPF when more detailed information becomes available. In the case of the proposed structural flood protection works, more detailed information will be available during the preliminary investigations; and in the case of community-driven projects – should they entail resettlement – more detailed information will be available at the time of preparation of community flood MAPs that outline community-driven measures to be implemented.

ANNEX 1: **Guidelines for Land Acquisition and Access to Resources**[3]

A Resettlement Policy Framework (RPF) should be prepared using the following major sections:

1. Principles and Objectives

Describe the basic principles and objectives for resettlement under the Project. State that the resettlement objectives are to move (or deprive from resources) as few people as possible consistent with the requirements of subprojects, and that the general principles of doing no harm, and of avoiding or minimizing resettlement, are to be followed in all subprojects. Show why acquisition of land or resources may be needed, and resettlement cannot be avoided in every case. Demonstrate that the commitment is to ensure that affected people are meaningfully consulted, compensated fully and fairly for their losses, and assisted in their efforts to improve their livelihoods and standards of living or at least to restore them. Describe any particular conditions in the Project and subprojects that may present special problems or opportunities, and show how the resettlement will be done, in principle, so as to overcome risks or take advantage of such opportunities.

2. Legal Frameworks

Review the national laws governing the taking of land or other assets. Because such legal instruments may come from many sources – land and water law, customary law or sharia, land tenure legislation, urban construction regulations, constitutional guarantees of compensation for takings for public utility, and so on – make this section as extensive as is warranted by the case in question. Set out the requirements of the process for taking land or changing access to resources. Discuss discrepancies among the various legal instruments, if found. Summarize what laws and regulations may apply to different categories of affected people. Next, set out any requirements of the Bank for resettlement that apply to the types of cases that may arise in the project. Analyze all gaps between national and Bank requirements, and say how such gaps may be bridged.

3. Estimated Population Displacement and Categories of Affected People

Every effort should be made to estimate eventual displacement, in part to estimate budgets and to evaluate consultation requirements and potential challenges to Project staff. Different categories of those displaced may include, for example, those losing legal title and those without it, those losing lands or those losing housing or those losing both, those losing temporary access or those losing permanent rights, business or residential property. Describe the unit of analysis, whether “cases” (such as properties or fields), or households or individuals. Describe whether uniform approaches will be taken across all subprojects, and how records will be kept.

[3] The following section is extracted from Environmental and Social Management Framework for World Bank Projects with Multiple Small-Scale Subprojects. A Toolkit. The World Bank. Africa Region, February 2005.

4. Eligibility Criteria for Various Categories of Affected People

Determine the method for setting a cut-off date for eligibility for compensation. Demonstrating that compensation will be paid only to those established in an area, or with certain kinds of assets, early in the Project will help to avoid a "rush" into areas that may come into the Project list of subprojects later. Such opportunistic invasions of possible subproject sites constitutes to be a major risk to Projects, especially where subprojects may be chosen from a very limited set of alternatives that become known publicly. Therefore, depending on the number, sequencing, and magnitude of subprojects, one or several rolling cut-off dates may be advisable.

Set out the different categories of people that may be affected by subprojects, and show the types of losses such people may suffer, whether to land, income, rights of access, housing, water sources, proximity to work, and others, and including combinations (house and land, for example). Define the criteria that will be used to identify the eligibility for compensation for each category of affected people. These criteria may include, for example, whether losses are partial or total, whether people have their own land or also rent land, and what happens when buildings are occupied by more than one business tenant or household. Make the criteria user-friendly, so that those applying the principles to subprojects "on the ground" will be able to quickly identify whether people affected are eligible for compensation, and how. Describe who will judge eligibility in difficult cases, for example by the use of neighborhood or village committees, or outside experts, and how such processes will work.

It may be necessary for country approval to define categories of people eligible under national law, and, separately, any others who must be compensated because of the requirements of World Bank policy. The unit of compensation may also need to be defined – individuals, families, collectivities (or all three, because some losses may be sustained by individuals, others by the community as a whole or by associations within it such as religious or farmers' groups). Some impacts may be defined as non-compensable, or as compensable with a generic payment – minor strips of land of a meter or two along a road to be widened in a non-farmed area, for example. Finally, cash payments may be more acceptable when losses constitute a very small fraction of incomes, than when the income source (or residence plot) is so compromised that the entire holding or structure should be replaced. Defining the treatment to be applied to the major variations of all the main types of impacts eliminates the need to negotiate these issues for each subproject.

5. Valuing Affected Assets

Describe the borrower country's methods of valuing those assets that it deems eligible for compensation, and those that must be compensated under the principles that meet the World Bank's policy requirements. Explain the methods for *inventorying* assets, *assigning values* to each type of asset, and *coming to agreements* with each affected person or group on the total profile of losses and compensation. Present, to the degree possible, an "entitlement matrix" (example below) which shows the types of affected people, the types of losses, and the forms and amounts of compensatory actions that will be taken for each type.

Example: Resettlement Entitlement Matrix

CATEGORY OF AFFECTED PEOPLE	TYPE OF LOSS	ENTITLEMENTS				
		Compensation for Loss of Structures	**Compensation for Loss of Assets**	**Compensation for Loss of Income**	**Moving Allowance**	**Other Assistance**
Property Owners	Loss of Land	----	Land replacement at new site, plus land clearing by subproject	Crops at market cost in scarce season	----	Food from WFP during construction of new site
	Loss of structure – residential or business	Compensation at full replacement value not depreciated	Fences (wire or wood) at $3/m Hand-dug wells at $200	For loss of rental income, lump sum payment of 6 months rent per tenant	Moving to be paid by subproject	Disturbance allowance of $100
Residential tenant	Loss of rental accommodation	No loss of structure, no entitlement to housing at new site	Replacement cost for non-movables if installation was agreed with owner	----	Project-paid moving if notification before deadline	6 months rent; equivalent for disturbance
Business tenant	Loss of premises	----	Replacement cost for facilities that cannot be moved	For loss of business income, payment of half of turnover for 6 months	Project-paid moving if notification before deadline	----
Encroachers (using land)	Loss of land	----	Relocation to resettlement site of choice, with payment of rental fee for land. For crops, fences and wells – as above for owners	----	----	Food from WFP during construction of new site
Squatters (living on site)	Loss of shelter	Compensation at full replacement value for structure, relocation to resettlement site, with payment of site rent	----	Payments in lieu of wages while rebuilding	----	Disturbance allowance of $100

Example: Procedure for Valuing Compensation Entitlement

> *A compensation committee including elders, government representatives, a project staff member, and two villagers will be organized by the appropriate government agency or kebele/village administrator, and will visit the affected area. Each asset will be enumerated and inscribed on a register. Values for each types of asset will be pre-printed, shown to the affected person, and set against the type and number of such losses that the individual will sustain. The total compensation for that category of loss will be shown, and the total of all losses shown as well. The inventory and evaluation will be signed and a copy given on the spot to the affected person. The form will say, and the affected person will be notified, that the inventory will not be official until a second signed copy, verified by project supervisory staff, is returned to the affected person. At that time, a copy of the grievance procedure will also be given to the affected person.*

6. Organization, Procedures and Responsibilities

Describe the process by which individual Resettlement Action Plans (RAPs) for subprojects will be prepared and submitted to Project authorities, considered and approved, and how entitlements will be delivered. This process must be integrated into the institutional arrangements and procedures used by the Project for managing the identification, preparation, approval and implementation of subprojects. It is expected that extension teams, with Project training, will be able to adequately assist communities in preparing any required RAPs before submitting their application, though specialized technical assistance may be required early in Project implementation or in more complex cases. Refer to more detailed guidance on preparing RAPs. Specify whether some or all RAPs should be reviewed by the Bank, and how this will happen.

Specify that RAPs must be:

- approved and disclosed to the public *before* overall subproject approval can be considered; and
- implemented *before* other subproject activities can begin.

State who in the overall Project organization will be responsible for resettlement, and what facilities the overall resettlement officials will have available to them. If there is no unit or officer(s) with the training and job description to oversee resettlement issues, describe the way in which such capacity will be developed, structured, and given authority.

Partial Example:

> *A unit with one resettlement officer (RO) will be attached to each provincial project coordination unit. The RO will report to the provincial coordinator. During the first six months, a consultant will oversee resettlement and train this officer.*

Partial Example:

> *Once a subproject is approved, compensation in kind or in cash will be completed before an affected party is required to move or give up ownership of or access to the asset in question. Where cash is to be paid, the affected person will be given a check provided*

he/she already has a bank account; if not, cash will be delivered at the district office of the Project.

6. Consultation with, and Participation of, Affected People

Describe how people affected by particular subprojects will be consulted throughout the process of preparing RAPs.

7. Schedule for Implementing Resettlement Provisions

Set out the schedule by which resettlement will arise and be treated, both in terms of the overall management of the Project and the flow of subprojects.

Example:

By effectiveness: project resettlement coordinator recruited. Month 6, resettlement oversight coordinator and staff in place, effective. Months 4-8, lower level staff trained in use of screening and evaluation tools, and in community consultation methods. By end of month 12, report on subprojects with resettlement for year 1 sent to Bank. For each subproject, resettlement items to be integrated into subproject calendar. Demonstration that no subproject to be accepted without completed land acquisition information and either RAP or statement that no RAP is needed. Schedule to show that no construction will take place where there is resettlement without entitlements paid.

8. Grievance Redress Mechanisms

Describe the mechanisms available to affected people for complaints about aspects of their resettlement treatment. Show how the mechanism will be accessible (in terms of language, distance, and cost) to affected people, and what recourse/appeal from the local grievance mechanism may be available.

9. Budget and Funding Arrangements

Estimate the overall costs of resettlement, including funds for general oversight. Show the sources of funds. Estimate the types and numbers of subprojects and a nominal resettlement budget based on an estimate of how many subprojects may involve resettlement.

It should not be difficult to estimate the budget required for "typical" subproject resettlement in relatively uniform sector investments, for example if all subprojects will be drainage schemes, or transmission lines. For projects where different types of subprojects may be selected with no prior knowledge of probable choices, or where only some fraction of subprojects may entail involuntary resettlement, estimating total costs may be more difficult.

10. Supervision and Monitoring Arrangements

Provide an appropriate mechanism for supervising the effective implementation of resettlement, either as part of overall subproject supervision, or separately to affirm that the resettlement

objectives for all affected people are achieved. Show how the results of monitoring will be fed back into overall Project implementation. Where appropriate, set up monitoring checklists or templates to focus the work of local monitors.

Partial Example:

NGO XY has agreed to serve as the resettlement and social benefit monitor for all subprojects in Province A. For resettlement, each six months the NGO will select a random sample of subprojects with resettlement, visit each, and report on the progress of resettlement using the tools provided in the Implementation Manual. The results will be summarized in a report to the Project managers and the Bank which uses key performance indicators selected by the Project as reporting topics. Qualitative comments on resettlement progress will also be provided.

ANNEX 2 RESETTLEMENT ACTION PLAN

A Resettlement Action Plan (RAP) should include, at a minimum, the elements outlined below[4].

1. Introduction and Resettlement Problem

Describe the subproject and its location. Identify the executing agency and person(s) responsible for preparing the RAP, along with their qualifications.

Describe the subproject activities that will cause displacement and efforts made to reduce the number of people displaced. Describe the site and the services currently available (schools, houses of worship, public transportation, health posts, markets etc) and their distance from the site.

2. Legal Framework

Provide a brief review of local laws, regulations and procedures on land acquisition and resettlement. Where gaps exist between local laws and World Bank policy, describe the ways to bridge these gaps.

3. Survey of Affected Properties, Families and/or Businesses

Collect data to complete Tables 1, 2, and 3 below.

Include additional information on dwelling value, willingness to be resettled, consultation meetings, etc.

4. Impacts Caused by Displacement

Provide the necessary level of detail to capture the extent of the impact of displacement. At a minimum complete Tables 4a and 4b.

5. Proposed Assistance to Resettled Families

Provide a detailed description of the types of assistance (e.g., compensation, resettlement to new housing, assistance for relocation) to be provided to oustees. Also describe the terms of agreement with oustees and the willingness of oustees to work with the discussed assistance and timetable.

In addition:

- Describe how efforts will be made to restore or enhance incomes;
- Describe how special attention will be given to people who are aged, invalids, single mothers or otherwise in need of special assistance;

[4] Source: *Simplifying Safeguards: Addressing Environmental & Social Issues in Health Projects*. World Bank, SMART (Draft 1; Feb 2004)

- Describe how access to services will be restored or enhanced;
- Show how families or community groups will be preserved;
- Describe measures to reestablish socioeconomic networks; and
- Describe possible impacts on host groups and measures taken to avoid rejection or other negative reactions.

Using Table 5 below, identify the solutions agreed to with each oustee.

6. Responsible Agency

Provide the name of the entity that will be responsible for monitoring and implementation of activities involved in implementing the RAP.

7. Source of Budget and Cost Estimate

Include the cost of land, housing, moving costs, administrative costs, moving allowances, and settle-in allowances.

8. Resettlement Schedule

Describe the resettlement schedule, including the activities involved, dates, and budget, along with pertinent comments. Include any follow up activities to assess whether oustees have been able to reestablish their livelihoods/living situation. This schedule should be tailored to correspond to the schedule for design and construction of the civil works, and should be presented as in Table 6 below:

9. Monitoring/Follow Up Activities

Describe how the responsible agency will follow up the implementation of the Plan and address activities required to achieve the goals of the Plan.

10. Evaluation

Describe how evaluation of the Plan will be conducted. No later than 6-12 months after the relocation date, the responsible agency should make reasonable efforts to locate and follow up on the relocated families to determine if they have been able to reestablish their livelihoods and living situation. If this is not the case for any or all of the persons relocated, further assistance should be provided by the responsible agency.

Table 1: Property (Goods and Assets Affected)

Household number[1]	Business number[2]	Name of household head or business owner	Plot area	Description of houses and construct -ions	Uses of the property (housing, economic activity, other)	Level of effect (total, partial, minimum)[3]	Tenure status (titled owner, owner without documents, tenant, sharecropper etc.)	Employment status of all adults	Comments

[1] Households should be defined as commensal units i.e. people who eat out of the same pot.
[2] Business should be defined as any economic activity.
[3] "Partial" in cases where family/business can develop activities involving listed goods and assets; "Total" where activities cannot be developed as a result of displacement.
[4] If they are not owners, include the name and address of the owner.

Table 2: Socioeconomic Characteristics of Families

Household number[1]	Name of household head	No. of persons in household	No. of children <13 yrs	No. of adults +60 yrs	No. of students	Sources of income	Place of work or study and distances	Means of transport to place of study/ workplace

Table 3: Socioeconomic Characteristics of Business

Business number	Name of business owner	Age of business owner	Type of activity	No. of employees	Monthly income average	Destination of production	Place of selling	Duration of existence of business in affected location	Comments

Table 4a: Impacts Caused by Displacement (Households)

Household Number	Loss of Land and house	Loss or decrease of income	Loss or difficulty of access to educational services	Loss of access to health services	Loss of access to public services	Loss of social networks

Table 4b: Impacts Caused by Displacement (Businesses)

Business Number	Loss of land	Loss of Business place	Loss or decrease of income	Loss of economic networks	Comments

Table 5: Agreed Solutions

Household or business number	Resettlement Solution	Comments

Table 6: Resettlement Schedule

Activities	Dates	Budget	Comments
Planning of census and surveys			
Information to people affected			
Conduct census and socioeconomic survey			
Analysis of data and identification of impacts			
Definition of assistance measures			
Relocation/assistance			
Follow-up Visit by Responsible Agency			

Appendix A:

Log-Frame of Goals, Purpose, Outputs and Activities for FPEW2

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
GOAL 1: **Develop institutional capacity, technical and human resources.**	Establishment of new units, or strengthening of existing units undertaking core services for flood risk management – e.g. flood emergency response units, flood forecasting centers, etc.	New units active. Strengthened units functioning better, procedures clarified.	Firm commitments by national Governments to support and sustain the structural units – i.e. flood emergency response units, flood forecasting centers, etc
PURPOSE: Delivery of effective government services for the management of flood risk.	Functioning flood forecasting, flood warning, emergency response and post-flood recovery services.	Flood forecasts being made and disseminated during annual flood seasons. Successful trials of flood warning, emergency response and post-flood assistance procedures.	Participation by region/state and local authorities in training/development of flood warning and response procedures [Goal 3]. Real-time data network operational [Goal 2]. Communities at risk trained/prepared [Goal 4].
OUTPUTS: Reliable flood forecasting and flood warning services.	Timely delivery of flood forecasts & warnings to communities at risk.	Communities at risk have received real warnings or have been involved in trials of warning procedures.	Incidence of high floods will determine whether real (operational) or trial warnings can be used in verification. Communications systems. Social security situation (e.g. Gambella). Adequate resources mobilized by national, region/state and local governments for trials or operations.
Effective emergency response to flood alerts.	Linkage of flood forecasts/warnings to DPPA (Ethiopia) and CDO (Sudan). Reliable flood emergency response procedures that reduce flood risk.	Successful trials or operations of flood warning and emergency response procedures.	
Post-flood recovery and support services to complement self-help activities of communities at risk.	Reliable post-flood procedures to assist recovery of communities.	Successful trials or operations of post-flood assistance procedures.	
ACTIVITIES: Flood risk mapping.	INPUTS: ○ Pilot study to test accuracy of a low-cost technique for estimation of terrain elevation from satellite imagery analysis in blind trial against high-accuracy digital topographic data available from the Merowe Dam Project. ○ Acquisition and analysis of more accurate topographic and land use data: L Tana, Sudan rivers ○ Develop DEMs in selected areas ○ Refinement of mapping undertaken for the Baro-Akobo	Preliminary flood risk maps for selected high-risk areas adjoining L Tana by Year 2. Refined flood risk maps for Baro-Akobo floodplains by Year 2. Finalized flood risk maps for Blue Nile and Main Nile by Year 5. DEMs for Dinder & Rahad by Year 5.	Technical support activities (hydrology & hydraulic modeling) in Goal 3.

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	○ Land use mapping in the Gambella plains: locations and sizes of all settlements identified; preparation of GIS layers to complement flood risk mapping already available. ○ Delineation of flood risk areas ○ Map production		
Establishment of flood forecasting center in Addis Ababa.	○ Establish, equip & support FFC office ○ Train FFC personnel & undertake study tour ○ Development of flood forecasting models/procedures	FFC office established in Year 1 FFC fully operational by Year 3, and functioning independently by Year 5.	Activities for support training and technical assistance for new FFC in Goal 3.
Support for/ rehabilitation of existing flood forecasting activities in Cairo and Khartoum. Upgrading of equipment.	○ Reinstate and rehabilitate the FEWS flood forecasting system in Sudan MIWR ○ Update and upgrade hardware and software in Khartoum and refine and recalibrate the forecasting procedures ○ Upgrade flood forecasting procedures in Khartoum & Cairo when additional data available from Ethiopia ○ Upgrade computer equipment, software, training in NFC Cairo	Sudan: upgrade equipment in Year 1, rehabilitated flood forecasting operational and training in Year 2; upgrade hardware in Year 5. Egypt: upgrade facilities with training in Year 1. Recalibrate flood forecasting procedures for new data in Years 2/3.	Training support for rehabilitation of FEWS flood forecasting system in MIWR and technical assistance for NFC Cairo is in Goal 3 activities.
Strengthen GIS capability in MIWR to support flood risk mapping in Sudan.	○ GIS software and supporting hardware to support the flood risk mapping effort ○ Training of staff in general GIS and flood risk mapping procedures	GIS unit equipped and trained by Year 2, ready for flood risk mapping preparation and production over next 3 years.	
New flood emergency planning units in DPPA (Ethiopia) and CDO (Sudan).	○ Establish & support new flood emergency response planning units within DPPA (Ethiopia) and CDO (Sudan) ○ In addition to planning role, units compile and manage flood intelligence databases	Flood emergency response planning units functioning full-time in CDO at beginning of Year 3, and in DPPA later in Year 3. Flood intelligence data-bases populated by Year 5 adequate to provide sound planning and management data for the future.	Units established after preparation of guidelines, support & training provided in Goal 3 activities
Capacity building and funding support for RFCU within ENTRO.	○ RFCU coordinates implementation and management of FPEW Phase 2 program of activities ○ RFCU coordinates collection of flood-related data in regional database	RFCU established in FPEW1 remains active and capable of performing essential functions throughout 5 years of FPEW2. National Project Managers appointed by ENTRO to coordinate implementation activities, convene National Working	

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	○ RFCU coordinates information exchange and data analysis, and develops platform for experience sharing and technical exchange ○ RFCU coordinates with EN countries, donors, consultants and other relevant EN projects in relation to FPEW project activities	Groups, and direct National Implementation Units for community programs.	
Office and field equipment for MWR (Ethiopia) and MIWR (Sudan).	○ Training and equipment for the Hydrological Services Department of MWR in Addis Ababa to undertake routine operations, data management and regular maintenance of river gauging stations (especially those to be considered part of a flood forecasting network) ○ Strengthen NMA and MWR regional offices, including provision of basic IT equipment and standard software, Internet links to Addis Ababa, appropriate training support, vehicles and office equipment. ○ Upgrade equipment/facilities at MIWR Khartoum office ○ Provide river gauging teams in Ethiopia and Sudan with adequate equipment for their field work, including current meters, ADCPs, boats, cables, *etc*. ○ Formalize arrangements so that current meters of MIWR in Sudan and MWR in Ethiopia can be calibrated using existing laboratory facilities at the National Water Research Center in Cairo.	At MWR (Addis Ababa): – install new IT equipment, including server, work-stations and printers; – install new database software for data processing, archiving and retrieval, supported by appropriate training; – install new system (hardware and software) for digitizing AWLR charts, supported by appropriate training; – vehicles for travel to regional offices and river gauging sites for monitoring, supervision and inspections. At MIWR (Khartoum): – new hardware and software (stand-alone modeling computer, color printer/ scanner, mass storage device for Nile Forecast Center; – hardware and software for GIS unit, supported by appropriate training of existing and new staff), – vehicles for travel by MIWR Hydrological Stations Unit to regional offices and river gauging sites for monitoring, supervision and inspections	Associated training support also in activities in Goal 3.
Office and field equipment for SMA (Sudan) and NMA (Ethiopia).	○ Upgrade equipment/facilities at SMA in Khartoum ○ Restore the hardware and software for the equipment that receives SST data at SMA ○ Improvement of facilities at any rain gauge sites that will be incorporated in real-time networks.	At SMA (Khartoum): – mass storage devices for archiving satellite imagery; or, procurement of a CD writer, and facility for archival and cataloguing that will accumulate; – expert assistance for SMA website development; – new PCs with high standard specifications;	Associated training support also in activities in Goal 3.

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
		– laptop computers to download and check field data from automatic recording sites; – color printer/scanner.	
Rehabilitate materials testing laboratory at MIWR to support national sediment sampling program and special technical studies in Khartoum rivers.	○ Rehabilitate laboratory facilities in Khartoum to provide capability for materials testing, including suspended sediment and bedload samples.	Laboratory equipped, staffed and functional by end Year 3.	
Office and field equipment, vehicles, communications for CDO.	○ Provide and upgrade communications and other essential equipment, ○ Provide appropriate training	At CDO (Khartoum & State offices): – vehicles – communications equipment – boats – office equipment	
Office equipment for HAC and support establishment of new HAC office in Dongola.	○ Produce operational and planning guidelines for post-flood recovery & assistance in Sudan ○ Training programs based on guidelines. ○ Provide and upgrade computer equipment and communications and other essential equipment, with appropriate training as necessary ○ Establish, equip and train State office in Dongola	Guidelines prepared and training delivered by end of Year 3. Dongola office operational by Year 4.	
Facilities, management support, technical assistance and travel budget for establishment of EN flood management interest group under NBCBN.	○ Establish & support an Eastern Nile sub-group within the NBCBN flood management research cluster with office equipment, IT, website and travel budget	EN sub-group organized and functioning with action plan by end of Year 2.	
GOAL 2: **Provide access to adequate real-time rainfall and river gauging data.**	Adequate real-time data for flood forecasting purposes.	Acceptably accurate forecasts of river floods in flood risk areas.	Firm commitments by national Governments to support and sustain flood forecasting centers and the network for data acquisition/ communications. Regional cooperation and shared responsibility for funding/operating/maintaining the network.

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
PURPOSE: To improve/enable flood forecasting so that communities at risk can receive sufficient warning to take appropriate actions to minimize exposure to flood hazard.	Lead times of flood warnings are adequate for appropriate actions to mitigate flood risk to be taken in advance of imminent flooding.	Reductions in flood damages/ impacts within communities at risk due to appropriate advance mitigating actions.	Effective delivery of government services for flood warning and response procedures [Goal 1]. Communities at risk trained/prepared [Goal 4]. Communications systems. Social security situation (e.g. Gambella).
OUTPUTS: A rainfall and river height data acquisition and communications network transmitting real-time data to centralized flood forecasting centers.	Flood forecasting centers in Addis Ababa, Khartoum and Cairo receiving real-time data adequate for their flood forecasting purposes .	Review satisfaction of flood forecasting centers with data received at regular intervals following annual flood seasons.	Political stability in the region and political will to cooperate in the common interest. Regional cooperation and shared responsibility for funding/operating/ maintaining the network.
ACTIVITIES: New network of reporting river gauging and rain gauge stations in Ethiopia.	INPUTS: ○ A network of rain gauges and river gauges to transmit real-time data to a central receiving station in Addis Ababa to support national and regional flood forecasting efforts ○ On-site data logging at all sites and use of manual observations at selected key sites to ensure adequate back-up ○ Review the data quality of river discharge records and discharge ratings at key river gauging stations to be considered part of a flood forecasting network ○ Inspection of access routes to key river gauging stations that can be identified by MWR as having access problems. Plan and implement a program to improve access ○ Improve facilities at key existing river gauging sites, including where necessary staff gauges, AWLRs, cableways, *etc*. Equip any new stations recommended in proposed reporting river and rainfall gauge network.	Network to be commissioned in Year 3. Maintenance contract to be funded until end Year 5, including support for national team to work jointly with maintenance contractor.	Satellite communications assumed, to be determined/finalized during FPEW1.

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
New reporting river gauging stations in Sudan.	○ Review the data quality of river discharge records and discharge ratings at key river gauging stations to be considered part of a flood forecasting network in the Sudan ○ Installation of six new river gauging sites on the Dinder, Rahad and Atbara River and tributary. Upgrading of facilities at Kashm el Girba and Kubur river gauging sites.	New stations to be commissioned by Year 4.	
New reporting weather stations in Sudan.	○ Replace equipment at 15 automatic weather recording stations in the Sudan with modern data acquisition equipment and new data communications hardware	Rehabilitated stations to be commissioned by Year 3.	
Studies to determine effectiveness of improved flood forecasting for HAD (Egypt) using expanded network data.	○ Studies to examine the benefits of improved flood forecasting with the additional data from improvements to the reporting gauge network, particularly in Ethiopia. Amendment of flood forecasting models to integrate the new data, comparisons of forecasts with and without new data, and use of the DSS for HAD to investigate the implications for operations of HAD and the socioeconomic benefits to be derived.	Studies completed by beginning of Year 3.	
GOAL 3: **Raise the level of institutional experience and skills.**	Ability to undertake flood management activities that were not possible before, or more efficiently than before.	New or improved flood management services available – e.g. flood intelligence database, flood forecasting, dissemination of warnings/alerts, response procedures.	Firm commitments by national Governments to support and sustain initiatives with adequate staffing, recruitment, funding, etc. Ongoing support for national governments from regional/international organizations e.g. ENTRO
PURPOSE: Training and technical assistance to make good use of the capacity and resources developed under Goal 1.	Delivery of appropriate training & technical assistance matching flood management needs and objectives.	New or improved flood management services functioning with trained personnel and utilizing technical assistance provided.	Firm commitments by national Governments to support and sustain initiatives with adequate staffing, recruitment, funding, etc.
OUTPUTS: Appropriately skilled and experienced staff to undertake	Essential flood management activities being undertaken and effective services being	Communities at risk are receiving real warnings or have been involved in trials of warning procedures. Emergency	Sound recruiting and staff support programs/ policies by governments to sustain required human resources,

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
essential flood management activities and to deliver effective government services.	delivered to communities at risk.	response and post-flood recovery services are being delivered or have been successfully trialed.	skills and experience. Ongoing learning and knowledge exchange through regional cooperation, joint activities, etc.
ACTIVITIES:	INPUTS:		
Training, technical assistance and specialist support for new FFC in Addis Ababa.	○ Train FFC personnel & undertake study tour/overseas specialist training ○ Development of flood forecasting models/procedures ○ Consulting specialists to provide assistance for establishment, technical administration and development of flood forecasting models/procedures, and to provide technical training and support	FFC fully operational by Year 3, and functioning independently by Year 5.	
Training associated with rehabilitation of flood forecasting capacity in Khartoum.	○ Specialist training associated with reinstatement of FEWS flood forecasting system	Rehabilitated flood forecasting operational and training in Year 2.	
Revision of flood forecasting procedures in Cairo and Khartoum to utilize new network data.	○ Recalibrate rainfall estimation and flood forecasting procedures to accept new data from expanded data acquisition network	Completion by Year 3 in readiness for commissioning of data acquisition network.	
Technical assistance with ongoing flood risk mapping program in Egypt.	○ Benchmark existing mapping program against good international practice ○ Development of flood risk mapping for a set of planning floods. ○ Identification of land use, buildings and infrastructure to determine the exposure of people and property to the flood hazard as a foundation for future flood emergency response planning and floodplain risk management planning.	Hardware & software in Year 1. Study tour in Year 2. Technical assistance completed by end of Year 3.	
Guideline procedures and training for flood emergency response procedures in DPPA (Ethiopia), and CDO and HAC (Sudan).	○ Produce operational and planning guidelines for flood emergency response planning in Ethiopia and Sudan ○ Training programs based on guidelines.	Guidelines for flood emergency response operations and planning prepared by end of Year 2 in Sudan and by Year 3 in Ethiopia, with training delivered prior to & in support of flood emergency response planning units [see Goal 1 activities].	
Guideline procedures and training for flood emergency	○ Preparation of operational and planning guidelines for regional and especially	Guidelines finalized in Year 2. Training completed by end of Year 3.	

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
response procedures at regional & woreda levels in Ethiopia (Lake Tana area).	woreda staff who are close to the flood risk areas around Lake Tana for effective emergency response to flood warnings ○ Training program based on guidelines.	Follow-up support in Years 4,5.	
Training at MWR H.O. to increase productivity of hydrological data management services in Ethiopia.	○ Training for the Hydrological Services Department of MWR in Addis Ababa to undertake routine data management and processing operations	Completion by Year 3 in support of capacity building activities in Goal 1. Follow-up support in Year 4.	
Hydrological analysis & hydraulic modeling to support flood risk mapping in Sudan.	○ Preliminary hydrological and hydraulic modeling studies to determine planning floods and flood levels, in support of flood risk mapping objectives	Analyses completed by end of Year 2 in readiness for flood risk mapping activities in Goal 1.	
Training to support activities at regional offices (MWR/NMA) in Ethiopia; and field offices (MIWR) in Sudan.	○ Training for regular maintenance and operations of river gauging stations by MWR field teams ○ Training for staff in regional offices to build capacity for basic data processing/management tasks	Training completed by Year 3, in advance of commissioning of new data network, and in support of capacity building at regional MWR/NMA offices and MIWR field offices [see Goal 1 activities].	
Training in dynamic weather forecasting for SMA.	○ Expert training in up-to-date dynamic (short-term) weather forecasting techniques	Delivery in Year 2.	
Field sampling and technical investigations of river hydraulics. sediment transport and channel morphology – urban river reaches of Khartoum.	○ Field sampling program to collect data on flow distributions, sediment transport and fluvial geomorphology of the rivers in Greater Khartoum. ○ Calibrate and develop detailed hydraulic and sediment transport models applied to the urban reaches of the rivers in Khartoum to provide good scientific information for evaluation of riparian interventions ○ Technical assistance to address specific sampling problems (*e.g.* measurement of bedload), and in the planning, analysis and review of the modeling research	Field program in Years 2,3. Models calibrated and applied by end of Year 5.	
Technical assistance for field sampling program and sediment transport modeling to address bank erosion and scour problems caused by flood releases in Egypt.	○ Field sampling program to collect data on flow distributions, sediment transport and fluvial geomorphology of a pilot reach of the Nile River. ○ Calibration and development of detailed hydraulic and sediment transport models to provide good scientific information for	Field program in Years 1,2. Technical assistance completed by end of Year 3.	

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	evaluation of bank erosion and scour problems that are an important source of flood damages in Egypt. ○ Technical assistance in specific aspects of the field sampling program (*e.g*. bedload sampling), and in planning, analysis and review of the scientific research.		
Pilot study on bank erosion management techniques to combat *haddam* in Sudan.	○ Pilot program to investigate methods that may be effective to combat bank erosion in the Sudan by adapting techniques that have been applied elsewhere and using locally available materials or low technology ○ Preparation of field guide manual.	Pilot program in Years 2,3. Manual produced by end of Year 3. Follow-up support in Years 4,5.	
Annual post-flood conferences and biennial technical conferences on flood management in EN region.	○ Annual post-flood conferences to enable professionals active in the fields of flood emergency response, weather and flood forecasting to compare experiences, learn from each other and be better prepared for their future roles. ○ Biennial technical conferences to bring together a more diverse mix of academics and other professionals with an interest in flood management, from whatever perspective.	Regular activities to be organized/managed by ENTRO's RFCU.	
Special seminars on topical issues of interest to flood management in EN region.	○ Smaller meetings of specialists convened to exchange knowledge and ideas in relation to topical issues for flood management that may be prominent at some particular time	Activities to be organized/ managed by ENTRO's RFCU as the need/interest arises.	
Joint study tours.	○ Study tours sponsored for practicing professionals from each of the regional countries to travel together to other parts of the world to study how their particular aspects of flood management are planned and undertaken elsewhere.	Activities to be organized/ managed by ENTRO's RFCU as the need/interest arises.	
Visiting specialist program.	○ Sponsored visits by international specialists to meet current technical needs. As a supplement or alternative to joint study tours, specialists could be brought to regional countries to advise on planning	Visits to be organized by Eastern Nile sub-group within the NBCBN flood management research cluster, or alternatively the RFCU within ENTRO.	

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	and implementation of specific aspects of flood management.		
Joint technical studies.	○ Investigations may be funded into subjects of joint interest to one or more regional countries. These investigations intended to be more specifically project-related than the program of research routinely supported by the NBCBN flood management research cluster.	Studies to be organized/ managed by ENTRO's RFCU as the need/interest arises.	
GOAL 4: **Assist communities at risk to be self-organized and prepared for floods**	Organized community flood risk management groups. Community flood risk management action plans prepared and being implemented.	Number of active community flood risk management groups. Number of flood risk management action plans prepared by communities at risk.	Effective cooperation and coordination between government authorities, NGOs and communities. Linkages between community flood risk management action plans and government flood management services to achieve a bottom-up, top-down approach to flood risk management. Stable security situation (e.g. Gambella).
PURPOSE: Train and equip communities at risk to be self-organized and prepared for floods.	Organized community flood risk management groups with adequate training and knowledge base to prepare sound community flood risk management action plans.	Number of functioning community flood risk management groups.	Adequate support by government authorities, NGOs and the Project to convince communities they will benefit from community flood risk management action plans and these will be implemented. Stable security situation (e.g. Gambella).
OUTPUTS: Development and implementation of community flood risk management action plans (community flood MAPs).	Community flood risk management action plans prepared and being implemented.	Number of flood risk management action plans prepared by communities at risk. Number of community flood MAPs being implemented.	Effective cooperation and coordination between government authorities, NGOs and communities.
ACTIVITIES: Guidelines for developing community self-reliance.	INPUTS: ○ Expert groups formed to draft initial training guidelines, and to train training/extension teams in Ethiopia and Sudan	Initial training guidelines prepared in Year 1, revised in Year 3 after training experience in the field.	Refer to PIP chapter 3. Preliminary surveys/assessments undertaken during FPEW1.

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Training of extension team members by expert group in Ethiopia and Sudan. Public education campaign and training of communities for self-reliance and self-organization. Support for preparation and implementation of community-driven flood risk management action plans for preparedness and self-management.	○ Program to provide training and practical education to the communities at risk by extension teams, expanding year by year to embrace new communities ○ Extension team members collaborate with State/Region CDO/DPPA to organize Project Coordination Unit (PCU) and Project Steering Committee at State/ Region level (S/R PSC) to appraise, review and approve applications for funding of community-driven sub-projects ○ Training of appropriate local authority staff to assist and review community proposals ○ Formation of community flood management groups ○ Collaboration between community flood management groups and extension teams to prepare community flood risk management action plans ○ ENTRO-appointed National Project Managers organize National Implementat-ion Unit (NIU) to refer funding applications to NWG or national Project Steering Committee (NPSC) for review and forward to ENTRO for release of funds ○ Bank accounts opened for NIU and PCUs for disbursement and accounting of funds ○ Development of detailed procedures for approval of funding applications to implement measures of community flood risk management action plans ○ Funding support for community-driven initiatives ○ Development and application of detailed procedures for review and supervision of implementation of measures approved for funding, including annual reviews by the expert group.	Training/extension teams trained & prepared in Year 1. Extension teams commence working with first set of selected communities during first dry season after training of trainers. First community flood risk management action plans prepared, and first applications for funding of community-driven initiatives during the following dry season. Each year, extension teams expand the number of communities involved by adding new sets of selected communities to their program. On-ground works/actions begin to be implemented by late in Year 2 or early in Year 3.	Substantial inputs required from training teams are well beyond resources available through government, so largely rely on NGOs. Government should have some input in the expert teams formed to develop guidelines and train trainers, and should be responsible for approval processes and participate in review processes.

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
GOAL 5: **Flood mitigation planning for certain urban areas.**	Implementation of flood mitigation measures. Land use management proposals.	Flood protection works in Gambella. Improved flood protection works in Dongola. Pilot land use management plan for selected flood risk area in Egypt.	Firm commitments by national Governments to support initiatives and maintain structural works. Stable security situation (e.g. Gambella).
PURPOSE: Where substantial development exists in urban flood risk areas that cannot realistically be reversed/ relocated, undertake management measures to manage future flood risk.	Implementation of flood mitigation measures. Land use management proposals.	Subject to outcomes of preliminary investigations, new flood protection works implemented in Gambella, and flood protection works rehabilitated in Dongola. Pilot land use management plan for selected flood risk area in Egypt.	Flood protection measures subject to preliminary investigations and confirmation of economic viability. Effective implementation by government authorities of resettlement plans as necessary.
OUTPUTS: Appropriate structural flood mitigation measures and non-structural planning measures.	Implementation of flood mitigation measures in Dongola and Gambella. Land use management plan prepared for selected flood risk area in Egypt. Introduction of land use management measures in master plans for Khartoum and Bahir Dar.	Works on the ground in Dongola and Gambella. Land use management plan for selected flood risk area in Egypt.	Flood protection measures subject to preliminary investigations and confirmation of economic viability. Firm commitments by national Governments to support planning initiatives and maintain structural works.
ACTIVITIES: Preliminary investigations, design & construction of flood protection works at Gambella (Ethiopia) and Dongola (Sudan).	INPUTS: ○ Preliminary survey and investigations to verify the extent of works necessary, more accurately estimate quantities and rates, costs and benefits, and review the socio-economic and environmental consequences and identify mitigating measures. ○ Preliminary design ○ Preparations for any required resettlement ○ Design & construction supervision during implementation of works	Preliminary investigations at Dongola completed in Year 2. Design & construction by end of Year 3. Preliminary investigations at Gambella completed in Year 1. Design & construction in Year 3.	Design & construction phase contingent upon outcomes of preliminary investigations. Adequate communications & security for personnel to be stationed in Gambella.
Technical assistance for pilot Land Use Management Plan in selected flood risk area, Egypt.	○ Selection of pilot reach for development of a Floodplain Risk Management Plan (FRMP)	Pilot reach selected and background data compiled in first half of Year 4. Study tour in first half of Year 5.	

OBJECTIVES	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	○ Specialist consultants to assist in preparation of FRMP	Draft FRMP completed in Year 5.	
	○ Study tour for selected government participants		
Technical assistance for land management planning, Bahir Dar (Ethiopia) and Khartoum.	○ Technical assistance to strengthen the capacity of the municipal office to apply land management planning in its master plan	Assistance provided in Years 2 and 3.	
	○ Study tour for selected government participants	Study tour in first half of Year 3.	

Appendix B:

National Strategies for Flood Risk Management

B.1 ETHIOPIAN NATIONAL FLOOD RISK MANAGEMENT STRATEGY

B.1.1 General

The flood risk management strategy for Ethiopia is consistent with the general management strategy identified in chapter 2.

In Ethiopia, the institutional capacity building focuses on developing capacity in MWR and DPAA at national level, and MWR and NMA at regional level. Capacity building at woreda level will also be important, both in relation to achieving an effective flood warning system, and also in reviewing and approving small projects that will be proposed by communities under the community preparedness sub-program.

With regard to development of an integrated real-time data acquisition network, Ethiopia is central to this Project component. The main area for development of the network will be within Ethiopia. Technical assistance is proposed to support this aspect of the national program for Ethiopia, and to assist in developing the capacity for effective flood warning and institutional preparedness for flood risk management.

Programs of public education and training to raise community awareness of flood risk and equip communities with knowledge and skills to assist them organize and be more prepared for floods will focus initially on the target areas surrounding Lake Tana. Future efforts need to be directed to communities in the Gambella plains once better access to this region can be secured.

Small-scale structural flood mitigation measures are likely to emerge from the public education and training programs, initially around Lake Tana. Larger scale structural flood mitigation measures are not proposed for Lake Tana under the FPEW Project because of the mitigating effects on lake levels being achieved through current and past projects (Tana-Beles diversion, and reconstruction of Chara Chara Weir), and because flood mitigation on the contributing rivers can best be advanced through irrigation project developments currently planned and under investigation. Medium-scale structural measures are proposed for urban communities on the Baro River under FPEW implementation, however these have to be preceded by rigorous assessment of environmental and social impacts, site survey and more rigorous determination of flood damages and development costs to prove economic costs and benefits.

A detailed program of activities for implementation in Ethiopia is included in the following chapter. However, key features of the national strategy may be summarized as follows.

B.1.2 Clarification and Delineation of Flood Risk Areas

Areas subject to flood risk need to be delineated, and the flood risk quantified in terms of flood hazard and exposure to flood risk). Initially, this work should be completed for the

target areas around Lake Tana and in the Gambella plains of the Baro-Akobo. Some preliminary work was undertaken during Project Preparation:

- satellite imagery and digital mapping was interpreted and field reconnaissance undertaken in the key target areas of the Fogera and Dembiya plains adjoining Lake Tana to identify areas of high flood risk;
- digital mapping of the Gambella Plains previously initiated by ENTRO based on earlier mapping of flood extents was refined and corrected.

Major flooding that occurred in 2006 should enable this work to be extended and improved if satellite imagery is available or if authorities undertake post-flood field investigations to acquire relevant data on flood extents, flood depths and durations.

In the Lake Tana areas, there were some minor anomalies in the flood mapping that should be resolved. Future work should estimate frequencies and depths of flood inundation throughout the Fogera and Dembiya floodplains. That would entail hydrological studies and hydraulic modeling in association with interpretation of more satellite imagery. The exposure of development (infrastructure, buildings, etc.) to flood hazard should also be determined from analysis of aerial photography or satellite images. Once work is completed for the Fogera and Dembiya floodplains, efforts should be made to extend the flood risk mapping to other flood risk areas around Lake Tana.

In the Gambella Plains, the flood risk mapping undertaken by Selkhozpromexport (1990), subsequently digitized by ENTRO and then improved and corrected during this Project Preparation, is probably the best example of flood extent mapping extant in the Eastern Nile region. It too needs further development: in particular, exposure of development to flood hazard should be determined from analysis of aerial photography or satellite images; and ideally accurate digital elevation data should be acquired to assist with estimation of flood depths.

If the flood risk mapping can be implemented for these two main target areas, the knowledge and skills will be developed to enable future application to other flood risk areas in Ethiopia within the Eastern Nile basin, and elsewhere.

The flood risk mapping aims to delineate flood extent, and establish flood hazard and exposure to flood hazard within those extents. The third component of flood risk is vulnerability. This can best be evaluated through social surveys and assessments, and can be mitigated in various ways.

B.1.3 Development and Support of a Flood Forecasting Capability

It is important that effective flood forecasting capability be developed in Ethiopia. This was emphasized by the experience of flooding in 2006. Currently the NMA provides effective weather forecasting using a network of synoptic stations, however effective flood forecasting requires a special unit properly trained and equipped to forecast the location, timing and magnitude of floods. A Flood Forecasting Center (FFC) should be located in Addis Ababa, which is centrally located between the two Eastern Nile FPEW target areas of Lake Tana and Gambella, and also centrally located in Ethiopia given that the FFC will ultimately be used as a national asset.

The tasks of flood forecasting in Ethiopia will include: forecasting of flooding in high flood risk areas in Ethiopia; forecasting of floods on major rivers such as the Tekeze, Abbay and Baro that are of regional forecasting interest; and potentially, forecasting for flood operations of Ethiopian dams. For forecasting applications aimed at high flood risk areas in Ethiopia, and potentially for flood operations of Ethiopian dams, the lead times available to forecast floods are often limited, and are certainly much shorter than lead times applicable in Sudan and Egypt. For example, for the rivers flowing into Lake Tana the delays experienced between onset of heavy rains and the onset of downstream flooding are typically 12 to 24 hours, compared to lead times of many days for high flood risk areas in the Sudan and weeks for HAD and downstream areas in Egypt. In these circumstances, it is not yet clear that forecasting techniques and hydrological models used in Egypt or Sudan will be most appropriate for Ethiopian purposes. While there would be advantages in achieving compatibility between methods in all countries of the region, this should not be a determining factor if better results could be achieved with alternative approaches. These decisions will need to be taken after preliminary hydrological studies very early in Project implementation. To extend the lead times available in Ethiopia, it may also be desirable to improve weather forecasting and in particular forecasts of rainfall depths and intensities; however there will be a trade-off between extending lead time and decreased forecast accuracy, and improvements in rainfall forecasting should be deferred until after an accurate hydrological flood forecasting system is functioning.

Although the office of the FFC may be housed conjointly with the MWR, it is proposed as a separate and autonomous unit reporting directly to the responsible Minister (currently the Minister for Water Resources). It must be organized to facilitate 24-hour operation during flood weather alert periods, so that whenever weather conditions are identified that have the potential to produce heavy falls of rain the FFC office will be manned continuously to monitor field conditions of rainfall and river flows. A prerequisite is a close working relationship with weather forecasting personnel in the NMA. Ideally, a representative from the NMA should be seconded to work with the FFC during the flood season from mid June to mid September. Given the short lead times available, it will also be essential that the manager of the FFC has the authority to issue flood emergency warnings and disseminate those warnings to relevant agencies and key contacts according to a predetermined plan. If that requires delegation of appropriate authority from the responsible Minister, then that must be pre-arranged.

Over the first few years, ongoing management support and technical assistance from international consultants is regarded as the best way to ensure practical outcomes. Management support and technical assistance from within the region (e.g. Egypt) would also be desirable if appropriate resources can be made available.

Naturally, access to field data on rainfall and river flows is necessary on a real time or near real time basis. To this end, a network of reporting river and rain gauges is proposed, initially focusing on the needs of forecasting floods in target high flood risk areas in Ethiopia (i.e. Fogera and Dembiya plains adjoining Lake Tana, and Gambella plain in the Baro-Akobo), and forecasting of floods on the major rivers of the Tekeze and Abbay that are of regional concern and flow across the international boundary into the Sudan.

Technical assistance and specialist contractors will be required for the installation and commissioning of the field equipment, particularly with respect to data communications and processing. Commissioning must include comprehensive training for MWR and NMA staff in the operations and maintenance of all equipment and facilities. It is proposed that MWR and NMA should assist in installation of the network so that they work alongside the visiting specialists. MWR and NMA could also be responsible for installation of any new data recording instruments that may be required. However, existing sites will be used as much as practicable.

An alternative would be to have a regional unit responsible for installation and commissioning of the real-time data network and/or for the operations and maintenance of the network after its commissioning. This could be a responsibility of the proposed Regional Flood Coordination Unit (RFCU) in ENTRO, for example. If the Ethiopian Government agrees, this might be a desirable target for future operations and maintenance, and could attract international funding and support to ensure system sustainability. In the short term, however, the RFCU does not currently exist, and when it does it will initially be preoccupied with other essential tasks (eg. regional coordination, supervision of flood risk mapping and other activities under FPEW implementation). It should take the time to develop and consolidate its organization and institutional strength before it embarks on such an ambitious endeavor as management of the real-time data network, which is also required urgently. In any case, one of the primary aims of the real-time data network will be for Ethiopian flood forecasting needs, and with appropriate training and support it is logical to build upon the skills and capacity that already exist in MWR and NMA for the operations and maintenance of the network, at least with respect to the data recording equipment and the field programs associated with station maintenance and the development and updating of discharge ratings. The data communications equipment is another matter, requiring new and different skills. One alternative is to ensure that thorough training is provided during system commissioning so that routine operations and maintenance can be accomplished by MWR and NMA staff. Another alternative is to fund a contract from the supplier(s) for ongoing operations and maintenance of the more sophisticated communications equipment. A third alternative could be to develop specialist capacity within Ethiopia to be able to reliably service the system. This might be either one or more private companies, or might be a public unit within a relevant Ministry. If so, it would be essential for that company (or unit) to be closely integrated in the steps of installation and commissioning of the system to maximize knowledge transfer from the international specialists.

B.1.4 Strengthening of Capacity for Flood Warning and Emergency Response

An essential adjunct to a flood forecasting system is a system for dissemination of flood warnings and an emergency response system to organize activities to evacuate people from flood hazard areas that may be inundated, provide them with temporary shelter and refuge, and assist with emergency relief such as food, blankets and clothing. If warnings can be delivered to those at risk sufficiently in advance of flooding, many will be able to take unassisted action to avoid danger or reduce damage to property and assets. Therefore dissemination of warnings must have the highest priority, however there will always be some (including the aged and infirm) for whom assistance will be critical.

To be effective, both systems for dissemination of flood warnings and for emergency response must be carefully planned in advance. For this reason a dedicated flood emergency planning unit (or sub-unit) is proposed to be added to the existing Early Warning Unit of the DPPA. This requires new positions to be created. Merely assigning additional duties to existing staff will be ineffective. Among other things, the unit would organize a system for dissemination of flood warnings and ensure its ongoing functionality, and would develop emergency procedures for evacuations and the welfare of those displaced by flooding. The time scales for warning dissemination and emergency action in flood events are much, much shorter than those familiar to the current work of the DPPA Early Warning Unit related to drought and famine relief, ranging from a few hours to a few days, depending on the localities at risk in Ethiopia. Considerable technical support and assistance will be necessary to establish and train the dedicated flood emergency planning unit. A chief coordinator must be appointed to be available and contactable 24 hours a day during the flood season from mid June to mid September. It is essential that the chief coordinator be available to receive flood warnings issued by the FFC. The chief coordinator would be able to delegate his/her responsibility when necessary, provided that other key links in the flood warning chain are advised in advance. The chief coordinator must also be ready to liaise with nominated officials in other agencies, including flood forecasters and weather forecasters, and any others who potentially have key roles in resolving any issues and constraints that may arise in either the dissemination of flood warnings or the provision of emergency services.

Several agencies at different levels of government in Ethiopia need to be involved and active in the dissemination of flood warnings and in the work of flood emergency response. Flood warning consultative committees (FWCCs) are proposed at national and regional levels to undertake advance planning for flood warnings, the national committee to be chaired by the chief coordinator and region committees to be chaired by region coordinators, and with members representing all key organizations that need to participate in the flood warning chain: e.g. FFC, DPPA, MWR,NWA, ministries related to transport, communications and agriculture, and perhaps selected NGOs. The FWCC should be comprised of senior technical specialists who will plan and coordinate the technical activities and communications essential for effective flood warning. At regional level, officials from woredas at highest risk from flooding should also be included in the FWCC.

The ultimate recipients of the flood warnings and the beneficiaries of the flood emergency response are individuals and communities remote from Addis Ababa, in the first instance in floodplains adjoining rivers flowing into Lake Tana, and in Gambella. Woreda officials and kebele leaders and council members therefore have key roles to play. Once again, nominated woreda officials will need to be contactable 24 hours a day during the flood season, and communications facilities to ensure this must be provided, together with adequate training and explanation of their essential roles during flood emergencies.

Clearly an emergency response plan is required for any system to be effective, and all those potentially involved will require training in the provisions of the plan and their role in it. Officials at regional level who can authorize and organize assistance to affected woredas (e.g. food and clean water, transport, shelter, clothing, medical aid, etc.) should also be embraced by the plan and be consulted during its development. The proposed program for FPEW implementation includes technical assistance for consultants with relevant expertise

and experience to work with DPPA in the preparation of guidelines for emergency response and flood warning. Once the guidelines have been prepared and DPPA staff in Addis Ababa are trained in the procedures, the training must be extended to regional and woreda officials as well. The training extension can be accomplished largely by DPPA staff (once head office staff are trained they can act as trainers to others) with a minimum of external assistance.

For flood warning, clear lines of communication must be established in the plan and sufficient redundancy included to avert failure. All links in the chain of communication, including redundancies, should be tested shortly prior to the main flood season to identify reassignments of duty, communications equipment shortcomings and the like that could impair performance during an emergency and to undertake remedial measures.

B.1.5 Programs for Public Education and Community Preparedness

Given the limitations in government resources that can be directed to flood management planning in Ethiopia, it is very important that the communities at risk are made better prepared for the advent of flooding and can organize themselves to take action to reduce danger and the material impacts of floods (flood damages). The most effective way to do this with limited resources is to develop a working partnership between government agencies and NGOs.

What are required are campaigns to raise awareness of communities at risk of the nature of the risk they face, the likely impacts of major floods in their area, and the types of activities they can undertake or participate in to modify flood risk (either by modifying the flood hazard, modifying exposure to flood hazard, or reducing their vulnerability to flood danger and damage). The community education and training campaigns should also advise communities of what government services are available and how they can avail themselves of the opportunities those services provide.

Equipped with this knowledge, and with appropriate levels of assistance, communities should then proceed to prepare and implement community flood preparedness action plans. The kinds of measures that may be included in their community action plans are discussed elsewhere. Examples are modifying flood hazard with small-scale structural measures, modifying exposure by protecting food stores or raising housing, or modifying vulnerability by constructing flood refuges or organizing community-based advance warning systems. The principle advocated is that the measures to be included in community action plans should be community-driven. If initiatives originate within the communities, that engenders involvement and community ownership, which typically leads to greater sustainability and better outcomes. Campaign workers or trainers should be available to work with community groups as they prepare their plans.

Implementation of the community action plans requires that a fund be available that can be accessed by communities. Procedures have to be established to ensure accountability, including procedures for review of community proposals, approval procedures, formal application procedures, and procedures for monitoring outcomes of funded proposals.

It is essential that government agencies be involved in the design and organization of the campaigns for public education and community preparedness. Accountability (review, approvals, allocation of funds, monitoring of outcomes) must reside with government agencies. However, government agencies do not have the time or resources to be continuously engaged in the more protracted activities of working with communities to inform and educate them, and assist them in preparation and implementation of their plans on the ground. This is where NGOs can supplement the government activities to deliver a more comprehensive and integrated program. In the initial phase of designing and organizing the campaigns and training the trainers who will go out in the field to work alongside communities, government and NGOs need to work together, with some assistance from specialists in flood management from government and contracted sources. Under the proposed partnership, the intensive effort of working with communities in the field would largely be undertaken by trained NGO staff (the trainers referred to above). This would relieve government officials of this burden. However, as noted above, government officials at local level and government agencies at higher levels will need to be involved in reviews, approvals, allocation of funds and monitoring to achieve accountability.

The objective of the programs for public education and community preparedness are to achieve tangible results on the ground in the communities that are at greatest risk from flooding.

B.1.6 Flood Mitigation Measures for Higher Flood Risk Urban Areas

In larger urban areas, resettlement can be less of a viable option, particularly where there are large numbers of buildings exposed to flood hazard (e.g. Gambella). Relocating large numbers of buildings and expensive assets outside floodplains or to areas of lesser flood risk may not be practicable, and although public education and raising community awareness does have a role to reduce vulnerability in urban communities, experience shows it is less successful than in rural communities where there is more social cohesion and community cooperation. Urban dwellers are typically more independent and generally rely less on interaction and cooperative efforts with neighbors. Despite these shortcomings, the scale of flood damages in urban areas considerably exceed those in rural areas of comparable size because of the density of development and higher values of assets exposed.

In these circumstances, structural flood mitigation measures that modify the flood hazard may often be the most effective means of reducing damage to property and assets, saving lives and managing the flood risk. However, structural measures should be followed by non-structural measures such as land use planning and development controls to deter accelerated development after flood protection measures are implemented. Uncontrolled post-works development has the potential to increase exposure to the residual risk (the reduced flood hazard remaining after structural works, including the risk of works being overwhelmed by larger floods rarer than the design flood or the risk of structural failure), and the reduced probability of flood inundation can even be outbalanced by greater consequences of flooding when it does occur.

The Terms of Reference for this Project Preparation did not extend beyond small-scale structural measures, although what was to be included as small-scale measures was not clearly defined. Preliminary studies have indicated that flood damages in urban areas of

Sudan far outweigh the damages in rural areas (Cawood, 2005), and the same is expected to be true of Ethiopia; and short of very large structures such as dams, some structural measures to protect urban areas most at risk is considered important for the national and regional flood strategies. In Ethiopia, that relates particularly to the larger settlements of Gambella and Itang on the Baro River, and to a more qualified extent to Bahir Dar beside Lake Tana.

The strategy therefore includes structural flood mitigation measures for Gambella and Itang, similar to those previously proposed by Selkhozpromexport (1990), and subject to preliminary investigations during Project implementation to assess environmental and social impacts and their mitigation, and to consolidate data on economic costs and benefits. It was not possible to visit the region during the current PP, and too little could be learned from documented information or consultations. The previous proposals entailed levees and earthworks, facilities for drainage from behind those works, and some river bank protection. These initiatives are unlikely to be taken up and implemented by any other projects that are currently planned.

Investigations showed that Bahir Dar is at quite low risk of flooding from either Lake Tana or the Abbay River. While small peripheral areas may be affected occasionally from these major water bodies, the most frequent and disruptive flooding that affects more central or more populated areas of Bahir Dar is caused by local runoff, and is essentially an urban stormwater drainage issue. That issue is being addressed by drainage works included in city master plans that are already being implemented, and strictly urban drainage and flash flooding fall outside the initial scope of the FPEW Project. Nevertheless, the real problems that do exist are aggravated by past poor land use management, and technical assistance is proposed under Project implementation to support current initiatives and control future development in areas of greatest risk within Bahir Dar.

Large dams on rivers are also very effective means to mitigate flood risk, and can have important roles to play in the national flood management strategy. In the case of Lake Tana and surrounding floodplains, reconstruction of CharaChara Weir has already mitigated lake flood levels (see Appendix A), and new dams in the near future that would mitigate floods in some of the worst-affected areas adjoining the lake and on lake tributary rivers are likely under irrigation projects currently under investigation or planning. These irrigation projects are also likely to include flood protection and drainage works to manage flood damage and mitigate flood impacts in developed rural areas. Current construction of Tekeze Dam will also mitigate floods for downstream reaches of the Tekeze River, including the Humera area that was damaged by floods in 2006.

B.1.7 Regional Cooperation and Data Exchange

In order to acquire and maintain parity with the capabilities of its regional neighbors, Ethiopia should actively participate in activities proposed for mutual learning and technical transfer, including regular technical conferences, joint studies and joint study tours, etc. It should also openly exchange technical information and data related to floods, and provide access to data from the real-time data network proposed under section B.1.3. Ethiopian authorities can potentially learn valuable lessons from the experience already gained in Egypt and the Sudan, while those countries will benefit from access to real-time or near

real-time data from Ethiopia. There are also disaster management lessons that could be learned from DPPA's experience and capability in the management of drought and famine. Greater partnership and more shared activities will be of mutual interest to both Ethiopia and its neighboring Eastern Nile countries.

The activities of the regional program detail FPEW proposals in this regard.

B.2 SUDANESE NATIONAL FLOOD RISK MANAGEMENT STRATEGY

B.2.1 General

The flood risk management strategy for Sudan is consistent with the general management strategy identified in chapter 2.

In the Sudan, the institutional capacity building focuses on developing capacity in MIWR and CDO in particular, and also in HAC and SMA. For CDO and HAC, which more directly provide services to communities at risk, capacity building is required at both national and state levels. In CDO this should extend to mahaliya level too.

The systems for flood forecasting and flood warning in Sudan are at least partly dys-functional, and the delivery of government services to communities at risk is poor and has to face substantial challenges. This demands substantial training and staff development, in addition to improvement of essential facilities. Improvements to the data acquisition network and rehabilitation of the national flood forecasting capacity are necessary.

Programs of public education and training to raise community awareness of flood risk and equip communities with knowledge and skills to assist them organize and be more prepared for floods will focus initially on selected target areas. The programs need to be expanded year by year until all the communities at risk have received this assistance, but it must be recognized that because of the large number of communities at risk the programs will have to be sustained for many years.

Technical assistance is proposed to investigate bank stability problems and trial low-technology or appropriate technology solutions to the problem of *haddam*, and technical assistance is proposed in Khartoum to advance knowledge and science of river hydraulics in the interests of future riparian urban development and design, and to raise the profile of land use planning with respect to floodplain management.

Small-scale structural flood mitigation measures are likely to emerge from the public education and training programs. Larger scale structural flood mitigation measures are not proposed under the FPEW Project, however hydropower developments currently under investigation for the Abbay river in Ethiopia could have significant mitigating effect on floods in the Blue Nile, and the Tekeze Dam currently under construction will regulate part of the upper catchment of the Atbara River and have some mitigating effect on floods in Sudan. Under FPEW implementation, medium-scale structural measures are proposed for the urban community of Dongola on the Main Nile in Northern State; however this will have to be preceded by rigorous assessment of environmental and social impacts, site survey and more

rigorous determination of flood damages and development costs to prove economic costs and benefits.

A detailed program of activities for implementation in the Sudan is included in the following chapter. However, key features of the national strategy may be summarized as follows.

B.2.2 Acquisition of Digital Terrain Data and Flood Risk Mapping

The objective is to acquire digital terrain data and accomplish flood risk mapping as rapidly as possible for the Blue Nile downstream of Roseires, the White Nile downstream of Jebel Aulia, and the Main Nile from Khartoum to downstream of Dongola. In the longer term, flood risk mapping should be extended to populated reaches (generally the most down-stream reaches) of the Dinder, Rahad and Atbara Rivers, but this is of lower priority.

Digital terrain data has already been acquired for approximately 500 km of the Main Nile in conjunction with development of Merowe Dam; and data will soon be acquired for all of Khartoum State, including reaches of the Blue, White and Main Niles in its jurisdiction. Under the FPEW Project, an initial trial is proposed of techniques developed within Sudan for interpreting surface elevations from satellite imagery (techniques of Environment & Development Services). If sufficiently accurate, this has the potential to greatly reduce the cost of acquisition of digital terrain data for the outstanding areas of the Blue Nile and Main Nile. If unsuccessful, aerial photogrammetry or LiDAR technology should be deployed. MIWR has already acquired recent river cross-section data for the Blue and White Niles. For the Main Nile older cross-sections were acquired in the past but may have been misplaced or destroyed. In any case, given the instability of channel morphology, new river cross-sections need to be surveyed.

Hydrological studies are required to establish the magnitudes of planning floods at different locations (planning floods: e.g. AEPs of 20%, 10%, 5%, 2%, 1%). Hydraulic modeling should then be undertaken to determine flood levels for the different planning floods. Note that for model calibrations, data on historical flood levels is almost indispensable. Given the very large flood that occurred in 2006, this is a great opportunity to record maximum flood levels that occurred at numerous locations along the main rivers – an opportunity that may not be repeated for many years or even decades, and would much improve the accuracy of flood risk mapping.

Having determined the planning flood levels, the digital terrain data can be used to map the extents of flooding associated with a range of probabilities. The final step is to map land use and exposure to flood hazard of buildings and infrastructure, and estimate populations exposed. The flood risk maps can then be used in flood warning to predict areas that will be inundated in future floods, and in planning and execution of flood emergency response procedures and post-flood assistance and recovery efforts.

B.2.3 Rehabilitation of Flood Forecasting Capabilities

An operational flood forecasting system was established in MIWR in the 1990s, but has been allowed to atrophy through neglect and inadequate funding. The system should be rehabilitated as a priority for the Sudan. Initially, a short review should be undertaken to evaluate whether improved forecasting methods should be substituted for the methods

implemented in the 1990s, and to consider compatibility with the system of forecasting used in Cairo for forecasting inflows to HAD.

Assuming that real-time data will also come on-line from the data acquisition and communications network proposed for Ethiopia during the time-scale of FPEW Phase 2 (to *c.*2011), the flood forecasting procedures will also need to be revised to make good use of this important additional data.

The data acquisition system in Sudan should also be extended to include additional reporting river monitoring stations on the Dinder and Rahad Rivers, and on the Atbara River; and replacement/renewal of climatic stations used in weather forecasting. The additional river monitoring stations are required to allow forecasting of river levels and tributary inflows on the main tributaries of the Blue Nile and Main Nile. The weather stations are important for short-term weather forecasting to identify the probability of severe weather that can aggravate impacts of river flooding in Sudan, and can be complementary to other synoptic stations in the region (including across the border in Ethiopia) to forecast weather conditions and rainfall over the upper catchment areas. Consideration can be given to including the new river monitoring stations in Sudan, and at least some of the renewed weather stations, in the new real-time network for data acquisition and communications proposed under the Ethiopian national strategy. The new network need not necessarily end at the national borders.

B.2.4 Programs for Public Education and Community Preparedness

Given the limitations in government resources that can be directed to flood management planning in the Sudan, and the widespread advent of flooding either concurrently or sequentially when it occurs, it is very important that the communities at risk are made better prepared for the advent of flooding and can organize themselves to take action to reduce danger and the material impacts of floods (flood damages). The most effective way to do this with limited resources is to develop a working partnership between government agencies and NGOs.

What are required are campaigns to raise awareness of communities at risk of the nature of the risk they face, the likely impacts of major floods in their area, and the types of activities they can undertake or participate in to modify flood risk (either by modifying the flood hazard, modifying exposure to flood hazard, or reducing their vulnerability to flood danger and damage). The community education and training campaigns should also advise communities of what government services are available and how they can avail themselves of the opportunities those services provide.

Equipped with this knowledge, and with appropriate levels of assistance, communities should then proceed to prepare and implement community flood preparedness action plans. The kinds of measures that may be included in their community action plans are discussed elsewhere (e.g. section 7.4). Examples are modifying flood hazard with small-scale structural measures, modifying exposure by protecting food stores or relocating housing, or modifying vulnerability by constructing flood refuges or organizing community-based advance warning systems. The principle advocated is that the measures to be included in community action plans should be community-driven. If initiatives originate within the communities, that engenders involvement and community ownership, which typically leads

to greater sustainability and better outcomes. Campaign workers or trainers should be available to work with community groups as they prepare their plans.

Implementation of the community action plans requires that a fund be available that can be accessed by communities. Procedures have to be established to ensure accountability, including procedures for review of community proposals, approval procedures, formal application procedures, and procedures for monitoring outcomes of funded proposals.

It is essential that government agencies be involved in the design and organization of the campaigns for public education and community preparedness. Accountability (review, approvals, allocation of funds, monitoring of outcomes) must reside with government agencies. However, government agencies do not have the time or resources to be continuously engaged in the more protracted activities of working with communities to inform and educate them, and assist them in preparation and implementation of their plans on the ground. This is where NGOs can supplement the government activities to deliver a more comprehensive and integrated program. On its own initiative, the Sudanese Red Crescent Society already undertakes community work aimed at raising awareness of flood risk and developing community preparedness, and the FPEW Project should take advantage of their initiative and support them to work more closely with government agencies in Sudan. In the initial phase of designing and organizing the campaigns and training the trainers who will go out in the field to work alongside communities, government and NGOs need to work together, with some assistance from specialists in flood management from government and contracted sources. Under the proposed partnership, the intensive effort of working with communities in the field would largely be undertaken by trained NGO staff (the trainers referred to above). This would relieve government officials of this burden. However, as noted above, government officials at local level and government agencies at higher levels (especially CDO) will need to be involved in reviews, approvals, allocation of funds and monitoring to achieve accountability.

The objective of the programs for public education and community preparedness are to achieve tangible results on the ground in the communities that are at greatest risk from flooding through development and implementation of community action plans.

B.2.5 Government Resettlement Programs

Resettlement of rural villages or parts of villages in flood risk areas has been a policy of government in the Sudan, and has been used with varying success to date. Success has depended on how seriously communities had recently been affected by floods, and on the prior provision of services at the new settlement site. The most common cause of lack of success has been failure to provide adequate services at new sites that make them un-attractive destinations for resettlement, often due to lack of adequate funding.

Resettlement is supported as a measure in the national flood risk management strategy provided the resettlement is voluntary, and if it complies with the provisions described in the RPF (see PIP). Those provisions are posited in order to secure equity for those being resettled. Resettlement is a high-cost management measure, and should only be implemented after economic cost-benefit analysis and comparison with other management alternatives. The economic benefits must clearly outweigh the costs of resettlement, including additional costs of residents moving to their place of work, additional costs of

supplies or services, etc – if any. Environmental assessments should also be undertaken in advance to identify and mitigate any adverse environmental impacts, or to identify environmental benefits and opportunities of resettlement.

Involuntary (forced) resettlement is rejected as a valid flood risk management measure, except in certain circumstances where land acquisition is essential for structural flood mitigation measures, and only then if adequate compensation is made.

No schemes for village resettlement have been proposed in the initial phases of the FPEW Project, and no specific provision for funding of resettlement have been made. It is possible that resettlement could emerge as a community-driven response during development of community flood preparedness action plans, however, and in those circumstances it would be necessary to consider how it should be funded and what support it should receive from government.

B.2.6 Institutional Strengthening and Capacity Building

The challenges faced by Sudanese authorities in flood management are considerable. In the arid and semi-arid regions of Sudan that are the focus of this PP, most of the population live near the few main rivers, and when larger floods occur numerous villages and towns may be affected sequentially over a relatively short period of time. These settlements at risk are spread out over more than 2000 km of rivers, and many are remote from Khartoum and other major centers. This places great demands on the resources and planning of government agencies, particularly those charged with duties of emergency response and post-flood assistance and recovery.

With respect to post-flood assistance and recovery, there is a little more time available to organize and distribute aid, and HAC coordinates government activities and mobilizes other resources (e.g. NGOs, international aid) as necessary. With respect to flood emergency response, however, the time available to respond is very short and the CDO must be ready and equipped to act independently. Consequently, a main target of institutional strengthening and capacity building under the first phases of the FPEW Project implementation will be the CDO. Pertinent aspects will include:

- Creation and training of a dedicated flood emergency planning unit within CDO. This requires new positions to be created. Merely assigning additional duties to existing staff will be ineffective. Among other things, the unit would organize a system for dissemination of flood warnings and ensure its ongoing functionality, and would develop emergency procedures for evacuations and the welfare of those displaced by flooding. It would also compile a flood intelligence data-base, working in cooperation with SRCS which has already commenced activities in this regard by working with villagers. The flood emergency planning unit, or some other unit in CDO to be nominated, should also be trained to be able to assist in design and organization of the programs for public education and community preparedness (section B.2.4) and to administer those programs on behalf of the government and coordinate the activities of the NGOs involved.
- Development of operational and planning guidelines for flood emergency response, followed by training in their application. The guidelines would cover planning and organization relevant to the functions of the flood emergency planning unit, and

operational procedures for putting plans into action during flood alerts and emergencies, including flood warning. The training would be most intensive in the national headquarters, but because dissemination of flood warnings and emergency activities need to be effective in the field, relevant supplementary training should also be conducted at relevant state CDO offices. Further training by CDO at mahaliya or lower levels can be undertaken by those trained at either national or state levels.

- Provision of essential equipment – e.g. communications equipment essential for command of emergency operations; office equipment to support the proposed flood emergency planning unit; transport, especially where it is most needed in the field, either vehicles or boats.

Technical assistance is proposed in the initial stages to ensure the flood emergency planning unit is properly organized and functioning, with follow-up visits during two successive flood seasons to ensure sustainability.

Similar capacity building is proposed for HAC, although in this case no new planning unit is proposed. Guidelines for operations and planning should be developed, followed by training in their application. Support should be provided for a small office to be set up in Northern State at Dongola, the only state in the focus area along the Blue Nile and Main Nile that has no HAC office. Provision of essential equipment is also included so that HAC can act from a position of greater strength and capability in its coordination of government activities for post-flood assistance and recovery, and in conducting and planning its business.

Institutional strengthening and capacity building is also required at MIWR to: (a) support its ongoing work operating and managing the data network of river monitoring stations and discharge ratings; (b) restore a capability for sediment sampling and sample analysis; (c) strengthen its GIS capability so that it can participate and be trained in the preparation of flood risk maps, and then continue its role in flood forecasting making use of flood risk maps after their preparation; (d) to support its flood forecasting function.

Capacity building is also required at SMA to support its work in weather forecasting, including ancillary equipment for data acquisition, storage and display; and training in modern dynamic (short-term) weather forecasting procedures.

B.2.7 Strengthening of Flood Warning Capacity

An essential adjunct to a flood forecasting system is a system for dissemination of flood warnings and an emergency response system to organize activities to evacuate people from flood hazard areas that may be inundated, provide them with temporary shelter and refuge, and assist with emergency relief such as food, blankets and clothing. If warnings can be delivered to those at risk sufficiently in advance of flooding, many will be able to take unassisted action to avoid danger or reduce damage to property and assets. Therefore dissemination of warnings must have the highest priority, however there will always be some (including the aged and infirm) for whom assistance will be critical.

To be effective, both systems for dissemination of flood warnings and for emergency response must be carefully planned in advance. This is the reason a dedicated flood emergency planning unit (or sub-unit) is proposed to be added to CDO. Considerable technical

support and assistance will be necessary to establish and train the flood emergency planning unit. A chief coordinator must be appointed to be available and contactable 24 hours a day during the flood season from mid June to mid September. It is essential that the chief coordinator be available to receive flood warnings issued by the FFC. The chief coordinator would be able to delegate his/her responsibility when necessary, provided that other key links in the flood warning chain are advised in advance. The chief coordinator must also be ready to liaise with nominated officials in other agencies, including flood forecasters and weather forecasters, and any others who potentially have key roles in resolving any issues and constraints that may arise in either the dissemination of flood warnings or the provision of emergency services.

Several agencies at different levels of government in Sudan need to be involved and active in the dissemination of flood warnings. Flood warning consultative committees (FWCCs) are proposed at national and state levels to undertake advance planning for flood warnings, the national committee to be chaired by the chief coordinator and state committees to be chaired by state coordinators, and with members representing all key organizations that need to participate in the flood warning chain: e.g. MIWR, CDO, SMA, ministries related to transport and communications, HAC, and perhaps selected NGOs. As distinct from the NCCD, which is comprised of ministers (politicians) who coordinate activities of government ministries for flood emergency response, the FWCC should be comprised of senior technical specialists who will plan and coordinate the technical activities and communications essential for effective flood warning. At state level, mahaliya officials should also be included in the FWCC.

The ultimate recipients of the flood warnings are individuals and communities, many remote from Khartoum, in riparian villages and towns along the Blue Nile and Main Nile, and on tributaries such as the Dinder and Rahad. Village leaders and council members or flood preparedness committees therefore have key roles to play. Nominated mahaliya officials will need to be readily contactable during the flood season, and communications facilities to ensure this must be provided, together with adequate training and explanation of their essential roles during flood emergencies.

For flood warning, clear lines of communication must be established in the FWCC plans and operational guidelines, and sufficient redundancy included to avert failure. All links in the chain of communication, including redundancies, should be tested shortly prior to the main flood season to identify reassignments of duty, communications equipment shortcomings and the like that could impair performance during an emergency and to undertake remedial measures.

B.2.8 Flood Mitigation Measures for Higher Flood Risk Urban Areas

In larger urban areas, resettlement can be less of a viable option, particularly where there are large numbers of buildings exposed to flood hazard (e.g. Dongola). Relocating large numbers of buildings and expensive assets outside floodplains or to areas of lesser flood risk may not be practicable, and although public education and raising community awareness does have a role to reduce vulnerability in urban communities, experience shows it is less successful than in rural communities where there is more social cohesion and community cooperation. Despite these shortcomings, the scale of flood damages in urban areas

considerably exceed those in rural areas of comparable size because of the density of development and higher values of assets exposed.

In these circumstances, structural flood mitigation measures that modify the flood hazard may often be the most effective means of reducing damage to property and assets, saving lives and managing the flood risk. However, structural measures should be followed by non-structural measures such as land use planning and development controls to deter accelerated development after flood protection measures are implemented. Uncontrolled post-works development has the potential to increase exposure to the residual risk (the reduced flood hazard remaining after structural works, including the risk of works being overwhelmed by larger floods rarer than the design flood or the risk of structural failure), and the reduced probability of flood inundation can even be outbalanced by greater consequences of flooding when it does occur unless appropriate management of protected land is pursued.

The Terms of Reference for this Project Preparation did not extend beyond small-scale structural measures, although what was to be included as small-scale measures was not clearly defined. Preliminary studies have indicated that flood damages in urban areas of Sudan far outweigh the damages in rural areas (Cawood, 2005); and short of very large structures such as dams, some structural measures to protect urban areas most at risk is considered important for the national and regional flood strategies. In the Sudan, that relates particularly to Dongola on the Nile in Northern State. Dongola is already dependent on structural flood protection works to mitigate flood hazard, but unfortunately past experience demonstrates that improvements are required. Other main centers affected are Atbara and Khartoum. In Atbara the problems relate more to flash flooding and poor land use planning and regulation of development. In the major flood of 2006, which from preliminary accounts was the highest since 1946 in Khartoum and must be approximately of the order of 2% AEP, impacts there were relatively minor [1]. It appeared that past measures have largely resolved key problems experienced in previous floods. In the case of Tuti Island, peak flood levels approached but did not exceed building floor levels – further-more, planned development of the island after completion of the connecting bridge will improve future mitigation of flood hazard on Tuti Island.

The strategy therefore includes structural flood mitigation measures only for Dongola. Little technical information was available on the existing levees and ancillary works in Dongola (which have presumably been constructed without adequate engineering design or documentation). In order to establish the extent of future work required to reinstate the works to a good standard of structural integrity, the first step during Project implementation will therefore be to undertake site survey and geotechnical and structural audit of the works in place. The proposals should then be subject to preliminary investigations to assess environmental and social impacts and their mitigation, and to consolidate data on economic costs and benefits.

Considerable development pressure is expected in Greater Khartoum over coming years and decades, and relevant authorities will have to more closely manage the use of riparian

[1] Extensive shallow flooding did occur in some parts of Greater Khartoum, e.g. Omdurman, and was of inconvenience to many residents; however, this occurred remote from the river due to local rainfall and is a problem of urban stormwater drainage management.

lands. Project implementation therefore includes technical assistance to deliver training in land use management principles and practice for selected government officials, review institutional arrangements for land use planning and management in Khartoum State, and cooperatively develop a land management framework for riparian districts of Greater Khartoum.

Large dams on rivers are also very effective means to mitigate flood risk, and can have important roles to play in the national flood management strategy. Because of the terrain, there is little opportunity for this kind of development in the Sudan (although raising of Roseires Dam is being investigated this would have minor flood mitigation effect). Current construction of Tekeze Dam in Ethiopia will mitigate floods in the Atbara River to some extent, and the feasibility of large hydropower dams on the Abbay River in Ethiopia is being investigated, which have the potential for effective flood mitigation for the Blue Nile, and by extension for the Main Nile. Sudan should monitor these developments carefully, and examine the implications for flood mitigation and riparian agriculture and water supply in Sudan.

B.2.9 River Bank and Channel Stability

In many places in Sudan, unstable river channel morphology and bank collapse (known locally as *haddam*) have been responsible for greater damages during floods than damages due to inundation over banks. Although previous studies and projects have attempted to address this problem, they have often suffered from a lack of detailed field data and there have been virtually no practical outcomes to date. It is a problem of flooding that must not be ignored. A parallel project under ENSAP will address watershed management, and it should lead to better land use practices and less erosion from source areas in upper catchments that contributes to the problems of sediment transport and channel instability; but action is also required to treat the symptoms of river bank instability where it is being experienced and causing loss of property and productive land.

Technical assistance is proposed to undertake trial field programs of bank stabilization using appropriate technology. The trial program should review and build upon previous and existing studies in the Sudan, making use as much as possible of local materials and experience of successful practices internationally. Best outcomes should derive from an effective partnership of international and local scientific and engineering expertise and local community participation. Local community participation could be linked to the programs of public education and community preparedness outlined in section B.2.4.

In Greater Khartoum, where riparian development and indiscriminate land use activity can and has led to unanticipated and adverse effects on channel morphology and bank stability downstream, more scientific knowledge and better analytical tools are needed for river hydraulics and fluvial geomorphology. Technical assistance is therefore proposed to carry out an intensive field program of data collection in the rivers of Khartoum, and to develop and calibrate models of river hydraulics, sediment transport and channel morphology. Best outcomes should derive from a team comprising both national and international experts. As the results are of interest to counterpart scientists and engineers in Egypt, where similar issues are of concern in the Nile River downstream of HAD and parallel studies are proposed, including an Egyptian specialist in the international team could be of benefit.

B.2.10 Regional Cooperation and Data Exchange

In order to acquire or maintain parity with the capabilities of its regional neighbors, Sudan should actively participate in activities proposed for mutual learning and technical transfer, including regular technical conferences, joint studies and joint study tours, etc. It should also openly exchange technical information and data related to floods and reservoir operations, and provide access to data from its near real-time data network. Greater partnership and more shared activities will be of mutual interest to both Sudan and its neighboring Eastern Nile countries. One example could be exchange of information or mutual participation in the studies of river hydraulics and sediment transport proposed in both Sudan and Egypt, as noted above. Another example would be exchange of information on operations of Merowe Dam with the Egyptians for inflows to HAD, just as it will be of interest to the Sudanese to have exchange of information on the operations of future Ethiopian dams on the Abbay and Tekeze.

The activities of the regional program detail FPEW proposals in regard to regional cooperation and data exchange.

B.3 EGYPTIAN NATIONAL FLOOD RISK MANAGEMENT STRATEGY

B.3.1 General

The flood risk management strategy for Egypt is consistent with the general management strategy identified in chapter 2.

In Egypt, the institutional capacity building is focused on the Nile Forecasting Center in Cairo. Although fully functional and well organized, the NFC has challenges to face in the near future with the introduction of a new generation of satellite communications, proposed changes that will affect the operations of HAD (e.g. Toshka spillway development) and inclusion of new data from the data network proposed under the Ethiopian sub-program. In other words, the capacity building is required to adapt to changing circumstances that are imminent so that the NFC can remain fully functional.

Egypt should support and encourage the expansion of the real-time data acquisition network in Ethiopia and Sudan, as improved forecasting of reservoir inflows will allow more refined operations to maximize the great benefits enjoyed from HAD.

In general, Egypt's institutions for water management have greater capacity than those in its neighboring Eastern Nile nations, and the depth and range of skills available is greater. HAD affords the country with a singular asset in flood risk management, and has markedly reduced flood risk downstream; however the experience of recent years, and in particular 1998 to 2001, demonstrated that the downstream flood risk has not been eliminated and still requires management. Technical assistance is therefore favored as the best means to enhance technical capacity and support existing initiatives in Egyptian flood risk management. Areas appropriate for flood risk management include flood risk mapping, sediment transport modeling and fluvial geomorphology, and land use management related to management of floodplain lands.

Programs of public education and community preparedness would no doubt be of some benefit in Egypt, but do not demand the priority they should receive in Ethiopia and Sudan where flood risk, particularly the probability of damages and danger, is much higher.

As a structural measure for flood risk management, HAD has proved to be highly effective, and no additional structural measures are specifically proposed.

B.3.2 Flood Forecasting

Egypt has the Nile Forecasting Center within MWRI, which is a fully functioning forecasting center. Set up in the 1990s, its equipment is in need of updating, particularly in view of an imminent new generation of satellite data communications.

Prior to acquisition of new data sets from the proposed expanded data acquisition networks in Ethiopia, studies should be conducted with historical rain and river data from Ethiopia to determine the improvements in forecasting by undertaking an error analysis that compares forecast results using old and new data sets, including the application of forecast updating methods. The economic benefits of refined reservoir operations of HAD can also be estimated. If the benefits are sufficiently great, it may justify Egyptian assistance to costs of operation and maintenance of the data acquisition network to support its sustainability.

Acquisition of new data sets from the proposed expanded data acquisition networks in Ethiopia and Sudan will also require recalibration of the flood forecasting software. Construction of Merowe Dam in northern Sudan will also require minor adjustment to forecasting procedures. Future developments such as reconstruction of the Toshka Spillway and irrigation development on the western shore of Lake Nasser also require adjustment of operational procedures, but this is already the subject of investigations by Egyptian authorities and requires no further assistance.

B.3.3 Flood Risk Mapping

Following the flood seasons of 1998 to 2001, culminating in unprecedented high storage levels in 2001, Egypt has embarked on a program to update and delineate flood risk areas downstream of HAD to Delta Barrage. Good progress has been made to date, and future efforts are planned to capture land use data from aerial photography and ground survey to identify structures and land use within flood risk areas. Hydraulic modeling is proposed to relate flood levels to river discharges and rates of release from HAD. Ultimately, development and implementation of floodplain management plans will be based on the flood risk mapping, as unregulated development on floodplains since construction of HAD is an important issue.

Much, if not all of this, is within the existing capacity of Egyptian authorities. There is, however, a need to benchmark current work and future plans against international good practice. This can best be achieved in two ways: one is for Egyptian specialists to undertake study tours to examine how flood risk mapping is being undertaken and applied in advanced countries such as The Netherlands, Germany and the U K; another is for international specialists to work alongside the Egyptian flood risk mapping teams to contribute and participate in the planning and implementation of future phases of the work.

To fully quantify the flood risk, annual probabilities of exceedance should also be attributed to the high river discharges that will be modeled. This requires analysis of the probabilities attached to different release rates for HAD, and how those discharges may be modified during progress of flood waves and due to extractions made down the river. As it is approximately 40 years since commissioning of HAD, a review of flood hydrology would be appropriate, especially in view of proposed modifications associated with Toshka Spillway, other developments upstream, and current Egyptian studies on effects of climate change.

B.3.4 Scour, Sediment Transport and Fluvial Geomorphology

High release rates have caused serious scour near structures and aggravated bank erosion causing property damages downstream of HAD. As in Sudan, property damage due to bank erosion is considered an important element of flood damages in Egypt.

Technical assistance is proposed to assist research and investigations on a pilot reach of the Nile River in Egypt. Studies proposed include a field program for acquisition of data on velocity profiles, sediment transport, channel morphology, etc., over a period of time that includes high discharges and is sufficiently long to observe and measure morphological changes. Hydraulic and sediment transport modeling will be undertaken to calibrate and apply a model that will improve scientific understanding of fluvial geomorphology and design stabilization or preventive measures. Technical assistance is specifically required in techniques of bedload sampling and application of sediment transport modeling. This can best be achieved by international specialists working alongside the Egyptian research teams to contribute to the planning and participate in implementation the pilot study. After effective technical transfer in this way, similar application and analyses could be accomplished by Egyptian specialists unaided.

As the results are of interest to counterpart scientists and engineers in the Sudan, where similar issues are of concern in the Blue Nile and Main Nile Rivers and parallel studies are proposed in Khartoum, including a Sudanese specialist in the international team could be of mutual benefit.

B.3.5 Regional Cooperation and Data Exchange

Egypt should actively participate in activities proposed for mutual learning and technical transfer, including regular technical conferences, joint studies and joint study tours, etc. It should also openly exchange technical information and data related to floods and reservoir operations, and provide access to data from its near real-time data network. Greater partnership and more shared activities will be of mutual interest to both Egypt and its neighboring Eastern Nile countries. One example could be exchange of information or mutual participation in the studies of river hydraulics and sediment transport proposed in both Sudan and Egypt, as noted above. Another example would be exchange of information and technical transfer on flood forecasting technology and operations, a field in which Egypt is relatively advanced within the region.

The activities of the regional program detail FPEW proposals in regard to regional cooperation and data exchange.

Appendix C:

Proposal for Phase 1 FPEW Project Implementation

1. **Name of Project**: **Flood Preparedness and Early Warning in EN – FPEW I**
2. **Total Cost**: **US $ 4.08 million**
3. **Summary of Components, Outcomes, Outputs and Activities**

Components	Outcomes	Outputs	Activities
Regional Coordination	Enhanced flood-related information and data exchange among the EN countries and strengthened transboundary flood management	1. Regional Flood Coordination Unit (RFCU)	1.1 Establish RFCU protocols and operational guidelines 1.2 Establish, staff and equip RFCU office (including transition to Khartoum)
		2. Annual Flood Forums	2.1 Build professional network and share knowledge 2.2 Facilitate participation in international flood forums
		3. Flood Information Database	3.1 Design and agree on web-based database 3.2 Collect, collate , process, quality assured and load data in databases
		4 Information and Experience Exchange	4.1 Identify key knowledge gaps 4.2 Develop training modules and deliver workshops 4.3 Conduct selected study visits
		5 Regional Analysis and Special Studies	5.1 Identify needs 5.2 Conduct special studies
Pilot Flood Preparedness and Emergency Response	Reduced vulnerability of flood prone communities	1. Flood Risk Mapping for pilot areas prepared	1.1 Prepare digital flood risk maps
		2. Community Flood Preparedness and Response Plans	2.1 Determine information needed by the community for effective response 2.2 Facilitate development of community response plans 2.3 Evaluate effectiveness of plans and process for the non-structural measures put in place (guidelines, wireless communication, etc.)

Flood Forecasting, Warning and Communication System	Detailed design of EN Flood Forecasting, Warning and Communication System	1. Strengthen National Flood Forecast and Warning Systems	1.1 Refine flood forecast, warning and communication system requirements 1.2 Identify appropriate approaches, technologies and equipment 1.3 Procure for pilot communities (simple communication equipment, staff gauges, stilling wells, current meters etc.) 1.4 Enhancing current institutions and initiate new one in Ethiopia
		2. Detailed Design of Regional Flood Forecasting System	2.1 Prepare functional specifications from project preparation 2.2 Undertake necessary field work 2.3Prepare detailed design and tender documents

1. Background

ENSAP: The Eastern Nile Subsidiary Action Program (ENSAP) – which includes Egypt, Ethiopia and Sudan – seeks to initiate a regional, integrated, multipurpose program through a first set of investments. Within this regional context, the Eastern Nile riparian countries decided that the first ENSAP program, referred to as the Integrated Development the Eastern Nile (IDEN), will be to initiate a regional, integrated, multipurpose development program that confirms tangible win-win gains and demonstrates joint action for the Eastern Nile countries. IDEN comprises seven subprojects that recognize the severe toll that droughts and floods have on the people and economy of the Eastern Nile, as well as the potential benefits of a regional approach to the management of such events. The Flood Preparedness and Early Warning (FPEW) project is one of the cooperative projects that address issues pertaining to flood management and mitigation. Other cooperative projects with potential flood mitigation benefits are the EN Watershed Management project and the Joint Multipurpose Program (JMP).

ENSAP is governed by the Eastern Nile Council of Minister (ENCOM), its highest decision making organ. This Council is made up of Ministers of Water of the Eastern Nile Basin states. It is supported by a Technical Advisory Committee (ENSAPT), consisting of three senior officials from each member country.

Eastern Nile Technical Regional Office: To facilitate the implementation of ENSAP activities, the Eastern Nile Council of Ministers (ENCOM) resolved to establish an Eastern Nile Technical Regional Office (ENTRO) in Addis Ababa, Ethiopia, with powers to perform all the functions entrusted to it by ENCOM, including the power to receive and administer grant funding for its activities. ENTRO assists the Eastern Nile Council of Ministers and Technical Advisory Committee in the implementation of the ENSAP.

Currently, water resources lie at the focus of the EN cooperation with potential impact on other sectors of the economies of the countries.

Figure 1: EN Countries and River System

The River System and Features: The Eastern Nile comprises major river systems that originate in the Ethiopian highlands in the east and flow to the west into Sudan and later join the Main Nile, which finally flows to the Mediterranean sea. Major river systems are the Blue-Nile (Abbay in Ethiopia), Tekeze–Atbara and Baro-Akobo-Sobat (see Figure 1). Climate and river flows within the Eastern Nile are highly variable and the region is prone to the extremes of floods and droughts. During exceptional wet periods, the three major rivers mentioned above can give rise to large-scale riverine flooding, particularly in the floodplain areas of Ethiopia and Sudan. In Egypt, the large flood storage afforded by Lake Nasser behind the High Aswan Dam (HAD) has mitigated the more devastating impacts of riverine flooding. However, during exceptionally high flow periods, such as in 1998-99, excess spill from HAD can result in some downstream flood damage.

Flooding Impacts: All three EN countries are affected by floods. In Ethiopia, major damage is sustained across the floodplain around Lake Tana and Gambella with frequent damage to crops and houses as well as loss of livestock and human life. The High Aswan Dam (HAD) provides significant flow regulating capacity and as a result flood damage within Egypt occurs infrequently and is mainly limited to river structures (e.g. bridges and barrages) and agricultural activities on the islands. Sudan is the country most severely affected by flood in the EN, with more than 190 flood prone rural and urban communities. Loss of crops, livestock,

machinery and houses coupled with severe community disruption and dislocation as well as severe health issues occur frequently.

In the year 2006, in Ethiopia, flooding has caused severe damage in much of the country. Due to torrential rains in July and August on the upstream and the subsequent swelling of tributaries, most rivers overflowed their banks, submerging the surrounding lowlands. This flood has resulted in a loss of 256 lives and affecting the livelihood of around 10,000 people. The flood waters washed away houses and the property of many who resided alongside the river bank. It also damaged infrastructure in the south. The overflow of the Omo river severely affected about 8,000 people, and killed 364 helpless citizens. It also swept away about 3,200 cattle, and destroyed household belongings as well as over 1,000 traditional grain stores. In Sudan, Sennar State, floods had swept over several regions of the State. The number of houses destroyed by floods could reach over three thousand houses in addition to destruction of agricultural products" along, the Blue Nile banks.

The Flood Preparedness and Early Warning (FPEW) Project: The FPEW project has four components, namely, flood forecasting warning and communication, flood preparedness and emergency response, flood mitigation planning, and regional coordination. Project preparation is being coordinated by ENTRO with full participation of riparians through an arrangement that comprises three National Coordinators (one from each EN country), a Regional Coordinator at ENTRO (competitively hired from the region), and a Regional Working Group, consisting of twelve members, four from each country.

Pre-project Activities and Findings: As part of pre-project activities, each of the three National Coordinators prepared country background papers dealing with general aspects of flooding. Project conceptualization missions fielded to the EN countries helped in identifying project focus, priorities, and implementation arrangements. ENTRO conducted detailed background assessment of flooding extents and current coping mechanisms in all EN countries as well as social baseline assessments of flood-prone communities in Ethiopia and Sudan. Based on the pre-project activities carried out to date, the following have been identified as major gaps in the approaches and arrangements for flood mitigation and management.

- Flood inundation extent (or risk) maps are not available;
- There is generally low capacity for flood management;
- Flood management is reactive in nature rather than planned;
- There is no regional coordination on flood forecasting and no information sharing;
- Flood related information is not properly documented; and
- Flood forecasting and warning communication activities are limited at national level (e.g. in Sudan).

Project Preparation and Implementation: The FPEW project will be prepared and implemented in phases. Project preparation started in January 2006. Appraisal-ready project document is will be ready in early 2007. Preparation work is focusing on riverine flooding in selected river basins and flood-prone areas. Main outputs will include an assessment of country needs with respect to each aspect of flood mitigation and management, a broad flood-risk mitigation strategy for Ethiopia and Sudan, a strategy for enhancing operation of the HAD to reduce downstream flooding risk, and conceptual design of a flood forecasting, warning and communication system for the EN.

Preliminary work completed to date has shown that the lack of detailed information and variations in underlying knowledge are serious constraints to activities needed to implement the FPEW project. Indeed many of the analyses that support project preparation are being undertaken at a high rather than detailed level due to this very issue. It is therefore necessary to undertake a number of activities in the lead up to full implementation that are aimed at, for example, bridging existing technical and knowledge gaps, strengthening institutional arrangements and developing baseline data, etc so that the project can be implemented rapidly, consistently and with confidence across the EN region. This lead to identification of an initial phase-phase 1 of FPEW (FPEW I) to address these aspects.

FPEW I Implementation: This proposal covers the activities to be completed in FPEW I. This phase also will lay the needed foundation for further implementation of FPEW II. It focuses on selected interventions and activities that fit within the long-term FPEW project plan, align with FPEW project objectives and that are required to support subsequent (i.e. FPEW II) implementation of the project. More particularly, the work is aimed at supporting accelerated and comprehensive implementation of subsequent phases of the FPEW and includes:

- Establishing and/or strengthening institutional arrangements;
- Bridging existing technical and institutional knowledge gaps;
- Developing critical baseline information for the FPEW and other related projects (e.g. JMP);
- Piloting implementation of selected interventions in order to build riparian knowledge, in terms of pilot flood preparedness and response related practical training (learning by doing) at community levels;
- Strengthening existing coping mechanisms in order to provide a foundation for further development.

2. Objectives

One of the overriding long-term objectives of ENSAP is to 'target poverty eradication and promote economic integration'. The poor are the most affected by flood disasters; they reside on floodplains, cannot afford to move to 'safer' places and do not have the capacity to recover from devastations caused by recurrent floods.

The long-term objective (goal) of the FPEW project is to reduce human suffering and damages from flooding, and increase the benefits from flood management, in the Eastern Nile countries. The specific objective of FPEW I, is to establish a regional institution basis and to strengthen them, the existing capacities of the EN countries in flood forecasting, mitigation and management, promoting regional cooperation as well as to enhance the readiness of the EN countries for preparation/implementation of subsequent FPEW projects. The project's objective contributes to the long term objective which in turn contributes directly to the ENSAP goal[1].

FPEW I implementation will contribute directly to the development objective of the FPEW project by strengthening the existing capacities of the EN countries in flood forecasting, mitigation and management, promoting regional cooperation and enhancing the readiness of the EN countries to subsequent (i.e. FPEW II) preparation/implementation of the FPEW project, prepare the foundation for FPEW II implementation in terms of institutional settings

[1] ENSAP cooperation goal is to develop the water resources of the Eastern Nile Basin in a sustainable and equitable way to ensure prosperity, security and peace for all its people

and data collections at community and national levels, together with enhancing regional coordination and cooperation.

3. Project Cost and Financing Plan

3.1 Project Cost

The total project cost is about US $ 4.08 million, which will be spent over an implementation period of three years. The following is a breakdown of project cost by disbursement categories:

- Equipment for strengthen and upgrading current forecasting centers in Sudan and Egypt, initiating the implementation of national forecast center in Ethiopia.
- Consultancy And capacity building at pilot community level, national and regional levels.
- Workshop for experience exchange
- Office operation and refurbishment (Incl. ENTRO administrative support costs)
- Unallocated

3.2 Financing Plan

The main contribution to FPEW I implementation will be from the NBTF/WB and amounts to about US $ 3.48 mill. In-kind contributions from the EN countries are estimated to be about US $ 0.4 mill. The following is a breakdown of sources of financing for FPEW I implementation:

Source	In-Kind (USD)	In-Cash (USD)	Total (USD)
EN countries	0.40 million		0.40 million
NBTF/World Bank		3.48 million	3.48 million
Others (ENTRO)	0.20 million		0.20 million
Total	0.60 million	3.4 8million	4.08 million

These contributions will be in the form of staff time at national level, provision of necessary office space within country and associated facilities.

The Regional Flood Coordination Unit will be established. Minor refurbishing may be required to make the office ready for use. Total in kind contributions through ENTRO will amount to US $ 0.2 mill.

4. Proposed Project Components and Outputs

4.1 Overview

FPEW I implementation of the FPEW project comprises three key components as follows:

Regional Coordination which is aimed at establishing an RFCU to:

- Manage and implement day to day current and future preparation/implementation phases of FPEW.
- Liaise between donors, consultants and EN countries.

- Coordinate the common activities between FPEW and other IDEN projects
- Coordinate data collection and analysis from the EN countries, together with other IDEN projects.
- Serve the EN countries in the exchange and dissemination of vital flood-related information for use at national level; and
- Function as a platform for experience sharing and capacity building.

Pilot Flood Preparedness and Emergency Response activities in order to strengthen flood preparedness and flood mitigation planning at national level through:

- Flood-risk mapping; and
- Facilitation of improved flood mitigation mechanisms aimed at protecting property and assets.

Flood Forecasting, Warning and Communication Systems considerations that determine needs at both community and national level leading to:

- Identification of appropriate approaches, technologies and equipment related to non-structural measures;
- Trialing of these non-structural measures at selected communities and/or locations;
- Refinement of the functional specification emanating from the project preparation phase of FPEW II;
- Field work needed to support that refinement; and
- Preparation of detailed system design and tender documentation for the EN flood forecasting, warning and communication system.

4.2 Component 1 - Regional Coordination

The hydrologic setting in the EN is such that most of the flow causing damages in Sudan originates in the Ethiopian highlands in the east. Current flood forecasting systems in operation in Egypt and with limited capabilities in Sudan rely on satellite observation of Cold Cloud Cover (and duration) over the Ethiopian highlands and flow gauging stations within Sudan. Although it is estimated that getting rainfall and flow data from Ethiopia in real-time could increase the lead-time by about 2 – 3 days, there is currently no mechanism for such data sharing. An increase in flood forecast lead times would greatly benefit flood emergency response activities in Sudan, especially for sites relatively far upstream from Khartoum. The experience of Sudan in flood mitigation and management could be beneficially shared with Ethiopia, where flood disaster management is not well developed.

Several regulation dams are contemplated in Ethiopia with potential benefits for flood mitigation downstream. Moreover, the EN countries of Egypt, Ethiopia and Sudan are currently working on a number of projects targeting watershed management, irrigation and drainage development, and regional power trade, as well as a Joint Program for multipurpose development (JMP) of the EN waters. It is expected that the JMP will result in projects that will have transboundary impact in all three EN countries. The planning and design of such projects will require the assessment of downstream impacts including with respect to flood mitigation, reduced flood risk and damage, mutual benefits, etc. While the countries have agreed in principle to share data in real time to facilitate the analysis of impacts and to enable projects to operate effectively, the protocols to be determined within the overall umbrella of the Water Resources Planning and Management project under SVP.

The immediate objective of this key component is to put in place a mechanism for enhancing regional cooperation in the areas of flood management and flood forecasting, and for sharing regional experiences and information. It is clear that regional cooperation will evolve over time and this first step will lay the foundation for future transboundary management of flood disasters in the EN. It is envisaged that a regional unit will be established to manage the day-to-day implementation of the project components, in addition to providing a platform to enhance regional cooperation in flood management. The outputs and activities under this component are described briefly as below:

Output 1 - EN Regional Flood Coordination Unit Established

The main aim of this unit is to play a key rule in project implementation and management. It will Manage and implement day to day current and future preparation/implementation phases of FPEW and Liaise between donors, consultants and EN countries. It will also play an important role in coordinating the common activities between FPEW and other IDEN projects. It will also help in coordinating data collection and analysis from the EN countries, together with other IDEN projects. The unit will also serve the EN countries in the exchange and dissemination of vital flood-related information for use at national level; and will function as a platform for experience sharing and capacity building.

The EN RFCU unit will enhance flood-related information and data exchange among the EN countries and strengthen transboundary flood management. It is planned that initially the RFCU will be established and will be equipped with basic facilities (basic IT equipment, office facilities, dedicated line for internet connection, etc). The unit will be headed by the Regional Flood Coordinator[2] (also driving the FPEW project) with support provided by two other full time staff, will be competitively hired from the region, (a Technical Specialist and an IT/GIS person). Functions such as finance, procurement, and administration; formal external communication; protocols; and donor liaison; will be undertaken within the existing ENTRO organization according to existing modes of operation.

It is envisaged that the unit will serve as a data repository, provide flood-risk maps (where and when available), satellite remote sensing and GIS-based information on flood extents(where and when available), conduct flood behavior analyses, facilitate exchange of experiences, information among different national flood forecasting centers, provide forums for riparian and international experts to exchange experiences, provide useful information in the planning of regional projects with potential impacts on flood mitigation, coordinate preparation of the implementation of future FPEW projects, etc.

Activities:

Activity 1.1: Establish RFCU protocols and operational guidelines – essentially establish the rules for how the RFCU will operate, consult with the EN countries to ensure support for the RFCU remains strong, establish operating protocols (to be determined within the overall umbrella of the Water Resources Planning and Management project under SVP) with ENTRO, and secure policy-related guidance and approvals from ENCOM/ENSAPT as required.

Activity 1.2: Establish, staff and equip the RFCU – refurbish office accommodation as required, recruit staff, procure and install equipment (computers, communication,

[2] The Regional Flood Coordinator will charge the Project for the services rendered.

dedicated/broadband internet line, transport, etc), and finalize internal organizational issues with ENTRO.

Output 2 – Annual Flood Forums Conducted

EN Annual Flood Forums will be facilitated/conducted by RFCU to help sharing of experiences among practitioners, planners, and scientists within the region and (where possible) from other river basins world-wide. It is envisaged that topics addressed will include all aspects of flood management including current and emerging practices, the use and effectiveness of recent ICT technologies in flood forecasting and risk assessment, flood damage assessment and damage prediction, assessment of socio-economic impacts of floods, etc.

Activities:

Activity 2.1: Build professional network and share knowledge through annual forums - organize and conduct annual flood forums and in so doing assist in the building and maintenance of a professional network of flood management practitioners, and scientists in the EN, line agencies, international organizations, etc.

Activity 2.2: Facilitate participation of Eastern Nile flood forecasting specialists in international flood forums – support and facilitate the participation and publication of joint research of Eastern Nile flood forecasting specialists in international flood forecasting conferences, for the purpose of upgrading their knowledge and experience.

Output 3 – Database of Flood Information Established and Maintained

A web-based database of flood related data and information will be developed and established within the RFCU. All riparian will have access to the database which is expected to be used in the planning and implementation of flood management measures (e.g. floodplain land use management, assessment and reduction of the vulnerability of communities residing in the floodplain, planning of flood damage mitigation measures, etc).

Activities:

Activity 3.1: Design and agree on a web-based database – will involve the development of protocols and metadata for the database (and perhaps also for the website hosting the database), for data upload and its use as well as for riparian access, the upload of flood-related data (e.g. meteorology, hydrology, topography, channel/floodplain and other characteristics, land use, historical floods, existing and planned/potential regulations and other interventions, etc), creation of links to other good practice and relevant websites, etc.

Activity 3.2: Collect, collate , process, quality assured and load data – essentially the collection and collation of data to be loaded to the database and its upload in line with agreed protocols, selected analyses aimed at identifying data gaps, quality etc.

Output 4 –Information and Experience Exchange

Work to date has indicated that while resource constraints (e.g. data collection and information dissemination systems) are an impediment to the implementation of flood mitigation and management practices, difficulties with access to and incomplete local knowledge of such measures and how they could be implemented within the EN are further impediments. Capacity, focused on all elements of integrated floodplain management, can however be built relatively quickly through the pooling and sharing of knowledge within and

external to the EN. Study visits, for both technical specialists and high level managers, to centers successfully tackling issues faced within the EN countries will assist in building regional capacity. Contact and involvement with the WB-funded network and partnerships on 'Flood Awareness and Prevention Policy in border areas' (FLAPP) formed in European river systems is also envisaged.

Activities:

Activity 4.1: Identify key knowledge gaps – will include an analysis of data/information required within the database to support flood forecast and warning operations as well as wider floodplain management needs together with an assessment of training/experience sharing needs and opportunities, will also include identification of target groups.

Activity 4.2: Develop training modules and deliver workshops – follows from activity 4.1 with training to also cover the web-based database as well as flood management and mitigation.

Activity 4.3: Conduct selected study visits – aimed at gaining broader international and regional experience of flood management and mitigation measures involving both technical and senior managers within the EN countries (e.g. flood forecast centers in Mekong or Bangladesh, Egypt, Sudan, the Drought Monitoring Center in Nairobi, Kenya, Mur River in Graz, Austria) and site visits to places of relevance to the FPEW project within the EN countries (e.g. trial equipment sites, national forecast centers, etc)).

Output 5 – Regional Analysis and Special Studies Conducted

FPEW I implementation of the FPEW project will run in parallel with project preparation for the first half-year of FPEW II. During this period, it is expected that the preparation study will highlight areas that require further investigation. It is proposed that special studies that could be expected to have a direct and positive impact on subsequent implementation activities (i.e. FPEW II implementation) will be conducted the social and environmental framework of which will be taken care of in FPEW II. These may include such regional studies as: development of a robust regionally-based methodology for flood damage assessment; assessment of the effectiveness of existing and planned regulation works on flood mitigation and their implications for reservoir operation; determining the incidence and characteristics of flash floods; development of a flood risk reduction strategy for flood-prone areas along the Baro-Akobo-Sobat rivers; facilitated development of State and local flood response plans, etc.

Activities:

Activity 5.1: Identify special studies – project preparation and national consultations will assist in the identification of topics of special studies.

Activity 5.2: Conduct special studies as required.

Component 1: Time frame and Budget:

Time frame:	3 years (2007 – 2010)
Budget and cost sharing:	
Component Cost:	US $ 1.69 mill
National (in-kind) contribution:	US $ 0.10 mill
Other (ENTRO)	US $ 0.20 mill
Funding sought:	**US $ 1.39 mill**

4.3 Component 2 - Pilot Flood Preparedness and Emergency Response

Identifying and mapping at-risk communities including the extent of flooding and the location of high risk areas, is a basic input to flood response planning as well as to analyses aimed at identifying appropriate flood mitigation measures. It is also a major input to determining vulnerability - the ability of the community to anticipate, cope with and recover from flood (i.e. their susceptibility and resilience).

Increased flood preparedness and improved response (i.e. reduced vulnerability) are key drivers of flood damage reduction. While flood proofing assets likely to be affected by flood can be effective in reducing vulnerability (and thus damage), a prior knowledge of the likely extent and depth of expected flooding as well as knowledge of the types of assets and activities located within the floodplain are essential. Without such information and the plans to guide response in the event of a flood, the full benefits of river height forecasts cannot be realized. Flood emergency response in the EN is currently, by and large, reactive and ad hoc.

The immediate focus of this component is therefore on reducing the vulnerability of flood prone communities.

Output 1 - Flood risk mapping commenced

Flood risk maps will be produced together with other related mapping products to support flood management in the EN. Mapping activity will initially be restricted to selected (pilot) areas such as areas around Lake Tana, Gambella, Tuti Island, Dongola and Khartoum. The final identification will be done through countries consultation. These pilot areas will be identified before the grant agreement the maps will support a range of activities including: flood-risk assessment of communities; land-use planning of floodplains; flood emergency (contingency) planning; flood-damage assessment; and assessment of the impact of future/planned interventions. It is envisaged that two types of maps will be prepared: a (GIS-based) base map showing all flood prone areas and communities with a linked data base containing the major features, and a detailed flood-risk map. These maps will be prepared using topographic survey and existing digital terrain data coupled with the results of hydrologic and hydraulic analyses, and compiled into a suitable digital format.

The base map will be prepared using existing and freely available satellite imagery together with topographic data (such as the SRTM 90-m DEM, etc) and will cover the Lake Tana area and flood-prone areas in Gambella (both in Ethiopia), and flood-prone areas along the Blue Nile – Main Nile rivers in Sudan. The detailed maps will be produced for selected flood prone areas and will be based on a detailed topographic survey using current technologies (such as LIDAR). The aim will be to produce topographic contour maps with contour elevations of about 0.20 – 0.25 m.

Activities:

Activity 1.1: Prepare digital flood risk maps – will involve the preparation of a base digital terrain model and the overlay of the results of hydraulic analyses within selected areas.

Output 2 – Community Flood Preparedness and Response plans

An integrated approach, involving consideration of non-structural measures in terms of capacity building at community level, is required in order to achieve a sustainable reduction

in flood risk and effective long term flood management. Successful interventions (i.e. those that result in a long term and sustainable reduction in flood risk and improved coping mechanisms) will most likely involve National, State and Local governments as well as the at-risk communities. Implementation of key elements at pilot level will enable various strategies and measures for enhancing community capacity to better manage flood disasters to be explored. Results will provide valuable ground-trusting and learning opportunities for implementation on a larger scale as part of FPEW II implementation. Pilot activities could include: facilitating and assisting selected communities develop local and higher level flood management and response plans, trialing warning dissemination methodologies within selected communities with regard for timeliness and delivery to those who need to know; improving community understanding and interpretation of warning information,. Further possible pilot implementation activities will be added as more information is generated through on-going project preparation. However, during this Phase no structural measures for flood mitigation are envisaged.

Activities:

Activity 2.1: Determine information needed by the community for effective response – aimed at ensuring that flood forecast and warning system development is bottom up as well as top down driven and that it delivers what is needed to enable an effective response ahead of expected flooding. This will involve the following steps:

- Identifying the pilot communities (a maximum of 4 per country, Ethiopia and Sudan), in due consultation with DPPC, CDO
- Organizing the community through the help of local NGO's, DPPC, CDO ..etc.
- Identification of issues/problems related to floods through a participatory process with the communities.

Activity 2.2: Facilitate development of community response plans – will involve the provision of technical and other assistance to streamline local development of plans.

- Development of mitigation planes specific to the communities (these planes could include activities such as establishment of level indicators, areas of temporary shelters, storage areas, communication channels, evacuation planes, ...etc.).
- Development of understandable and user friendly training materials and tools including its procurement.
- Imparting training to the community and implement the planes.
-

Activity 2.3: Evaluate effectiveness of plans and process – this will involve a process of participatory evaluation and address the effectiveness of the activities in terms of flood damages avoided (in comparison with previous years and as against non-targeted communities) and community well-being. This could be carried out by designing an appropriate questionnaire and filling it up through participatory process among the targeted communities and holding a focused discussion with selected members of the targeted communities. In case there is an existing plan, the project tries to come up with ways of improving and updating them.

Component 2: Time frame and Budget:

Time frame:	2 years (2007 – 2009)
Budget and cost sharing:	
Component Cost:	US $ 1.26 mill
National (in-kind) contribution:	US $ 0.20 mill
Funding sought:	**US $ 1.06 mill**

4.4 Component 3 - Flood Forecasting Warning and Communication System

The communications element of a flood forecast and warning system is essential to its operation and the reduction of flood damages. Data has to be acquired and transmitted to the forecast center (and in some cases to the at-risk communities as well) and the resulting forecast transmitted to the local area for interpretation, value adding and disseminated to those who need to take action. The effectiveness of the system depends not only on the accuracy of the raw data and forecast but also on the lead time available to take action before the flood begins to affect the area.

In Egypt, the Nile Forecasting Centre was set up in the Planning Sector of MWRI in 1990 with assistance from NOAA (US National Oceanic & Atmospheric Administration Agency), and is well-equipped and skilled. It has developed models for short and medium term forecasting of inflows to HAD, and long-term simulation models for investigations of reservoir operations. It has facilities to receive satellite data, including half-hourly CCD information and imagery from METEOSAT. It also receives meteorological observations and weather forecasts from the ECMWF, which provides, *inter alia*, recent rainfall observations from five or six synoptic stations in the Ethiopian highlands. The Centre is, therefore, able to make near real-time estimates of rainfall in the upper Blue Nile basin from CCD data using established techniques that have been calibrated to the ground observations available. Data from selected river gauging stations upstream of HAD (in Sudan and Uganda) are also transmitted to the Forecasting Centre. A variety of techniques are also used to make seasonal stream flow estimates of inflows to Lake Nasser, and these are refined every 10 days as data from observation stations become available. Flood mapping are carried out manually in Egypt up to now. Digitizing existing flood maps and automating the flood mapping in the future is mandatory.

In Sudan there is a systematic arrangement for flood forecasting, warning and communication. The flood forecasting system uses the Flood Early Warning System (FEWS) developed with Dutch assistance after the devastating floods of 1988 and the Galway Flood Forecasting System (GFFS). This system is now not operational, due to lack of trained staff and availability of funds to further sustainability and upgrading of the system. There is no capability to estimate likely inundation extents. Forecasts are disseminated through official media (TV, radio, newspapers) but are generally not referred to by many of the (rural) flood prone communities.

In Ethiopia there is no systematic real-time flood forecasting system although some forecasting is done in the Awash basin using statistical techniques. Seasonal and short-term forecasts of rainfall by the National Meteorological Services Agency are frequently used to issue warnings regarding the likelihood of flooding. However, these warnings are often too

general to be used to plan emergency response activities. The warning messages are issued through the mass media. Flood forecasts for the Lake Tana area would need to be based on expected rainfall as lead times are extremely short and river rises rapid.

Regionally available forecasts of flood peaks and volumes for the EN would help improve operation of the HAD thereby reducing the risk of releasing excess water downstream while assisting in keeping flows below critical levels.

Output 1 – Strengthen national flood forecast and warning systems

The strengthening of national flood forecasting and warning capabilities and systems is one of the priorities of the FPEW project. Support will be provided across the EN in the form of enhanced data acquisition, capacity building and communication equipment. In addition, in the case of Ethiopia, support will be needed to initiate the formation of a unit (possibly) at the Ministry of Water Resources dedicated to generating and disseminating flood forecast and warning information. An important element of project implementation will be the determination of basic data needed to support flood forecast and warning activities at national and regional level as well as at the local community level. This will necessitate the piloting of communication equipment for disseminating warning information to selected flood-prone communities.

Activities:

Activity 1.1: Prepare/Enhance flood forecast, warning and communication system requirements – will involve refinement of project preparation outputs following further consultation with riparian experts as well as assessment of local community needs in terms of what information is required, with what lead time, how will they receive it, etc (i.e. a consideration of top down and bottom up needs).

Activity 1.2: Identify appropriate approaches, technologies and equipment – likely to include a mix of technologies from manually read staff gauges upwards aimed at meeting identified needs.

Activity 1.3: Procure for pilot communities (same communities as indicated under component 2, activity 1.2) – aimed at trailing approaches so that final performance best matches needs. This activity could be shifted to FPEW II depending on the workload on the side of ENTRO.

Activity 1.4: Enhancing current institutions and initiate new one in Ethiopia - one major activity will be strengthening national forecasting center and initiate new one in Ethiopia. The main output of this component that it will sustain the institutional capacities among the three countries and upgrade existing centers. In a next stage (FPEW II), one of these national centers can be upgraded to be the regional forecasting center for the EN region. If the EN countries agree at the end of FPEW1 about important need for implementing a RFFC, in this case the RFC will operated by specialists from the three national center and will require special institutional arrangements that can be made clear at the end of FPEW I and can be implemented as part of FPEW II.

Output 2 - Detailed design of Regional Flood Forecast, Warning and Communication System

Flood forecasting, warning and communication is one of the four components the FPEW project. During FPEW I, analysis will be made on current systems, decide about new

modules that can upgrade on the current system to serve as regional system or deliver a conceptual design that can serve the EN. It is proposed that as part of the FPEW I implementation, the conceptual design of the EN Flood Forecasting, Warning and Communication System will be developed into a detailed design. This will include software and hardware aspects for real time data acquisition and transmission, the types of forecast information to be generated and the communication systems including the format and type of information to be delivered to end users.

Activities:

Activity 2.1: Refine functional specifications from project preparation – will aim to look at existing specifications and address specific additional or new requirements in terms of data and information needs in order to support and enhance local response activities.

Activity 2.2: Undertake necessary field work – will involve field surveys to review existing monitoring systems, the location of additional data collection and transmission systems, etc.

Activity 2.3: Prepare detailed design and tender documents – this activity will deal with undertaking detailed design either for upgrading one of the existing systems to serve regional purposes or set a detailed design for a new one if current systems cannot serve regional requirements.

Component 3: Time frame and Budget:

Time frame:	2 years (2007 – 2008)
Budget and cost sharing:	
Component Cost:	US $ 1.02 mill
National (in-kind) contribution:	US $ 0.10 mill
Funding sought:	**US $ 0.92 mill**

5. Implementation Arrangements

ENTRO is established in Addis Ababa under a Headquarters Agreement with the Government of Ethiopia, which awards to ENTRO the legal personality, privileges and immunities of a regional organization. The ENCOM approved legal status of ENTRO (December 2002) ,invested ENTRO with the legal personality to perform the functions entrusted to it, including the power to receive and administer grant funding, in the territories of all three EN countries. ENTRO has been designed as an NBI institution by Nile-COM (Extraordinary Nile-COM Meeting, Addis Ababa, Ethiopia, and September 12, 2003).

ENTRO will be the recipient of the World Bank grant funds. ENTRO together with EN countries will manage FPEW I of the FPEW project and thus be responsible for the coordination of all activities, procurement of equipment and consultants, and management of funds. ENTRO together with the EN countries will have final responsibility for the quality of outputs and will work in close cooperation with both the Bank's Nile Team in supervising the activities and with the already identified National Flood Coordinators in the MOIWR (Sudan), MOWNR (Ethiopia) and MWRI (Egypt).

Activities at national level would be supported, coordinated by the National Focal Point institution, represented by national project coordinators, which is part of the overall ENSAP

arrangements. Countries will provide counterpart staff to support project activities within their territories.

The following are the implementation arrangements that will take place:

- Initial implementation will be conducted at ENTRO during the first year of the project
- RFCU will be established in Khartoum (legal, institutional, technical and financial arrangement will be in place by the end of the first year of the project), ENTRO will make sure that all arrangements are in place before moving
- FCU manager will be responsible for managing day to day implementation matters of the project, both at regional and national levels.
- FCU manager will liaison with NFPI represented by national coordinators, who will manage and supervise the implementation mechanisms within their respected countries.

The implementation setup is illustrated in the following diagram (figure 2):

- RFCU will report to ENTRO and receive fund and technical support from ENTRO main office, RFCU mandate will be mainly responsible for overall project implementation and management, as mentioned in this document.
- RFU manager will report to the senior coordinator (presently the regional flood and model coordinator) at ENTRO main office, in future projects implementation coordination unit will be established at ENTRO.
- NFPI (ministries of water affairs in each country): will be responsible for implementing the project's activities at national level, NFC (currently the manager of national flood forecasting center in each country) will be representing the NFPI in the implementation process. NFPI will work closely with RFCU of the project. Chart a1.1 shows procurements and financial arrangements and relation between ENTRO and NFPI.
- NFPI: Will report to ENSAPT team leader in each country about issues, progress, and needed support. ENSAPT team leader will reflect in ENSAPT regional meetings.
- ENTRO will keep track of all records of the project.
- M&E specialist will be hired at ENTRO level and he will consider all M&E activities for all ENSAP projects.
- Auditing of the project will be part of annual ENTRO Auditing activities.

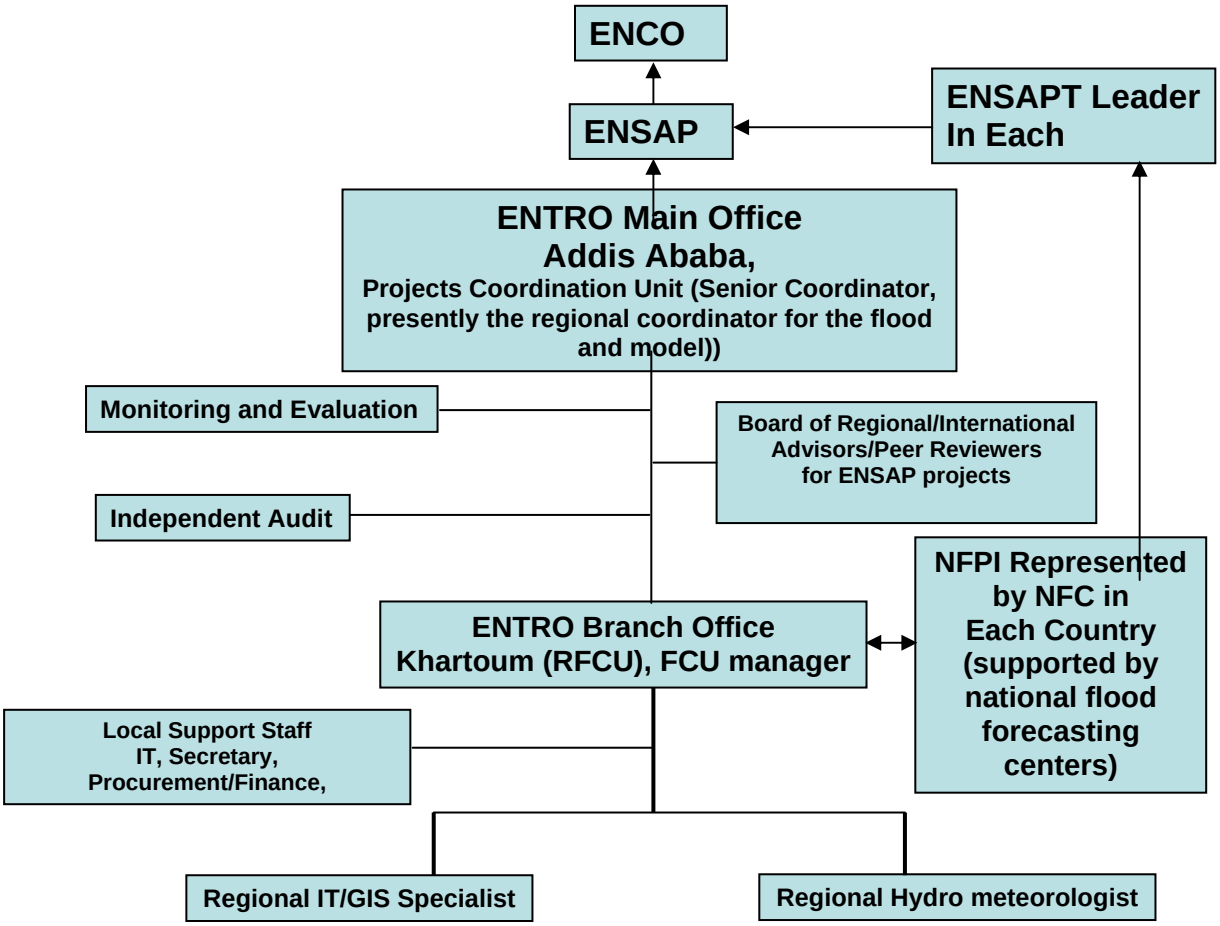


Figure 2: Organogram for Project Implementation

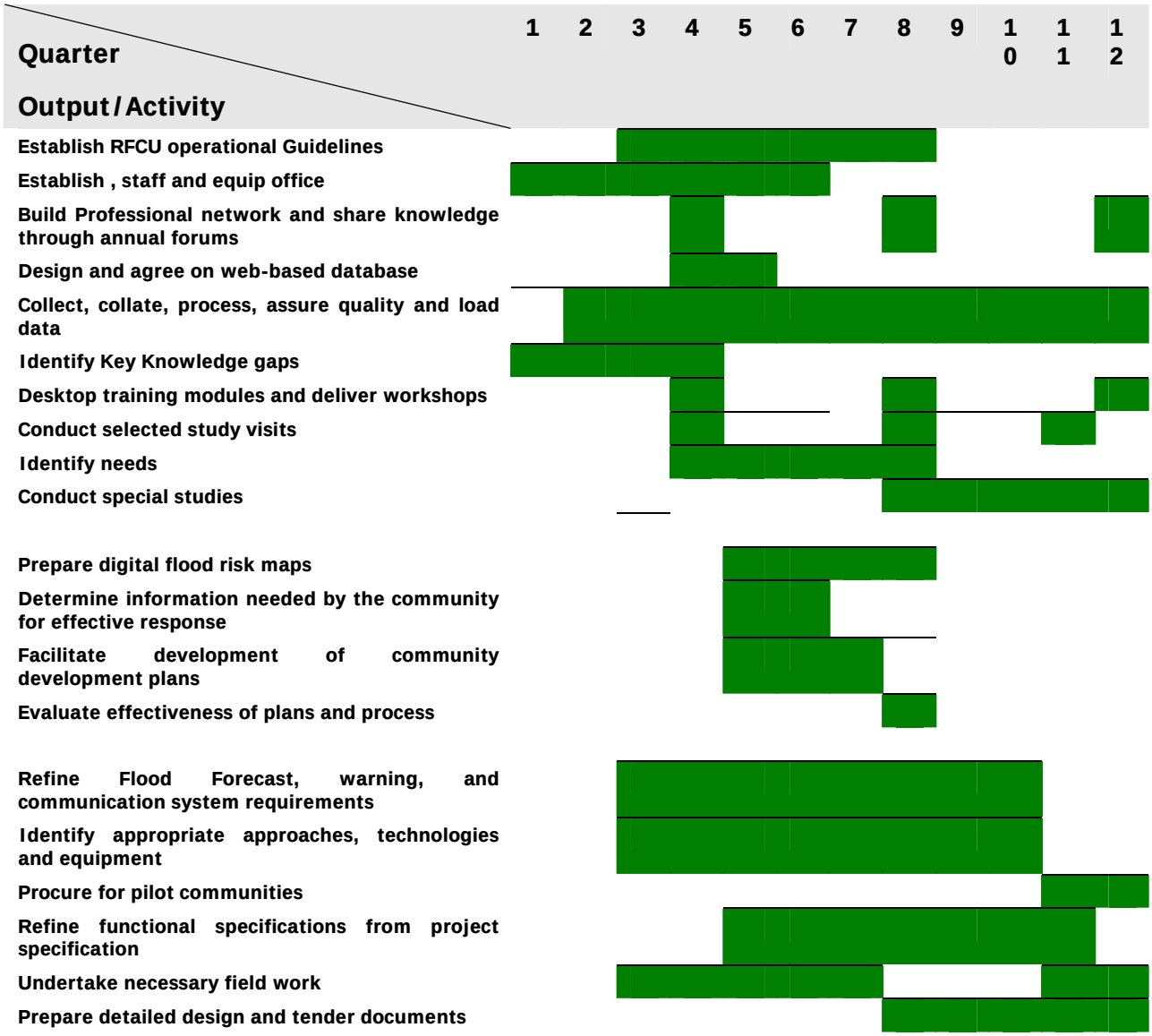
- A Board of regional/international advisors/peer reviewers will be formed at ENTRO level to review gives technical guidance along projects implementation.
- ENTRO will report to ENSAPT leaders about the progress, issues and needed actions during project implementation.
- ENSAPT will report to ENCOM and receive guidance as well.

Monitoring and Evaluation

ENTRO will hire full time monitoring and evaluation specialist for the ENSAP projects. Initially, this specialist will provide the required inputs for this project. ENTRO will consider strengthening its monitoring and evaluation depending on how the future projects unfold. The monitoring and evaluation framework is in annex 3.

6. Projected Work plan (timetable):

It is estimated that project implementation plane will take about 3 years. In the project setup, it is considered also that the during the implementation of FPEW I, implementation of FPEW II will start and will overlap with FPEW I, during the third year. This, explains the rationale behind putting the RFCU staffing and O & M have been set to cover about 2 years of the FPEW I duration.



7. Budget Summary

Category	Amount
Equipment	$669,800
Consultancy	$1,923,600
Workshop and Training	$448,508
Office operation and refurbishment (Including project support costs)	$330,000
Unallocated	$108,092
Total Sought Budget	**$3,480,000**
In Kind Contribution by ENTRO	**$200,000**
In Kind Contribution by EN countries	**$400,000**
Total Project Budget	**$4,080,000**

Annexes included in the original document have been excluded.

Annexes:

1. Procurement, Disbursement and Financial Management
2. Detailed Budget
3. Results Framework and Monitoring
4. Procurement Plan

Appendix D:

Detailed Project Cost Analysis

CONTENTS

Table D-1: Cost Estimates: Sudan Sub-Program

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs Period (y)	Recurring Costs Cost $
1. Flood Risk Mapping											
Survey	cross-section	215	480	103,200	34,400	34,400	34,400				
New data acquisition	km	1850	400	740,000	140,000	300,000	300,000				
Field survey	month	9	2,000	18,000	4,000	5,000	5,000	4,000			
Mapping	map	1300	75	97,500		9,750	29,250	29,250	29,250		
Acquisition of existing data, Merowe, Khartoum				150,000	150,000						
Labor – International	month	14		239,500	160,000	50,000	29,500				
Accommodation	month	14	3,000	42,000	27,000	10,000	5,000				
Travel	month	7	3,000	21,000	12,000	6,000	3,000				
Labor - Local	month	13		53,000	33,000	12,000	4,000	4,000			
Government contribution Labor	month	108	2,500	270,000	30,000	60,000	60,000	60,000	60,000		
In-country travel	trip	8	1,250	10,000		2,500	2,500	2,500	2,500		
TOTAL				**1,744,200**	590,400	489,650	472,650	99,750	91,750		
2. Hydrology & Hydraulic Modeling											
Software		1	5,000	5,000	5,000						
Labor – International	month	12		205,000	102,500	102,500					
Accommodation	month	12	3,000	36,000	18,000	18,000					
Travel	trip	4	3,000	12,000	9,000	3,000					
Labor - Local	month	9	4,000	36,000	18,000	18,000					
Government contribution Training	month	1		2,500		2,500					
TOTAL				**296,500**	152,500	144,000					
3. New reporting river gauging stations											
New Stations	site	5	25,000	125,000		62,500	62,500				
Cableway	site	1	7,000	7,000		7,000					
AWLR	site	1	10,000	10,000		10,000					

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Installation	site	1	30,000	30,000		15,000	15,000				
Labor – International	month	2.75		45,500							
Accommodation	month	2.75	3,000	8,250		8,250					
Travel	trip	2	3,000	6,000		6,000					
Labor - Local	month	18	4,000	54,000		54,000					
Government contribution Labor	month	8		14,000		14,000					
In-country travel	day	5	800	4,000		4,000					
Repairs/ replacements										10	71,000
Labor – site visits			500	1,500			500	500	500	1	500
Operation & Maintenance Costs			1,000	3,000			1,000	1,000	1,000	1	1,000
TOTAL				**308,250**		226,250	79,000	1,500	1,500		
4. New Reporting Weather Stations											
New Stations	site	15	15,000	225,000	0	225,000					
Installation	site	15	1,000	15,000	0	15,000					
Communication	site	15	1,500	22,500	0	22,500					
Central site	site	1	1,500	1,500	0	0	1,500				
Laptops	no.	5	2,000	10,000	0	0	10,000				
New Stations	site	15	15,000	225,000	0	225,000					
Labor – International	month	3		43,500	0	43,500					
Travel	trip	2	3,000	6,000		6,000					
Accommodation	month	3	3,000	8,498	0	8,498					
Labor - Local	month	9		27,000	0	24,300	2,700				
Government contribution Labor	month	7		11,500		11,500					
In-country travel	trip	15	800	12,000		12,000					
Weather Stations	no.	15			0	0	0	0	0		
Equipment	no.	15	8,500		0	0				10	127,500
Laptops	no.	5	2,000		0	0	0	0	0	5	10,000
Labor	days	15	100	4,500	0	0	1,500	1,500	1,500	1	1,500

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Travel	days	15	200	9,000	0	0	3,000	3,000	3,000	1	3,000
TOTAL				**395,998**	0	368,298	18,700	4,500	4,500		
5. Capacity Building at MIWR											
Computer hardware		10	2,500	25,000	12,500				12,500		
GIS software		1	40,000	40,000	40,000						
Flood forecasting software		1	35,000	35,000	0	35,000					
Materials testing laboratory		1	10,000	10,000	0	0	10,000				
Vehicle for international team		1	70,000	70,000	70,000	0					
Labor – International	month	19.5		328,500	65,700	98,550	82,125	82,125			
Travel	trip	6	3,000	18,000	3,600	5,400	4,500	4,500			
Accommodation	month	19.5	3,000	58,500	11,700	17,550	14,625	14,625			
Labor - Local	month	1.5		6,000	0	2,000	4,000				
Other management costs (eg cars office etc)		10%	7,000	35,000	7,000	7,000	7,000	7,000	7,000		
Government contributions Labor	month	12		28,500	2,850	7,125	9,975	8,550			
In-country travel	day	15	200	3,000	300	750	1,050	900			
Computer hardware		5	2,500							4	12,500
GIS software		1	40,000							10	40,000
FF software		1	35,000							8	35,000
Lab equipment	annual	10%	1,000	2,000				1,000	1,000	1	1,000
staff materials lab	month	12	3,000	108,000			36,000	36,000	36,000	1	36,000
TOTAL				**767,500**	213,650	173,375	169,275	154,700	56,500		
6. Community education & training for awareness & preparedness											
Training materials		2	15,000	30,000	15,000			15,000			
Funding for community initiatives				5,920,000	20,000	200,000	900000	1,800,000	3,000,000		
Radio-telephones	no.	12	1,500	18,000	18,000						
Vehicles		4	70,000	280,000	140,000	140,000					

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Labor – International	month	40.25		648,250	221,452	161,056	104,686	104,686	56,370		
Travel	trip	17	3,000	51,000	18,000	12,000	6,000	9,000	6,000		
Accommodation	month	40.25	3,000	120,750	41,250	30,000	19,500	19,500	10,500		
Labor - Local	month	1123		1,772,000	354,400	354,400	354,400	354,400	354,400		
In-country travel	day	200	200	40,000	8,000	8,000	8,000	8,000	8,000		
per diems	day	600	25	15,000	3,000	3,000	3,000	3,000	3,000		
Other management costs (eg cars office etc)		10%	280,000	140,000	28,000	28,000	28,000	28,000	28,000		
Government contributions Labor	month	22		47,500	4,750	9,500	9,500	14,250	9,500		
In-country travel	day	15	200	3,000	300	750	1,050	900			
TOTAL				**9,085,500**	872,152	946,706	1,434,136	2,356,736	3,475,770		
7. General capacity building at MIWR											
ADCPs	unit	2	35,000	70,000			35,000	35,000			
office equipment		1	10,000	10,000			10,000				
Radio-telephones	no.	8	1,500	12,000			12,000				
Vehicles	no.	3	70,000	210,000		70,000	140,000				
Labor – International	month	3.5		58,000		40,600	17,400				
Travel	trip	1	3,000	3,000		3,000					
Accommodation	month	3.5	3,000	10,500		7,350	3,150				
Labor - Local	month	5.5		17,500		5,000	12,500				
In-country travel	day	5	200	1,000			1,000				
Government contributions Labor		5		9,500			9,500				
vehicle maintenance & operation		10%	21,000	63,000			21,000	21,000	21,000		
TOTAL				**464,500**		125,950	261,550	56,000	21,000		
8. Capacity building at SMA											
Computers/hardware		3	7,000	21,000		21,000					
Software		1	10,000	10,000		10,000					
Labor – International	month	3.25		51,750		51,750					

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Travel	trip	2	3,000	6,000		6,000					
Accommodation	month	3.25	3,000	9,750		9,750					
Labor - Local	month	1	4,000	4,000		4,000					
Government contributions Computers/hardware	0	3	3,000			0				4	3,000
Software	0	1	10,000			0				10	10,000
Training		4.5	0	11,250		11,250					
TOTAL				**113,750**		113,750					
9. Capacity building for CDO											
Office equipment			10,000	10,000			10,000				
Labor – International	month	10.75		166,750		100,050	50,025	16,675			
Travel	trip	4	3,000	12,000		6,000	3,000	3,000			
Accommodation	month	10.75	3,000	32,250		19,350	9,675	3,225			
Labor - Local	month	1		4,000		4,000					
In-country travel	day	10	200	2,000		2,000					
Government contributions Labor	month	143		294,500		47,120	82,460	82,460	82,460	1	82,460
TOTAL				**521,500**		178,520	155,160	105,360	82,460		
10. General capacity building for CDO											
vehicles	no.	5	70,000	350,000			350,000				
office equipment		5	8,000	40,000		20,000	20,000				
boats	no.	5	35,000	175,000			175,000				
communications equipment	sets	9	10,000	90,000			90,000				
Labor – International	month	4.5		71,500		50,050	21,450				
Travel	trips	2	3,000	6,000		6,000					
Accommodation	month	4.5	3,000	13,500		9,450	4,050				
Labor - Local	month	3		12,000		6,000	6,000				
Government contributions Labor	month	5		9,500		4,750	4,750				
vehicles	annual	10%	35,000	70,000				35,000	35,000	1	35,000

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
boats	annual	15%	26,250	52,500				26,250	26,250	1	26,250
communications	replace		90,000	0						7	90,000
TOTAL				**890,000**	0	96,250	671,250	61,250	61,250		
11. Capacity building at HAC											
office equipment			10,000	10,000			10,000				
Labor – International	month	7.25		112,750			112,750				
Travel	trips	2	3,000	6,000			6,000				
Accommodation	month	7.25	3,000	21,750			21,750				
Labor - Local	month	6		24,000			12,000	6,000	6,000		
In-country travel	day	4	200	800			800				
Government contributions Labor	month	5		12,500			12,500				
TOTAL				**187,800**			175,800	6,000	6,000		
12. General capacity building for HAC											
vehicles	no.	3	70,000	210,000			210,000				
office equipment, Dongola		1	25,000	25,000			25,000				
communications equipment	sets	2	7,500	15,000			15,000				
Labor – International	month	5		79,750			79,750				
Travel	trips	2	3,000	6,000			6,000				
Accommodation	month	5	3,000	15,000			15,000				
Labor - Local	month	4.5		18,000			12,000				
In-country travel	day	10	200	2,000							
per diems	day	10	25	250			250				
Government contributions Labor	month	83		139,000			27,800	55,600	55,600		
In-country travel	trip	20	200	4,000			2,000	1,000	1,000		
vehicles	annual	10%	21,000	42,000				21,000	21,000	1	21,000
communications	replace		15,000	0						7	15,000
TOTAL				**556,000**	0	0	392,800	85,600	77,600		

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
13a. Dongola Flood Protection Works, preliminary investigations											
vehicles	no.		70,000	0							
office accommodation, Dongola	month	3	5,000	15,000		15,000					
Labor – International	month	7		114,000	28,500	85,500					
Travel	trips	4	3,000	12,000	9,000	3,000					
Accommodation	month	7	3,000	21,000	5,250	15,750					
Labor - Local	month	14.5		54,500	8,175	46,325					
In-country travel	day	70	200	14,000	3,500	10,500					
per diems	day	220	25	5,500	825	4,675					
Government contributions Labor resettlement	month	6	2,500	15,000		15,000					
TOTAL				**251,000**	55,250	195,750					
13b. Dongola Flood Protection Works, design & construction											
Dikes	Km	4.5	200,000	900,000			900,000				
Survey and Design		1	72,000	72,000			72,000				
Excavation/storage	m3	200000	2	360,000			360,000				
Pump Station	site	1	600,000	600,000			600,000				
Pumps	unit	6	25,000	150,000			150,000				
Stoplog outlet		1	30,000	30,000			30,000				
Vehicle	no.	1	70,000	70,000			70,000				
Labor – International	month	11.5		187,500			187,500				
Travel	trips	4	3,000	12,000			12,000				
Accommodation	month	11.5	2,500	28,750			28,750				
Labor - Local	month	15		49,000			49,000				
Per diems	day	300	25	7,500			7,500				
Government contributions Resettlement	month	3	2,500	7,500			7,500				

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Dikes - inspections	day	7	100	1,400			0	700	700	1	700
- repairs	intermittent	2.0%	18,000							5	18,000
Pump Station	annual	1	600	1,200			0	600	600	1	600
Pump replacement	replacement	3	25,000				0				
Resettlement	buildings	40	420	16,800			16,800			15	75,000
TOTAL				**2,493,650**			2,491,050	1,300	1,300		
14. Land Management Planning, Khartoum											
Study tour - travel	person-visits	2	8,000	16,000				16,000			
- overseas institutional costs	days	20	800	16,000				16,000			
Labor – International	months	11.25		180,750				180,750			
Travel	trips	5	3,000	15,000				15,000			
Accommodation	months	11.25	3,000	33,750				33,750			
Labor - Local	months	18		73,000				73,000			
In-country travel	trips	50	10	500				500			
Government contributions Training	months	6	2,500	15,000				15,000			
Study tour	months	2	2,500	5,000				5,000			
TOTAL				**355,000**	0	0	0	355,000			
15. Investigations of river hydraulics, sediment transport and channel morphology											
Sampling equipment				20,000			20,000				
Labor – International	months	17		301,000		75,250	45,150	75,250	105,350		
Travel	trip	5	3,000	15,000		6,000	3,000		6,000		
Accommodation	months	17	3,000	51,000		12,750	7,650	12,750	17,850		
Labor - Local	months	73		233,500		23,350	46,700	70,050	93,400		
In-country travel	trip	50	10	500		125	75	125	175		
Boat hire	day	215	50	10,750			5,375	5,375			

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Vehicles	day	200	20	4,000			2,000	2,000			
TOTAL				**635,750**	0	117,475	129,950	165,550	222,775		
16. Pilot program: appropriate technology for bank stability											
Materials				10,000			10,000				
Local labor	days	350	8	2,625			2,625				
Labor – International	months	11.75		196,750		59,025	137,725				
Travel	trips	5	3,000	15,000		6,000	9,000				
Accommodation	months	11.75	3,000	35,250		10,575	24,675				
Labor - Local	months	54		171,000		25,650	111,150	17,100	17,100		
In-country travel	trips	34	750	25,500		6,000	16,500	1,500	1,500		
per diems	days	175	25	4,375		650	2,850	450	425		
Boat hire	days	20	15	300			300				
Government contributions Labor	months	6		12,000			12,000				
TOTAL				**472,800**	0	107,900	326,825	19,050	19,025		
SUB-PROGRAM TOTAL				19,539,698	1,883,952	3,283,873	6,778,146	3,472,296	4,121,430		

Table D-2: Cost Estimates: Ethiopian Sub-Program

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
1. Flood Risk Mapping											
Survey	cross-section	50	360	18,000	18,000						
New data acquisition	images	200	75	55,000	55,000						
Field survey	months	1	2,000	2,000	2,000						
Mapping	maps	90	75	6,750		6,750					
Labor – International	month	8		131,000	98,250	32,750					
Accommodation	month	8	2,300	18,400	13,800	4,600					
Travel	trip	3	3,000	9,000	6,000	3,000					
Labor - Local	month	8		32,000	19,200	12,800					
In-country travel	trips	3	1,000	3,000	3,000						
Government contribution Labor	month	3		6,500	2,600	3,900					
TOTAL				**281,650**	217,850	63,800					
2. Network of reporting river gauging & rain gauge stations											
Satellite service	year	3	20,000	60,000			20,000	20,000	20,000		
Vehicles		2	80,000	160,000	160,000						
Communications equipment	station	75	8,000	1,200,000		1,200,000					
Instruments/installation/rehab.	station	25	15,000	375,000	187,500	187,500					
Site survey	site	5	1,500	7,500		7,500					
Construction, new sites	site	5	12,500	62,500		62,500					
Central station		1	12,500	12,500		12,500					
Maintenance contract	site-years	225	1,000	225,000			75,000	75,000	75,000		
Labor – International	month	35.5		608,000	304,000	243,200	60,800				
Accommodation	month	35.5	2,300	81,650	40,825	32,660	8,165				
Travel	trip	12	3,000	36,000	24,000	9,000	3,000				
Labor - Local	month	71		231,000	57,750	138,600	34,650				

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
In-country travel	trip	3	1,000	3,000	1,500	1,500					
Government contributions Labor	month	196		367,000	55,050	220,200	36,700	27,525	27,525		
Satellite service	year		20,000								
Site servicing	sites/year	75	480	108,000			36,000	36,000	36,000		
TOTAL				**3,537,150**	830,625	2,115,160	274,315	158,525	158,525		
3. Establishment of flood forecasting center in Addis Ababa											
Vehicles	no.	1	80,000	80,000		80,000					
IT equipment	station	1	50,000	50,000	50,000						
Office renovation	station	1	125,000	125,000	125,000						
Software		1	50,000	50,000	25,000	25,000					
Communications equipment	site	1	12,500	12,500		12,500					
Labor – International	month	48.75		811,000	324,400	324,400	81,100	81,100			
Accommodation	month	48.75	2,300	112,125	44,850	44,850	11,213	11,213			
Travel	trip	12	3,000	36,000	18,000	12,000	3,000	3,000			
Labor - Local	month	41.75		167,750	41,938	83,875	25,163	16,775			
In-country travel	trip	3	1,000	3,000		3,000					
Government contributions Labor	month	260		558,500	89,360	117,285	117,285	117,285	117,285	1	117,285
TOTAL				**2,005,875**	718,548	702,910	237,760	229,373	117,285		
4. Capacity building for DPPA											
Vehicles	no.	1	80,000	80,000			80,000				
IT equipment	station	1	8,000	8,000		8,000					
Office renovation	station	1	20,000	20,000		20,000					
Software		1	10,000	10,000		5,000	5,000				
Communications equipment	site	1	12,500	12,500		12,500					
Labor – International	month	14.75		238,000		119,000	71,400	47,600			
Accommodation	month	14.75	2,300	33,925		16,963	10,178	6,785			
Travel	trip	8	3,000	24,000		15,000	6,000	3,000			

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Labor - Local	month	8		33,000		9,900	9,900	9,900	3,300		
Government contribution Labor	month	171		343,500		54,960	96,180	96,180	96,180	1	96,180
TOTAL				**802,925**		261,323	278,658	163,465	99,480		
5. Capacity building at regional & woreda level											
IT equipment		1	12,000	12,000			12,000				
Software		1	10,000	10,000			5,000	5,000			
Communications equipment	site	4	12,500	50,000			50,000				
Labor – International	month	9.75		154,750		30,950	108,325	15,475			
Travel	month	9.75	2,300	22,425		4,485	15,698	2,243			
Accommodation	trip	6	3,000	18,000		6,000	12,000				
Labor - Local	month	26		104,000		10,400	62,400	20,800	10,400		
In-country travel	trips	16	800	12,800		1,600	7,200	3,200	800		
Government contributions Labor	month	30		55,000		5,500	22,000	22,000	5,500		
TOTAL				**438,975**		58,935	294,623	68,718	16,700		
6. Capacity Building at MWR											
ADCP	unit	5	35,000	175,000		105,000	70,000				
Standard current meters	unit	8	2,000	16,000		8,000	8,000				
IT equipment		1	36,000	36,000		21,600	14,400				
Other field equipment				30,000		15,000	15,000				
Software		1	25,000	25,000		12,500	12,500				
Vehicles	no.	3	80,000	240,000		160,000	80,000				
Labor – International	month	15.5		261,500	104,600	130,750	26,150				
Accommodation	month	15.5	2,300	35,650	14,260	17,825	3,565				
Travel	trip	6	3,000	18,000	9,000	9,000					
Labor - Local	month	10.5		39,500	9,875	19,750	5,925	3,950			
Government contributions Labor	month	21		46,500	6,975	32,550	6,975				
TOTAL				**923,150**	144,710	531,975	242,515	3,950			

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
7. Capacity building at NMA / MWR regional offices											
IT equipment		1	36,000	36,000		21,600	14,400				
Software		1	25,000	25,000		12,500	12,500				
Vehicles	no.	2	80,000	160,000		80,000	80,000				
Labor – International	month	8.75		147,750	59,100	73,875	14,775				
Accommodation	month	8.75	2,300	20,125	8,050	10,063	2,013				
Travel	trip	5	3,000	15,000	9,000	6,000					
Labor - Local	month	7.5		28,500	7,125	14,250	4,275	2,850			
Government contributions Labor	month	288		468,000			156,000	156,000	156,000	1	156,000
IT equipment	replacement									5	36,000
Software	upgrade	0.6								3	7,500
Vehicle O&M	annual	0.15		60,000			12,000	24,000	24,000	1	24,000
TOTAL				**960,375**	83,275	218,288	295,963	182,850	180,000		
8. Community education & training for awareness & preparedness											
Training materials				15,000	10,000	5,000					
Funding for community initiatives				850,000	10,000	80,000	160,000	300,000	300,000		
Radio-telephones	no.	4	1,500	6,000	3,000	3,000					
Vehicles	no.	2	80,000	160,000	80,000	80,000					
Labor – International	month	39.25		627,250	219,538	94,088	94,088	188,175	31,363		
Accommodation	month	39.25	2,300	90,275	31,596	13,541	13,541	27,083	4,514		
Travel	trip	12	3,000	36,000	7,200	7,200	7,200	7,200	7,200		
Labor - Local	month	403		1,052,000	315,600	157,800	157,800	263,000	157,800		
In-country travel	days	50	200	10,000	2,000	2,000	2,000	2,000	2,000		
Other management costs (eg cars office etc)	annual	10%	160,000	80,000	16,000	16,000	16,000	16,000	16,000		
Government contributions Labor	month	22		47,500	4,750	9,500	9,500	14,250	9,500	4	3,000

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
In-country travel	trip	8	200	1,600	200	400	600	400		10	10,000
TOTAL				**2,975,625**	699,884	468,529	460,729	8168,108	528,376		
9a. Flood protection works, Gambella: preliminary investigations											
office accommodation, Gambella	months	4	750	3,000	3,000						
office equipment, a-c, etc.				10,000	10,000						
communications equipment	unit	1	2,000	2,000	2,000						
Labor – International	month	5		84,000	84,000						
Accommodation	month	5	2,300	11,500	11,500						
Travel	trip	2	3,000	6,000	6,000						
Labor - Local	month	12.5		49,500	49,500						
In-country travel	days	80	120	9,600	9,600						
Per diems	days	115	20	2,300	2,300						
Government contributions Labor	month	1		2,500	2,500						
Resettlement	month	4	2,000	8,000	8,000						
TOTAL				**188,400**	188,400	0	0	0	0		
9b. Gambella Flood Protection Works, design & construction											
Dikes	Km	3.8	200,000	760,000			760,000				
Survey and Design		1	60,800	60,800			60,800				
Evacuation/storage	m3	50000	2	90,000			90,000				
Pump Station	site	1	350,000	350,000			350,000				
Pumps	unit	2	25,000	50,000			50,000				
Drainage		1	35,000	35,000			35,000				
Vehicle		1	80,000	80,000			80,000				
Bank Protection	m3	6000	80	480,000			480,000				
Office, Gambella	months	12	750	9,000			9,000				
Dikes	Km	3.8	200,000	760,000			760,000				

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Labor – International	months	13		213,000			213,000				
Accommodation	trips	6	3,000	18,000			18,000				
Travel	months	13	2,300	29,900			29,900				
Labor - Local	months	14		45,000			45,000				
In-country travel	days	300	25	7,500			7,500				
Government contributions Resettlement	months	6		15,000	0		15,000				
Dikes - inspections	days	5	80	800	0		0	400	400	1	400
- repairs	intermittent	2.0%	15,200							5	15,200
Pump Station	site	1	350	700	0		0	350	350	1	350
Pump replacement	replacement	1	25,000		0		0			10	25,000
Resettlement	buildings	40	350	14,000	0		14,000				
TOTAL				**2,258,700**	0	0	2,257,200	750	750		
10. Land management planning, Bahir Dar											
Study tour - travel	person-visits	2	8,000	16,000			16,000				
- overseas institutional costs	days	20	800	16,000			16,000				
Labor – International	month	7		120,000		72,000	48,000				
Accommodation	month	7	2,300	16,100		9,660	6,440				
Travel	trips	4	3,000	12,000		9,000	3,000				
Labor - Local	month	12		48,000		24,000	24,000				
In-country travel	days	80	200	16,000		8,000	8,000				
Per diems	days	170	20	3,400		1,700	1,700				
Government contributions Labor	months	12		30,000		15,000	15,000				
TOTAL				**291,900**		146,560	145,340				
SUB-PROGRAM TOTAL				14,664,725	3,029,851	4,566,259	4,341,761	1,625,738	1,101,116		

Table D-3: Cost Estimates: Egyptian Sub-Program

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
1. Update for NFC											
Satellite communications		1	20,000	20,000				20,000			
IT equipment		1	20,000	20,000				20,000			
Labor – International	month	2.5		43,500				43,500			
Accommodation	month	2.5	3,600	9,000				9,000			
Travel	trip	2	3,000	6,000				6,000			
Labor - Local	month	3		13,500				13,500			
In-country travel				100				100			
Government contribution Labor	month	2		7,500				7,500			
TOTAL				**119,600**				119,600			
2. Studies related to flood forecasting											
IT equipment		1	5,000	5,000	5,000						
Labor – International	month	10		195,000	78,000	117,000					
Accommodation	month	10	3,600	36,000	14,400	21,600					
Travel	trip	5	3,000	15,000	9,000	6,000					
Labor - Local	month	26		162,000	40,500	121,500					
In-country travel				100		100					
TOTAL				**413,100**	146,900	266,200					
3. Revise flood forecasting procedures											
Labor – International	month	2.75		49,750		19,900	29,850				
Accommodation	month	2.75	3,600	9,900		3,960	5,940				
Travel	trip	1	3,000	3,000		3,000					
Labor - Local	month	8		48,000		12,000	36,000				
In-country travel				100			100				
Government contributions Labor	month	4.5		16,875		5,625	11,250				
TOTAL				**127,625**		44,485	83,140				

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
4. Assistance with flood risk mapping											
Vehicle		0.5	70,000	35,000	35,000						
IT equipment		1	12,500	12,500	12,500						
software		1	4,000	4,000	4,000						
Study tour - travel	person-visits	3	8,000	24,000		24,000					
- overseas institutional costs	days	20	800	16,000		16,000					
Labor – International	month	21.5		421,000	168,400	147,350	105,250				
Accommodation	month	21.5	3,600	77,400	30,960	27,090	19,350				
Travel	trip	6	3,000	18,000	9,000	6,000	3,000				
Labor - Local	month	68		408,000	102,000	142,800	163,200				
In-country travel				250	100	100	50				
Other management costs (eg cars office etc)	annual	10%	35,000	10,500	3,500	3,500	3,500				
Government contribution Labor	month	4		15,000		11,250	3,750				
TOTAL				**1,041,650**	365,460	378,090	298,100				
5. Sediment transport modeling of pilot reach											
Vehicle		0.5	70,000	35,000	35,000						
Field sampling equipment		1	40,000	40,000	40,000						
IT equipment		1	7,500	7,500			7,500				
software		1	40,000	40,000			40,000				
Specialist training course - travel	person-visits	2	12,000	24,000		24,000					
- course fees	fee	2	6,000	12,000		12,000					
Labor – International	month	19		322,000	64,400	48,300	209,300				
Accommodation	month	19	3,600	68,400	13,680	10,260	44,460				
Travel	trip	6	3,000	18,000	6,000	3,000	9,000				
Labor - Local	month	24		144,000	43,200	36,000	64,800				

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Other management costs (eg cars office etc)	annual	10%	35,000	10,500	3,500	3,500	3,500				
Government contributions Labor	month	5		18,750		14,063	4,688				
TOTAL				**740,150**	205,780	151,123	383,248				
6. Land use management											
Study tour - travel	person-visits	5	8,000	40,000					40,000		
- overseas inputs	days	20	800	16,000					16,000		
Labor – International	month	30.75		536,000				348,400	187,600		
Accommodation	month	30.75	3,600	110,700				71,955	38,745		
Travel	trip	12	3,000	36,000				24,000	12,000		
Labor - Local	month	36		216,000				108,000	108,000		
In-country travel				500				300	200		
Government contributions Labor	month	18		63,000				21,000	42,000		
TOTAL				**1,018,200**				573,655	444,545		
SUB-PROGRAM TOTAL				3,460,325	718,140	839,898	764,488	693,255	444,545		

Table D-4: Cost Estimates: Regional Sub-Program

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
1. Management unit support for ENTRO											
Office equipment		1	15,000	15,000			15,000				
IT equipment		1	10,000	10,000			10,000				
Labor – International	month	2		36,000			18,000	18,000			
Accommodation	month	2	2,500	5,000			2,500	2,500			
Travel	trip	2	3,000	6,000			3,000	3,000			
Labor - Local	month	140		910,000			273,000	318,500	318,500		
In-country travel				100				100			
ENTRO national PMs	month	171		950,000	150,000	200,000	200,000	200,000	200,000		
Regional travel				75,000	15,000	15,000	15,000	15,000	15,000		
TOTAL				**2,007,100**	165,000	215,000	596,500	557,100	533,500		
2. EN flood management interest group in NBCBN											
Office equipment		1	15,000	15,000	15,000						
IT equipment		1	10,000	10,000	10,000						
Website establishment		1	2,500	2,500	2,500						
Labor – International	month	3		55,000	27,500	13,750	13,750				
Accommodation	month	3	3,000	9,000	4,500	2,250	2,250				
Travel	trip	2	3,000	6,000	3,000	3,000					
Labor – Local	month	23		108,500	21,700	21,700	21,700	21,700	21,700		
In-country travel	year	4	7,500	30,000		7,500	7,500	7,500	7,500		
Website maintenance	year	4	450	1,800		450	450	450	450		
Government contributions	month	45		168,750	33,750	33,750	33,750	33,750	33,750		
TOTAL				**406,550**	117,950	82,400	79,400	63,400	63,400		
3. Regular conferences											
Labor - Local	month	12.5		54,688	10,938	10,938	10,938	10,938	10,938		

Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
										Period (y)	Cost $
Regional travel	year	160	800	128,000	25,600	25,600	25,600	25,600	25,600		
Accommodation, per diems	nights	1000	130	130,000	26,000	26,000	26,000	26,000	26,000		
Venues	events	8	6,000	48,000	9,600	9,600	9,600	9,600	9,600		
Government contributions Labor	month	54		202,500	40,500	40,500	40,500	40,500	40,500		
TOTAL				**563,188**	112,638	112,638	112,638	112,638	112,638		
4. Special topic seminars											
Labor - Local	month	16		85,752		28,584	28,584		28,584		
Regional travel	trip	54	800	43,200		14,400	14,400		14,400		
Accommodation, per diems	nights	270	130	35,100		11,700	11,700		11,700		
Venues	events	3	4,000	12,000		4,000	4,000		4,000		
Government contribution Labor	month	16.5		61,875		20,625	20,625		20,625		
TOTAL				**237,927**		79,309	79,309		79,309		
5. Joint study tours											
Study tour - travel	person-visits	20	16,000	320,000		80,000	80,000	80,000	80,000		
- overseas institutional costs	days	60	800	48,000		12,000	12,000	12,000	12,000		
Labor - Local	month	4		14,000		3,500	3,500	3,500	3,500		
Government contributions Labor	month	12		45,000		11,250	11,250	11,250	11,250		
TOTAL				**427,000**		106,750	106,750	106,750	106,750		
6. Visiting specialists											
Labor – International	month	6		126,000		31,500	31,500	31,500	31,500		
Accommodation	month	6	6,000	36,000		9,000	9,000	9,000	9,000		
Travel	trip	6	3,000	18,000		4,500	4,500	4,500	4,500		
Labor - Local	month	1.5		5,250		1,313	1,313	1,313	1,313		
TOTAL				**185,250**		46,313	46,313	46,313	46,313		
7. Joint studies											
Miscellaneous		1	10,000	10,000		2,500	2,500	2,500	2,500		
Labor – International	month	1.5		24,000			24,000				

	Item	Unit	Number	Rate $	Cost $	Year 1 $	Year 2 $	Year 3 $	Year 4 $	Year 5 $	Recurring Costs	
											Period (y)	Cost $
	Accommodation	month	1.5	3,000	4,500			4,500				
	Travel	trip	1	3,000	3,000			3,000				
	Labor - Local	month	80		560,000		140,000	140,000	140,000	140,000		
	Government contributions Labor	month	40		150,000		37,500	37,500	37,500	37,500		
	TOTAL				**751,500**	0	180,000	211,500	180,000	180,000		
	SUB-PROGRAM TOTAL				4,578,515	395,588	822,409	1,172,409	1,066,200	1,121,909		

Table D-5: Breakdown by Cost Category

		INTL		REGIONAL		GOVT	
		Labor	Non-labor	Labor	Non-labor	Labor	Non-labor
Ethiopia	14,644,725	3,624,250	5,395,250	1,843,450	1,668,675	1,948,000	185,100
Sudan	19,539,697	3,252,750	4,756,000	2,643,750	7,541,548	1,092,650	253,000
Egypt	3,460,325	1,663,250	351,000	991,500	333,450	121,125	0
Regional	4,578,515	273,000	428,000	2,688,290	561,100	628,125	0
TOTAL	42,243,262	8,813,250	10,930,250	8,166,990	10,104,773	3,789,900	438,100
		20.9%	25.9%	19.3%	23.9%	9.0%	1.0%

Table D-5: Cost Schedule

		Yr1	Yr2	Yr3	Yr4	Yr5
Ethiopia	14,644,725	3,029,851	4,566,259	4,341,761	1,625,738	1,101,116
Sudan	19,539,697	1,883,952	3,283,873	6,778,146	3,472,296	4,121,430
Egypt	3,460,325	718,140	839,898	764,488	693,255	444,545
Regional	4,578,515	395,588	822,409	1,172,409	1,066,200	1,121,909
TOTAL	42,243,262	6,027,531	9,512,439	13,056,804	6,857,488.84	6,789,000
		14.3%	22.5%	30.9%	16.2%	16.1%

Table D-6: Labor Inputs: Sudan Sub-Program

Months of Input	1. Flood risk mapping	2. Hydrology & hydraulic modeling	3. New reporting river gauging stations	4. New reporting weather stations	5. Capacity building at MIWR	6. Community education & training	7. General capacity building at MWR	8. Capacity building at SMA	9. Capacity building for CDO	10. General capacity building for CDO	11. Capacity building for HAC	12. General capacity building at HAC	13. Flood Protection Works, Dongola (a)	(b) design / construct	14. Land management planning, Khartoum	15. Investigations of river hydraulics,	16. Pilot program: bank stability	TOTAL
INTERNATIONAL	14	12	2.75	2.75	19.5	40.25	3.5	3.25	10.75	4.5	7.25	5	7	11.5	11.25	17	11.75	**184**
Team Leader	4.5	2	0.5	0.5	4	5	0.5	0.5	0.7	0.5	0.5	0.5	0.5	1	0.5	5	0.7	**27.5**
Economist	0.5					1							1		0.5			**3**
Water Resources Engineer					1.5	11				1	1	1		4		2	8	**29.5**
Hydrologist	3	3	1		6		1.5						1	0.5	3	2		**21**
Hydraulic Modeler		7			1											8		**16**
Environmental Scientist						3			1		0.7		1.5		3.7		3	**13**
Social Development Specialist						11					1		1		1.5			**14.5**
Institnl Specialist									1			0.5			2			**3.5**
Emergency Mgt Specialist					0.5	1			8	1	4	1.5						**16**
Civil Design Engineer						5							2	4				**11**
Contract Admin. Specialist						0.7								1				**1.7**
GIS Specialist	6				3.5	1												**10.5**
IT Specialist.					2	1												**3**
Meteorologist				1				2										**3**
Communications Specialist.			0.7	0.7	0.5	0.5	0.5			1		0.7						**4.7**
Procurement Specialist			0.5	0.5	0.5		1	0.7		1		0.7		1				**6**
NATIONAL	13	9	18	9	1.5	112	5.5	1	1	3	6	4.5	14.	15	18	73	54	**1369**
Water Resources Engineer					1.5					3	6	4.5		8			12	**35**

Months of Input	1. Flood risk mapping	2. Hydrology & hydraulic modeling	3. New reporting river gauging stations	4. New reporting weather stations	5. Capacity building at MIWR	6. Community education & training	7. General capacity building at MWR	8. Capacity building at SMA	9. Capacity building for CDO	10. General capacity building for CDO	11. Capacity building for HAC	12. General capacity building at HAC	13. Flood Protection Works, Dongola (a)	(b) design / construct	14. Land management planning, Khartoum	15. Investigations of river hydraulics,	16. Pilot program: bank stability	TOTAL
Hydrologist /Hydraulics Specialist	4	9	6	3		33	2.5	1					2	1	2	34	6	**103**
Social Development Specialist													3		1.5			**4.5**
GIS Specialist	8														5			**13**
Environmental Scientist									1				3		2.5		6	**12.5**
Economist	1												2.5		1			**4.5**
Planning Specialist															6			**6**
Technician			12	6		108	3						4	2		39	30	**117**
Administrative staff						10								4				**14**
GOVERNMENT	108	1	8	7	12	22	5	4.5	143	5	5	83	6	3	8	0	6	**426.5**
Engineers	108	1	2		9	11	2		89	2	5	28			3		1.5	**261**
Scientists				1	1.5			4.5							3		1.5	**11.5**
Social													6	3	1			**10**
Economist						6									1			**7**
Technical			6	6	1.5		3		36	3		28					3	**86.5**
Administrative staff						5			18			27						**50**

Table D-7: Labor Inputs: Ethiopian Sub-Program

Months of Input	1. Flood risk mapping	2. Network of reporting stations	3. Establishment of flood forecasting center	4. Capacity building for DPPA	5. Capacity building at regional & woreda	6. Capacity Building at MWR	7. Capacity building at NMA /MWR regional	8. Community education & training for	9. Flood protection works, Gambella (a)	(b) design / construct	10. Land management planning, Bahir Dar	TOTAL
INTERNATIONAL	8	35.5	48.75	14.75	9.75	15.5	8.75	39.25	5	13	7	205.25
Team Leader	1	12	3	2	1.5	1.5	1	4	0.5	1	1	28.5
Economist		0.5	0.7	0.7		0.5	0.5	1	1			5
Water Resources Engineer						4		11		4	4	23
Hydrologist	2	8	30	2	1.5	5	4		1	2		55.5
Hydraulic Modeler	3		4									7
Environmental Scientist		1			1.5			3	1.5		1	8
Social Development Specialist				2	3			11	1			17
Institnl Specialist		1	0.5	1		0.5	0.7				1	4.75
Emergency Mgt Specialist		1.5	1.5	5	1.5	0.5		1				11
Civil Design Engineer						1.5		5		4		10.5
Contract Admin. Specialist		2	1				1	1				5
GIS Specialist		1	1									2
IT Specialist.		6	0.5	2	0.7		0.7	0.5				10.5
Meteorologist		1.5	0.5			1	0.7			1		4.75
Communications Specialist.	1	12	3	2	1.5	1.5	1	4	0.5	1	1	28.5
Procurement Specialist		0.5	0.7	0.7		0.5	0.5	1	1			5
NATIONAL	8	71	41.75	8	26	10.5	7.5	403	12.5	14	12	614.25
Water Resources Engineer										6	1.5	7.5

Months of Input	1. Flood risk mapping	2. Network of reporting stations	3. Establishment of flood forecasting center	4. Capacity building for DPPA	5. Capacity building at regional & woreda	6. Capacity Building at MWR	7. Capacity building at NMA /MWR regional	8. Community education & training for	9. Flood protection works, Gambella (a)	(b) design / construct	10. Land management planning, Bahir Dar	TOTAL
Hydrologist /Hydraulics Specialist	5	30	32	3	4	6	6	33	2	2		123
Social Development Specialist				4	16				3		1.5	24.5
GIS Specialist	3		9			2					1	15
Environmental Scientist		4			6				3		2	15
Economist		1	0.7	1		0.5	0.5		2.5			6.25
Planning Specialist											6	6
Technician		36				2		360	2	2		402
Administrative staff							1	10		4		15
GOVERNMENT	3	196	260	171	30	21	288	22	1	6	12	101
Engineers	1	72	162	87		15	72	11	1	6		427
Scientists	1	6	20		6						12	45
Social				42	8							50
Economist								6				6
Technical	1	108	51		16	6	144					326
Administrative staff		10	27	42			72	5				156

Table D-8: Labor Inputs: Egyptian Sub-Program

Months of Input	1. Upgrade NFC	2. Studies related to flood forecasting	3. Revise flood forecasting procedures	4. Assistance with flood risk mapping	5. Sediment transport modeling of pilot	6. Land use management		TOTAL
INTERNATIONAL	2.5	10	2.75	21.5	19	30.75		86.5
Team Leader	0.5	4	0.7	15	3	8		31.25
Economist		3				1.7		4.75
Water Resources Engineer						10		10
Hydrologist	1.5	3	2	3	3			12.5
Hydraulic Modeler				2.5	13			15.5
Environmental Scientist						1.5		1.5
Social Development Specialist						5		5
Institnl Specialist						3		3
Emergency Mgt Specialist				1		1.5		2.5
Civil Design Engineer								
Contract Admin. Specialist								
GIS Specialist								0
IT Specialist.								0
Meteorologist								0
Communications Specialist.								
Procurement Specialist	0.5							0.5
NATIONAL	3	26	8	68	24	36		161
Water Resources Engineer		4	2			12		18
Hydrologist /Hydraulics Specialist		18	6	44	24			92
Social Development Specialist						6		6
GIS Specialist	1			24		4		29
Environmental Scientist						2		2
Economist		4						
Planning Specialist						12		12
Technician	2							2
Administrative staff								
GOVERNMENT	2	0	4.5	4	5	18		33.5
Engineers	2		3	4	4	6		19
Scientists			1.5		1	6		8.5
Social						6		6
Economist								
Technical								
Administrative staff								

Table D-9: Labor Inputs: Regional Sub-Program

Months of Input	1. Upgrade NFC	2. Studies related to flood forecasting	3. Revise flood forecasting procedures	4. Assistance with flood risk mapping	5. Sediment transport modeling of pilot	6. Land use management		TOTAL
INTERNATIONAL	2	3	0	0	0	6	1.5	10.5
Team Leader	1	1				6		8
Economist								
Water Resources Engineer								
Hydrologist		2						
Hydraulic Modeler								
Environmental Scientist								
Social Development Specialist								
Institnl Specialist							1.5	1.5
Emergency Mgt Specialist								
Civil Design Engineer								
Contract Admin. Specialist								
GIS Specialist								
IT Specialist.	1							1
Meteorologist								
Communications Specialist.								
Procurement Specialist								
NATIONAL	140	23	12.	16	4	1.5	80	277
Water Resources Engineer				6			80	86
Hydrologist /Hydraulics Specialist	60	8						68
Social Development Specialist								
GIS Specialist	60							60
Environmental Scientist								
Economist								
Planning Specialist								
Technician			12.	10				22.5
Administrative staff	20	15			4	1.5		40.5
GOVERNMENT		45	54	16.5	12		40	167.5
Engineers							40	40
Scientists		45	54	16.5	12			127.5
Social								
Economist								
Technical								
Administrative staff								

Table D-10: Flood Damages: Sudanese Rural Riparian Villages

Damages estimated in US$ in 196 rural villages flanking the Blue Nile and Main Nile Rivers in Sudan

	Annual Exceedance Probability		
	1% AEP (1 in 100)	5% AEP (1 in 20)	30% AEP (1 in 3.33)
DIRECT COSTS			
Agriculture	133,750,000	88,275,000	
Farm residences	1	0	
Loss of permanent production through scouring	1,337,500	882,750	
Industry	0	0	
Commercial	400,404	40,954	
Housing	23,400,001	13,325,001	
Public Facility	13,970,001	6,732,501	
Recreational	1	0	
Vehicle losses	1,137,501	0	
Sub total	173,995,409	109,256,206	0
TOTAL DIRECT COSTS	173,995,409	109,256,206	0
INDIRECT COSTS			
Temporary Accommodation	7,137,000	3,568,500	
Temporary Water Supply	6,182,400	2,318,400	
Medical supplies, sanitation, etc.	2,760,000	1,380,000	
Recovery assistance - food, seeds, etc.	3,312,000	1,656,000	
Temporary Electricity Supply	13,000	1,950	
Deployment of Emergency Services	19,500,000	13,000,000	
Gathering food, fuel, water	2,340,000	1,170,000	
TOTAL INDIRECT	41,244,400	23,094,850	0
TOTAL COSTS	**215,239,809**	**132,351,056**	**0**

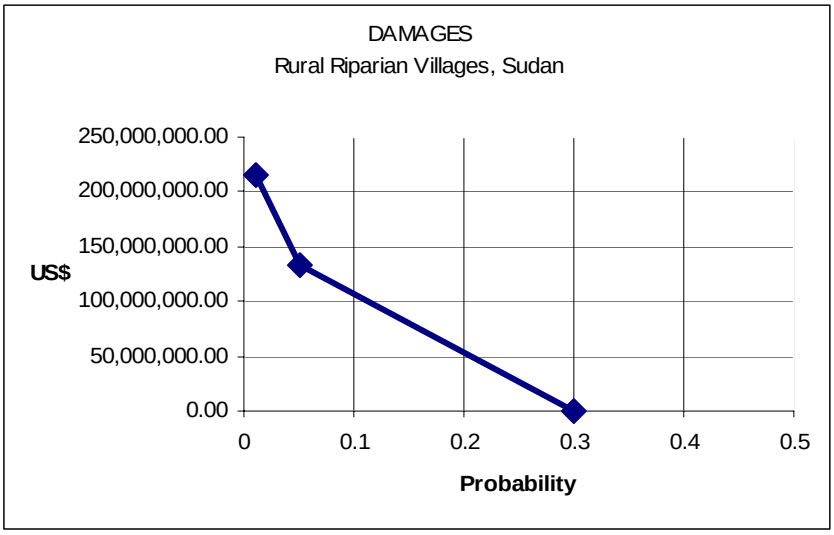


Figure D-1: Flood Damages vs. Probability of Exceedance: Sudan Rural Riparian

Table D-11: Flood Damages: Fogera and Dembiya Plains, Ethiopia

Damages estimated in US$ in two main rural plains adjoining Lake Tana in Ethiopia

	Annual Exceedance Probability		
	1% AEP (1 in 100)	5% AEP (1 in 20)	100% AEP (1 in 1)
DIRECT COSTS			
Agriculture	9,102,273	3,146,591	
Farm residences	1	0	
Loss of permanent production through scouring	91,023	31,466	
Industry	8,100	1,800	
Commercial	115,604	11,344	
Housing	10,560,001	3,520,001	
Public Facility	155,001	74,001	
Recreational	1	0	
Vehicle losses	1	0	
Sub total	20,032,004	6,785,203	0
TOTAL DIRECT COSTS	20,032,004	6,785,203	0
INDIRECT COSTS			
Temporary Accommodation	1,143,000	284,625	
Temporary Water Supply	171,360	64,260	
Medical supplies, sanitation, etc.	76,500	38,250	
Recovery assistance - food, seeds, etc.	91,800	45,900	
Temporary Electricity Supply	5,040	378	
Deployment of Emergency Services	4,445,000	2,213,750	
Gathering food, fuel, water	495,300	123,338	
TOTAL INDIRECT	6,428,000	2,770,501	0
TOTAL COSTS	**26,460,004**	**9,555,703**	**0**

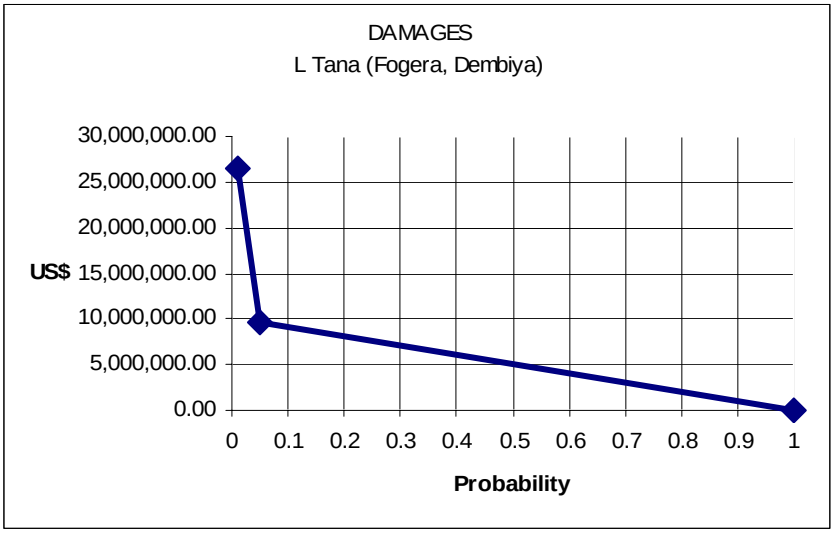


Figure D-2: Flood Damages vs. Probability of Exceedance: Lake Tana Plains

Table D-12: Flood Damages: Gambella, Ethiopia

Damages estimated in US$ in urban Gambella

	Annual Exceedance Probability		
	1% AEP (1 in 100)	5% AEP (1 in 20)	20% AEP (1 in 5)
DIRECT COSTS			
Agriculture	70,612	35,306	
Farm residences	0	0	
Loss of permanent production through scouring	706		
Industry	0	0	
Commercial	723,750	49,750	
Housing	2,545,550	262,150	
Public Facility	752,500	190,500	
Recreational	0	0	
Vehicle losses	245,000	49,000	
Sub total	4,338,118	586,706	0
TOTAL DIRECT COSTS	4,338,118	586,706	0
INDIRECT COSTS			
Temporary Accommodation	183,750	74,725	
Temporary Water Supply	71,680	6,762	
Medical supplies, sanitation, etc.	48,000	8,453	
Recovery assistance - food, seeds, etc.	57,600	10,143	
Temporary Electricity Supply	13,267	418	
Deployment of Emergency Services	2,143,750	428,750	
Gathering food, fuel, water	245,000	15,925	
TOTAL INDIRECT	2,763,047	545,176	0
TOTAL COSTS	**7,101,165**	**1,131,882**	**0**

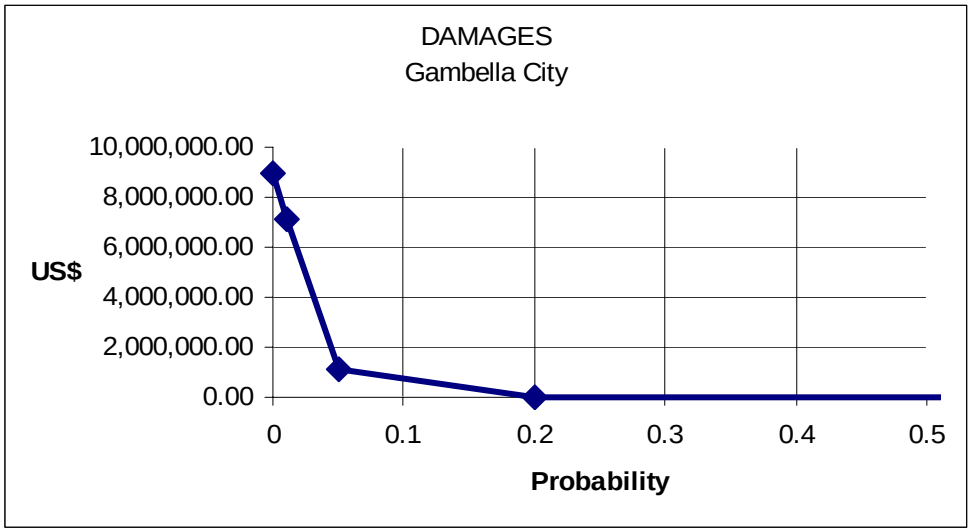


Figure D-3: Flood Damages vs. Probability of Exceedance: Gambella

Table D-13: Flood Damages: Dongola, Sudan

Damages estimated in US$ in urban Dongola

	Annual Exceedance Probability		
	1% AEP (1 in 100)	5% AEP (1 in 20)	20% AEP (1 in 5)
DIRECT COSTS			
Agriculture	1,629,450	725,359	
Farm residences	1	1	
Loss of permanent production through scouring	16,295	0	
Industry	1	1	
Commercial	1,900,625	323,438	
Housing	7,809,375	1,250,156	
Public Facility	3,564,000	877,600	
Recreational	0	0	
Vehicle losses	1,023,750	170,625	
Sub total	15,943,497	3,347,180	0
TOTAL DIRECT COSTS	15,943,497	3,347,180	0
INDIRECT COSTS			
Temporary Accommodation	2,882,250	360,281	
Temporary Water Supply	116,480	19,413	
Medical supplies, sanitation, etc.	78,000	13,000	
Recovery assistance - food, seeds, etc.	93,600	15,600	
Temporary Electricity Supply	32,080	4,010	
Deployment of Emergency Services	5,250,000	656,250	
Gathering food, fuel, water	840,000	105,000	
TOTAL INDIRECT	9,292,410	1,173,555	0
TOTAL COSTS	**25,235,907**	**4,520,735**	**0**

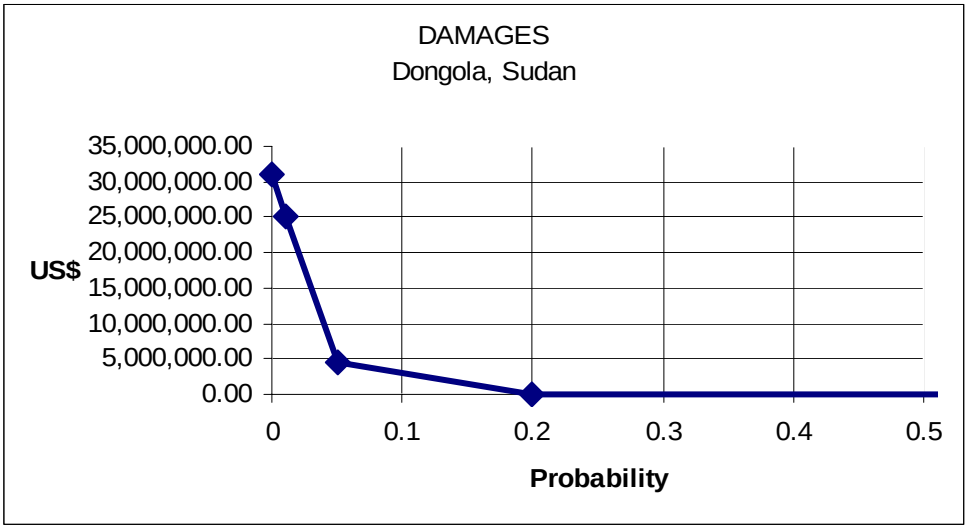


Figure D-4: Flood Damages vs. Probability of Exceedance: Dongola

Appendix E

Environmental and Social Management Framework

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

Executive Summary

This Environment and Social Management Framework (ESMF) has been prepared to assist communities to develop sub-projects associated with flood preparedness and early warning capacity (FPEW) in the Eastern Nile (EN) River basin. The community sub-project program is part of the FPEW Project.

The FPEW Project is designed to improve the ability to identify flood risk and enable communities to plan and prepare for floods in the EN basin. The Project includes elements to enable better prediction of the potential for flooding through flood risk planning based on historic flood information and through the measurement of flood heights in the river system to enable communities downstream to be advised of approaching floods and their likely extent of flooding.

The ESMF provides communities and their extension teams with tools to establish if the sub-projects they proposed will have potentially adverse effects on the environment and their social fabric within their communities. It addresses a range of subjects which require specific planning to meet the safeguard requirements of funding agencies and also to accommodate the legal requirements within the individual jurisdictions within the EN basin.

The ESMF also addresses a range of issues that arose during consultation conducted at national, region, district and local levels in the period from January to July in 2006. This consultation was representative rather than exhaustive but highlighted a number of common concerns within the community that were consistently influenced by the flooding of the EN and its immediate and long-term effects. It highlighted the pressure that population demands for food, shelter and income increasingly place on the river basin.

To be considered for funding the sub-project will have to establish that its environmental and social effects can be adequately managed and include planning documents to indicate these effects have been considered and, where they influence a project, there are planning documents to demonstrate there are plans in place for their mitigation.

It is expected that consultation within the community will have taken place to ensure the sub-projects meet community needs and have community support. This is essential to the successful implementation and operation of the project as it engenders both ownership and commitment to the project within the community.

It is anticipated the types of sub-projects that will be put forward are minor works and non-structural projects that will provide a greater level of preparedness when flooding occurs, and projects that will enable the village to recover more rapidly from flooding through measures such as protection of buildings, water and food supplies, and through having services (such as schools and clinics) located in areas least prone to flooding.

The ESMF is designed to allow communities to prepare the additional planning documentation required when applications for funding of sub-projects are submitted. A range of issues are addressed to enable communities to submit environmental

management plans, resettlement action plans, indigenous peoples plans and dam safety reports.

Consultation that has been undertaken has identified a need to address both institutional and community capacity to address environmental issues and their management. A program of strengthening that capacity and training is part of the overall FPEW Project as this issue crosses most aspects of the Project. Development of environmental and social awareness and knowledge, and building a support base of knowledge for the communities to source, has been included in the overall Project awareness and training program. The training will result in the development of extension teams to assist the communities prepare sub-projects as well as building capacity within the communities.

It is expected the first communities will be in a position to develop sub-projects in Year 2 of project implementation (during Phase 1) with the many communities providing sub-project proposals in the following five-year phase of the Project.

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ACRONYMS

Acronym	Description
AHD	Aswan High Dam
AP	Affected person
CDO	Civil Defense Organization (Ethiopia)
DP	Displaced person
DPPA	Disaster Prevention and Preparedness Agency (Ethiopia)
DS	Dams specialist
DSR	Dam Safety Report
EA	Environmental Assessment
EMP	Environmental Management Plan
EN	Eastern Nile
ENCOM	Eastern Nile Council of Ministers
ENPM	ENTRO National Project Manager
ENSAP	Eastern Nile Subsidiary Action Program
ENTRO	Eastern Nile Technical Regional Office
ESD	Ecologically sustainable development
ESMF	Environmental and Social Management Framework
FPAG	Flood Preparedness Action Group
FPEW	Flood Preparedness and Early Warning
HAC	Humanitarian Affairs Commission (Sudan)
IA	Implementing Agency
IDP	Internally displaced person
IP	Indigenous peoples
IPP	Indigenous Peoples' Plan
IR	Inception Report
masl	meters above sea level
ISDS	Integrated Safeguards Data Sheet
MIWR	Ministry of Irrigation and Water Resources (Sudan)
MWR	Ministry of Water Resources (Ethiopia)
NBI	Nile Basin Initiative
NCS	National Comprehensive Strategy (Sudan)
NGO	Non-government organization
Nile-COM	Nile Council of Ministers
NIU	National Implementation Unit
NFC	National Flood Coordinator
NFPI	National Focal Point Institution
NPSC	National Project Steering Committee
NWG	National Working Group
PAP	Potentially affected person
PCU	Project Coordination Unit
PID	Project Identification Document
PIP	Project Implementation Plan
PP	Project Preparation
PSC	Project Steering Committee
RAP	Resettlement Action Plan

Acronym	Description
AHD	Aswan High Dam
RFC	Regional Flood Coordinator (ENTRO)
RFCU	Regional Flood Coordination Unit (ENTRO)
RPF	Resettlement Policy Framework
RWG	Regional Working Group
SAP	Social Assessment Plan
SECS	Sudanese Environment Conservation Society
TBP	Technical Background Paper
WB	World Bank
WRD	Water Resources Department

1. Introduction

The Eastern Nile Technical Regional Office (ENTRO) of the Nile Basin Initiative, in Addis Ababa, has requested financing from the World Bank and other donor agencies for the *Flood Preparedness and Early Warning Project* (FPEW). This program is part of the initiative referred to as the Integrated Development of the Eastern Nile which comprises seven (7) projects:

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

This is the report of a study to produce an Environmental and Social Management Framework (ESMF) for the proposed FPEW project.

1.1 OBJECTIVES

The objectives of this study are:

- to establish clear directives and methodologies for the screening of sub-projects to be financed under the proposed project;
- to enable the key issues and safeguard policies which apply to be addressed in the planning of sub-projects;
- to provide guidelines on the development of supplementary planning documents to support the application to undertake the sub-project; and
- to identify monitoring, auditing and reporting needs to confirm actions proposed in the planning documents.

This document builds on the environmental assessment (EA) undertaken during Project Preparation and it is developed as part of the Project Implementation Plan (PIP) in a manner such that it may also be used as a stand-alone document. The document has been prepared through working closely with other team members involved in the Project Preparation studies.

The study was undertaken in a period during June and July 2006, prior to a World Bank pre-appraisal mission, and subsequently revised after feedback from the pre-appraisal mission and review by the Regional Working Group (RWG) for the FPEW project. The study is a desktop study with inputs from other study team members who have visited areas in which the project will be implemented.

1.2 CONTEXT WITHIN FPEW PROJECT

This study has been undertaken to develop an Environmental and Social Management Framework (ESMF) because the precise details of the sub-projects to be financed are as yet unknown. Thus it is not possible to ascertain specific impacts at this stage. The ESMF will provide the framework that will be applied to screening of specific sub-projects as they are developed and provides for specific planning reports (such as EMP, RAP, IPP, SAP) to manage identified effects and budget the costs associated with that management, monitoring, auditing and reporting during the implementation of the project.

The ESMF can also be used in subsequent phases of the FPEW project which may enable communities to identify further sub-projects to enhance their FPEW capacity. This initial phase of the project is focused on building capacity within all levels of the community and government to enable the basic needs of FPEW to be provided. In Box 1-1 a number of issues pertinent to the application of the ESMF are cited.

1.3 LAYOUT OF THIS DOCUMENT

Section 1 – Introduction and context
- Introduction (this section)
- Document layout

Section 2 – Project Description

Section 3 – Environmental and Social Management Requirements

Section 4 – Sub-project Preparation, Approval and Implementation

Section 5 – Environmental Management
- Environmental assessment
- Cultural property
- Natural habitats

Section 6 – Land Acquisition and Access to Resources

Section 7 – Indigenous Peoples

Section 8 – Safety of Dams

Section 9 – Environmental Monitoring and Evaluation
- Purpose of environmental monitoring
- Annual reviews
- Reporting

Section 10 – Public Disclosure

Section 11 – Capacity Building and Institutional Strengthening
- Key principles
- Integration of environmental protection and management into the FPEW project
- Development of environmental awareness and knowledge
- Vehicles for implementation;

Section 12 - Budget

Box 1-1 Key Issues in the EA of the FPEW Project

Positive and negative impacts

Long-term sustainability and poverty reduction in floodplain areas of the Eastern Nile (EN) River basin are dependent in varying degrees on the ability of the community to address the requirements of disaster preparedness. Floods are an annual event which these communities endure and live with, as the communities recognize the benefits to their land that flooding brings. However, there are many disbenefits that also arise as a result of flooding, both environmentally and socially. It is the objective of this project to reduce the effect of these disbenefits and reduce the cost to the community that is incurred. This ESMF seeks to identify and manage the beneficial and adverse effects of the FPEW project (and its sub-projects) to minimize the effect on the environment.

Indirect, cumulative and unpredictable impacts

The FPEW project has a number of implications for environmental assessment and environmental management that arise through the approach taken to its implementation:

Induced development – Improvement of conditions on the floodplain and within local economies and society may result in induced environmental effects that occur as a result of changed livelihood strategies. These induced effects are not predictable at this stage.

Cumulative effects – A number of individual projects, such as development of institutional and community capacity, are not likely to have an environmental effect. But collectively the awareness and knowledge they create may have significant environmental effects, both natural and social.

Environmental management – The precise details of sub-projects under the FPEW project, and their precise locations, are not yet known. Thus it is not possible to ascertain the effects of the individual sub-projects at this stage. This ESMF will provide a system that can screen specific sub-projects as they are identified. On the basis of this uncertainty, the precautionary principle has been applied to any definition of environmental category in reports of which this document is part, for the purpose of flagging the potential for adverse environmental effects.

"*Environment*"

The use of the term "environment" in this document, and documents of which it is part or referred to, is all encompassing and includes issues relating to the natural and social environments, including issues such as natural habitats, biodiversity, land degradation, water resources, environmental health, human health, access to natural resources by sedentary and transient populations, gender differentiation in use of the environment and public safety. In conducting all levels of EA, be it screening through to detailed EA in levels of complexity, it is recognized that environmental effects can be beneficial to one aspect and adverse to another and that EA must identify the net effect of a sub-project in its assessment.

2. Description of the Proposed Project [1]

2.1 PROJECT DESCRIPTION

The FPEW project is intended to address the trans-boundary aspects of technical, institutional, social and capacity building issues relating to flood preparedness, as part of the Eastern Nile Subsidiary Action Program (ENSAP). This comprehensive approach to flood risk management also necessitates nationally focused work on flood issues.

The development objective of the project is to improve mitigation planning, forecasting and warning, and emergency preparedness and response to floods, at regional and national levels, in the EN Basin. The project consists of four (4) components:

(i) Flood mitigation planning;

(ii) Flood forecasting, warning and communication;

(iii) Emergency preparedness and response; and

(iv) Regional context.

Flood mitigation planning

This component will explore proactive mitigation measures to reduce the risk from the impact of flooding, as well as enhance the beneficial effects of floods.

Flood forecasting and warning

Development of flood forecasting systems for the EN countries built upon existing forecasting systems and capacity

Emergency response and preparedness

To be most effective, response to a natural disaster warning should be rapid, comprehensive and with clear lines of authority. As each country has existing organizations and procedures for emergency response, this component is envisaged as strengthening national capacities and developing trans-boundary aspects of emergency response and preparedness.

Regional component

This component is intended to enhance regional cooperation and collaboration through exchange of expertise and information/data, sharing of experience, professional development and institutional capacity building, and technology transfer regionally and internationally.

The key practical benefits to be derived from the FPEW project include:

- Capacity building in Ethiopia, with development of a flood forecasting capability and improvements to the hydrometeorological data acquisition network;
- Institutional strengthening in Sudan to effectively deliver services for emergency response and post-flood relief and recovery; and
- Improved flood forecasting for the Aswan High Dam (AHD) in Egypt, based on improved data acquisition networks in upstream countries.

The project will also embrace certain preliminary work to combat river bank erosion, as this issue is as much concern to villagers in Sudan as damage from inundation.

This ESMF, and accompanying RPF, have been prepared in the Project Definition stage to address World Bank (WB) operational guidelines. The input to these documents resulted from the analysis of economic, social and environmental issues associated with the flood risk management strategy and the identification of institutional and community strengthening and capacity building required to provide sustainable, community-driven outcomes for the project.

2.2 CONSULTATION

A summary of consultations undertaken during the course of the project is provided at Annex 1.

Consultation has been carried out in two (2) phases: in preparation of the Inception Report (IR) and during Project Preparation (PP). The IR consultation was undertaken between 23 January 2006 and 10 February 2006. The PP consultation commenced on 15 April 2006 and was completed on 30 June 2006.

The key environmental issues that arose (not necessarily in order of importance) were as follows:

- In-migration in various areas gives rise to a population with little understanding of historic changes and events which have led to environmental degradation and flooding;
- The adverse effect of in-migrants and internally displaced persons (IDP) on the natural resources of areas in which they settled;
- Use of resources previously left undisturbed by previous settlers due to recognition of the environmental values they supported;
- The inability to predict the effect of dam releases on stream and bank erosion;
- The impact of highland clearing on lowland flood levels;
- The encroachment of urban populations, particularly low income and disadvantaged groups, onto flood-prone areas;
- The introduction of pest plants and animals resulting from flooding and the subsequent use of pesticide to control the pests;
- The impact of fishing on fish stocks and composition in natural lakes and streams;
- The lack of penetration of environmental awareness and knowledge into both institutional and community frameworks, primarily due to lack of resources;
- The resistance to resettlement away from flood-prone and sensitive areas for fear of loss of land tenure and access to resources, and loss of stock and crops;
- The decline in public health, through disease introduction, that accompanies flooding; and
- Industrial and domestic waste generated in urban centers, particularly in illegal settlements that are not serviced by local authorities, and liquid wastes release from industrial operations, such as sugar factories.

The range of people interviewed included staff from the range of national, regional, local and village governments, NGOs and individuals and groups in villages and towns within the EN basin.

2.3 ANTICIPATED TYPES OF SUB-PROJECTS

2.3.1 Phase 1

The projects identified in this phase of the project fall into four (4) categories:

- Capacity building to enable flood warning and flood preparedness to be more accurately estimated and communicated;
- Development of early warning systems through improvement of the measurement and monitoring networks on the rivers, particularly in Ethiopia;
- Physical works to reduce the existing threat of flooding in specific areas; and
- Pilot studies of low technology solutions to stream bank erosion.

The latter three have a component of actual on-ground works that will require, at least, an initial environmental examination. In some cases, such as where extensive levee construction is proposed, the works will require a full EA to be completed. These assessments will be carried out by an international specialist, consistent with the requirements of OP4.01, and its annexes, and other safeguard policies, with national support and a counterpart from the national water resource management authority and any similar counterparts from state and local authorities.

It is expected that as community awareness and knowledge builds there will be a demand for the introduction of community-driven projects. The type and scope of these projects is not known at this stage, but they are expected to be small-scale, self-help type projects where communities provide significant in-kind contribution to the project. These projects are the focus of this ESMF.

2.3.2 Further Phases

Further phases of the project are expected to lead to an increased focus on community-driven development. In the FPEW project such sub-projects could include:

- Village level early warning systems – gauging posts, flood markers
- Low technology stream bank protection
- Levees less than 500 meters in length and one meter in height
- Elevated earth platforms for storage of grain and livestock and placement of homes
- Reinforcing earth-walls of houses
- Provision of corrugated iron and collection drains to promote water harvesting;
- Waste disposal facilities;
- Development of all-weather paths and roads, with their accompanying culverts and bridges;
- Rural telephone/radiophone networks;
- Terracing;
- Community grain stores;

- Anti-erosion interventions; and
- Stream and river bank protection.

It is also possible that communities may seek assistance to move public facilities, such as schools and clinics, away from the flood zone to enable these facilities to have a year-round function.

2.4 SUB-PROJECT EXCLUSIONS

The following types of sub-projects are expected to be excluded from funding:

- Activities already covered in the programs for which other sources of funding have been provided, or those already included in other national, regional or local public development programs;
- Purchase of mechanical equipment;
- Acquisition of equipment for government services;
- Administrative buildings,
- Religious infrastructure; and
- Local headquarters for groups, cooperatives or executing organizations.

Sub-projects for which local capacity would need to be demonstrated prior to financing include:

- Secondary roads;
- Dams and weirs;
- Use of pesticides and agro-chemicals; and
- Sub-projects which may affect sensitive ecosystems, such as wetlands, forests and other unique habitats.

2.5 PROJECT COORDINATION AND IMPLEMENTATION

The project coordination and implementation plan is described in chapters 3 and 4 of the Project Implementation Plan (PIP) for Phase 2.

2.5.1 FPEW Project

The over-arching framework for organization and management of the FPEW Project implementation is depicted in Figure 2-1. This diagram assumes that funding is provided from donors to the EN region through the medium of The World Bank (the funding agency). It is possible that some funding may be provided by soft loans directed to national governments in the region, and for these circumstances a variation on the framework for organization and management is presented in chapter 4 of the PIP.

The RFC (or RFCU manager) will play a key leadership role, supported by a National Flood Coordinator (NFC) in each country designated by the national government. It is assumed the NFC will be a representative of the National Focal Point Institution (NFPI) for the FPEW Project.

In view of the activities involved and potential workload, ENTRO will also appoint and employ full-time a Project Manager in each country to be attached to the NFPI for the

duration of the Project. Each of the three national Project Managers engaged by ENTRO will provide essential support to the relevant National Flood Coordinator (NFC) designated by the national government, and will play key roles in National Working Groups (NWGs). Each national Project Manager will work within the NFPI to coordinate all activities in the national sub-program of FPEW implementation in cooperation with implementing agencies and implementing consultants, and will liaise with the RFC on regional aspects.

The Project Steering Committee (PSC) will be the apex level management body for the Project providing strategic and policy guidance for project implementation. It is proposed that the ENSAP Team (or ENSAPT) undertake the role of PSC – or, alternatively, that the PSC be drawn from current members of ENSAPT.

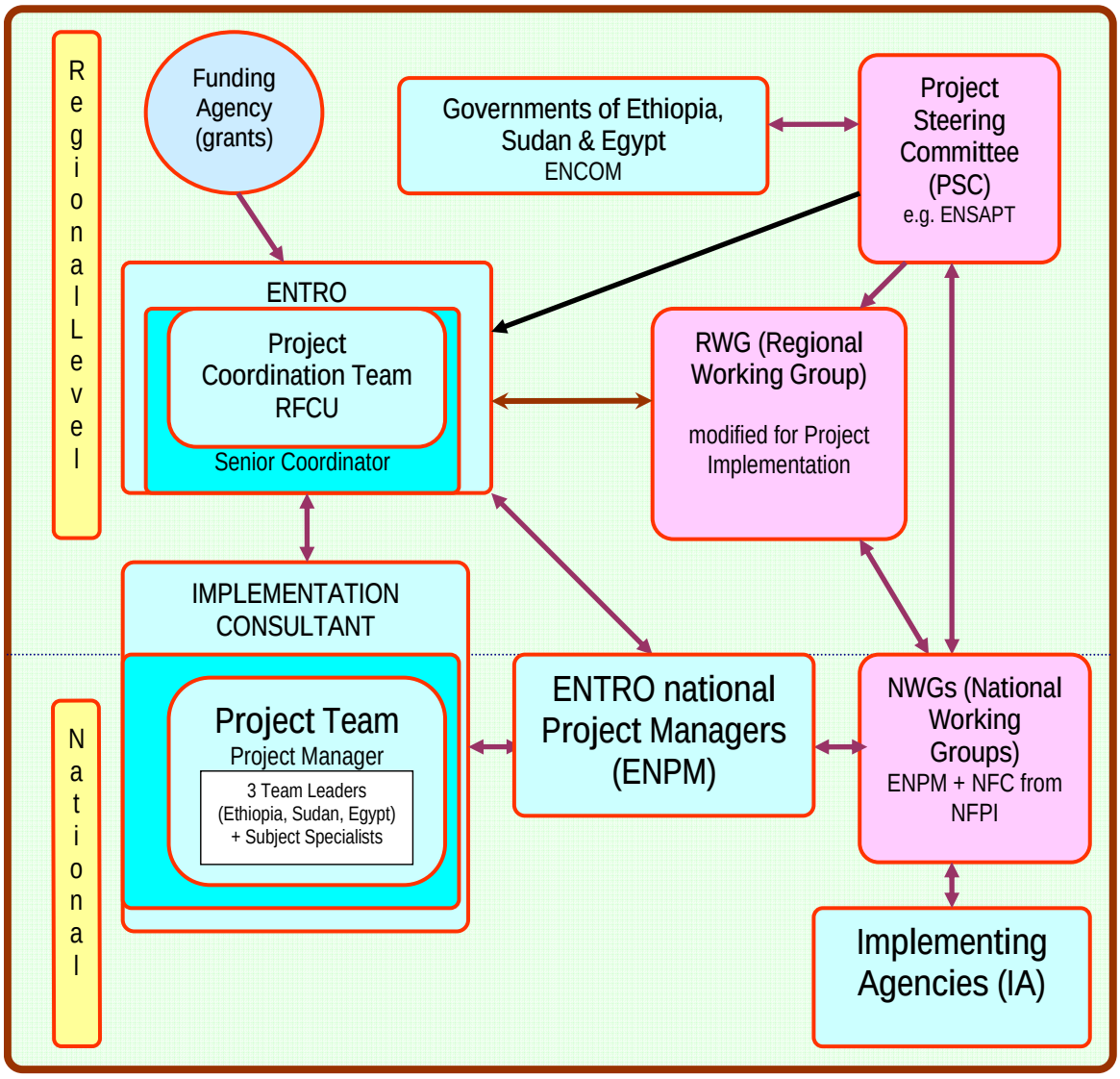


Figure 2-1 Project Organization and Management Chart

The Regional Working Group (RWG) will provide technical support to the PSC, review and monitor progress of project implementation for reporting to the PSC, recommend policy

and standardization on implementation issues, and co-ordinate NWGs to achieve consistency in their activities.

The key role of a NWG will be to coordinate project activities among the various implementing agencies in each country.

2.5.2 Community Programs

The framework for organization and management of the community programs for flood preparedness is depicted in Figure 2-2.

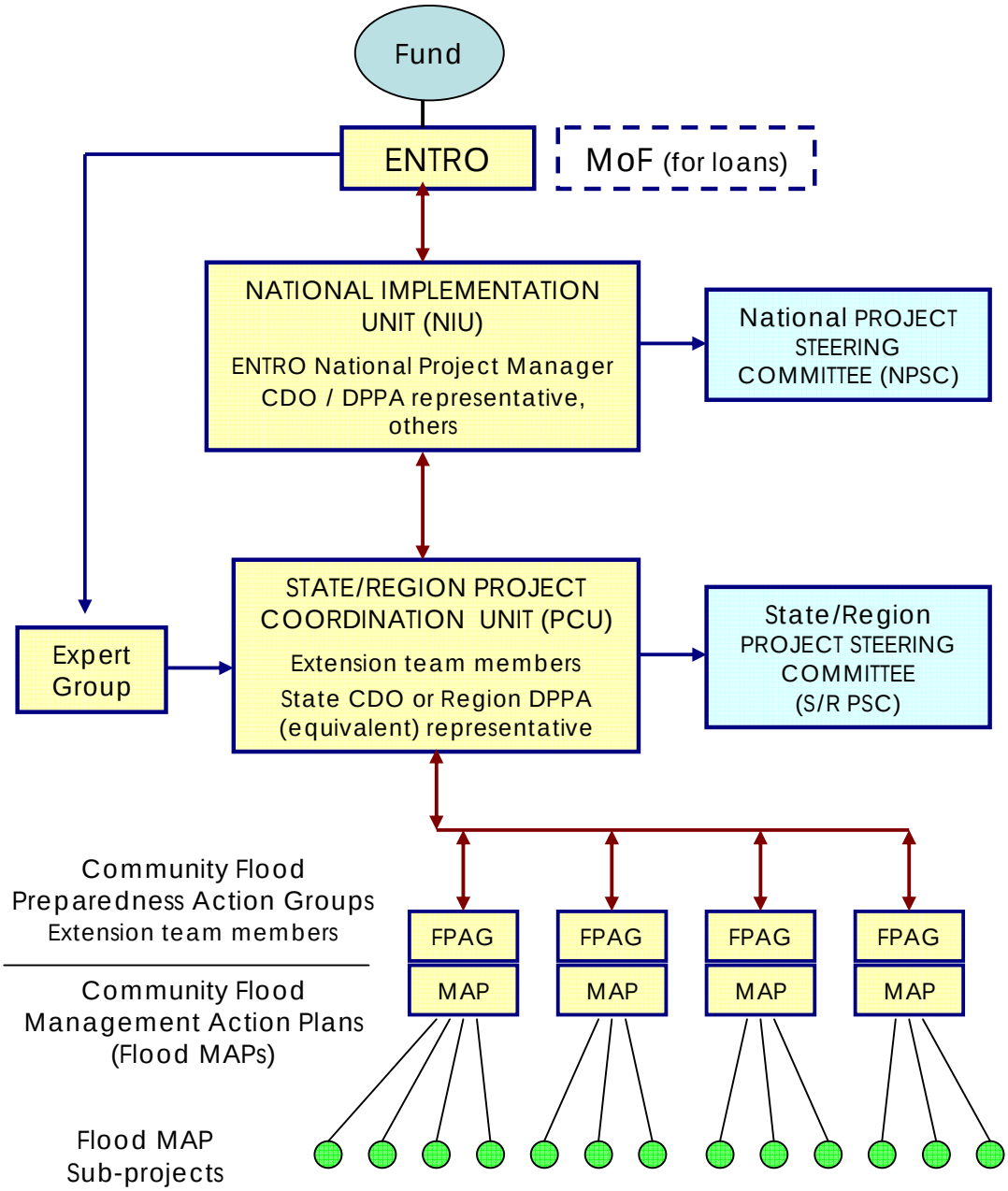


Figure 2-2 Management Arrangements for Community Programs

With assistance of extension teams, Flood Preparedness Action Groups (FPAGs) organized in each community would initially prepare community flood risk Management Action Plans (MAPs). To implement the community flood MAPs, the FPAG would then apply for funding to implement priority measures within its community flood MAP.

Applications for funding of priority measures would pass from communities (FPAGs) to Project Coordination Units (PCUs) at State or Region level, then to a National Implementation Unit (NIU) where approved applications would be forwarded to ENTRO. The NIU will be headed by the ENTRO-appointed National Project Manager (ENPM). There is also provision for review of funding applications by Steering Committees at both State/Region and national level.

The sub-project submissions would be prepared by the community FPAG with the assistance of the extension team that is assisting the community prepare its community flood MAP and raising awareness of environmental issues. Prior to approval of a project, the State/Region Project Steering Committee (S/R PSC) would review the project and the planning documents provided with it to ensure the sub-project satisfies all the legislative requirements for environmental protection at district, regional and national levels, and addresses all the relevant environmental safeguard policies of the WB or other funding agency. This process is described more fully in Section 4.

Other institutional strengthening works will also be undertaken, some through community-initiated programs (for instance, provision of a communications link between state/district/village for flood warning purposes) and others through national and state institutions to build capacity/systems at different levels.

3. Environmental and Social Management Requirements

3.1 OP 7.50 – INTERNATIONAL WATERWAYS

Project activities are focused in the EN basin including the Tekeze-Atbara, the Abbay/Blue Nile, the Baro-Akobo/Sobat and the Main Nile sub-basins in Egypt, Sudan and Ethiopia. The Nile is an international waterway.

The project has been identified and prepared jointly by the three countries as part of the Nile Basin Initiative (NBI), a regional initiative of the Nile riparian countries. The ongoing consultations, information sharing and transparency regarding the NBI, as indicated in minutes of the Eastern Nile Council of Ministers (ENCOM) and the Nile Council of Ministers (Nile-COM) the requirements of OP 7.50 are met.

The FPEW project was initially agreed as a "fast track" project by ENCOM in the Project Identification Document (PID) for the ENSAP.

3.2 OP 7.60 – DISPUTED AREAS

It is not anticipated this safeguard policy will be triggered, although minor local disputes of land on the Ethiopian/Sudan and Sudan/Egypt boundaries do exist, particularly at a local level. However, these issues are being managed nationally between the parties through negotiation.

4. Sub-Project Preparation, Approval and Implementation

This section describes the process to be used to provide the assurance that environmental and social concerns are properly addressed in the sub-project preparation and take account of institutional arrangements and procedures both in-country and applied by funding agencies. Ideally the call for sub-projects will include information on the priority projects being sought at national/regional and local levels. A flowchart of the process is provided at Annex 2.

4.1 PREPARATION AND APPLICATION

During sub-project preparation, communities, with their extension teams, will address environmental and social concerns. The extension teams will comprise people who have been working with the communities to build awareness, knowledge and capacity to address flood management issues at a community level. The focus of the sub-projects will be flood risk management; with the environmental and social effects of the sub-project, particularly in relation to safeguard policies of funding agencies and national, regional and local environmental and social policies, legislation and regulation.

A checklist is provided in Sample 1 at Annex 3. This checklist provides communities and extension teams with some keys to identify potentially adverse environmental and social effects of the sub-project.

The role of the extension team is to facilitate the development of the EA for the sub-project and to provide the community with expert advice on mitigation of adverse environmental and social effects. The extension team will assist the community to prepare additional planning documents (e.g. EMP, RAP, IPP) to accompany the sub-project application.

The EA checklist and its accompanying documentation should be attached to the sub-project application as an annex to the main document. In some cases, it may be appropriate to gain approval in principle for the project prior to preparation of additional planning documents, thus avoiding an investment in time and resources for a project that did not fit other criteria of application. However, funding for the sub-project will not be provided until ALL planning documents are provided, approved and disclosed (see Section 9 for details relating to public disclosure).

Where it is considered additional planning documents are required (following completion of the checklist), the community FPAG and the extension team should consult with the Project Coordination Unit in their State or Region to confirm the need and secure resources to carry out the work. They should also confirm the process for approval of the planning document, as this may require involvement of other agencies at state/regional and national levels (*e.g.* for an EMP which triggers an issue of significance identified by the national environmental protection agency).

Preparation of planning documents may require resource material and community participation in preparation of the documents.

There may be situations where project-funded technical assistance may be required. In these situations, sub-project funding may need to be multi-staged. Initially funds may be sought for specialist technical assistance. During Phase 2 of this project such assistance may be available through the expert group or local specialist teams working with the implementation consultant. These situations would include:

- Where land must be acquired for the sub-project, or someone's access to resources they are accustomed to using is changed (the need for a RAP must be identified);
- A sub-project involves changing access to resources in a park or protected area (the involvement of affected people influenced sub-project planning and the benefits they derived);
- A sub-project may affect a protected area or a natural habitat (describe how the project will avoid causing adverse effects on the area/habitat);
- An indigenous group may be adversely affected by a sub-project, or benefit from it (prepare an IPP);
- The use of pesticides is included in a sub-project (PMP is required).

4.2 APPRAISAL AND APPROVAL

The appraisal of a sub-project application will be undertaken by the State/Region PCU, and will be reviewed by the State/Region Project Steering Committee that is likely to include a staff member of the local authority. The procedures used by the PCU and the PSC need to take into account approval requirements by higher levels of authority, at regional and national levels, in relation to EA and planning approval/permitting procedures. These requirements will also be reviewed when the sub-projects are aggregated at national level.

As a guide to the institutional interests that may have approval requirements for sub-projects, a summary is provided at Table 4-1.

To clear a sub-project application for approval, the PCU should:

- Conduct a desk-top appraisal to ensure all the required information has been provided and that all the potentially adverse effects have been considered and that measures are provided to address them adequately;
- Refer any project for consideration to the State/Region PSC, which may in turn refer it to higher authorities where the project triggers an interest of those authorities (*e.g.* pesticides are proposed for use in disease control, or the projects is listed on the environmental protection agency list of trigger projects);
- Identify projects that require field appraisal before the application can be considered further (criteria for field appraisal are described in Table 4-2). Where projects trigger the interest of another authority, it is appropriate to include that authority in the field appraisal process, as well as representatives of the community and extension team submitting the application;
- Following review by the PSC and receipt of relevant external approvals from institutional interests, refer the applications to the National Implementation Unit; and

- Draft recommended approval conditions and implementation supervision requirements for consideration by the NIU.

Table 4-1 Institutional Interests

Institutional Interest Area	Referral for Approval
Agriculture	Pesticide Management Plan (agro-chemicals)
Communications	Telephone and radio communications
Cultural affairs	Indigenous Peoples Plans Management of archaeological materials
Environmental protection	Environmental management plan Trigger items for EA provided in national/regional guidelines for assessment, waste management
Health	Pesticide Management Plan (disease control), waste management
Land use planning	Resettlement, master planning
Transport	Roads, water transport
Water resources	Water supply, stream and river bank erosion, levees, drainage
Wildlife conservation and management	Works in protected areas or in areas with threatened species, access to protected areas

The PCU will then discuss the proposed conditions and requirements with the community leaders and extension team to gain consensus on the proposals. Once agreed, the sub-project is then included on a list of all applications made to the authority. When all complying applications have been received the PCU prioritizes the sub-projects based on the strategy for flood management in their jurisdiction.

Once completed, the prioritized list is forwarded through the NIU to ENTRO. Prior to submission to ENTRO, the NIU will refer the program of sub-projects to the National Project Steering Committee for review. Approved sub-projects are then funded by ENTRO through the respective NIU and PCU to the community.

Throughout the process it expected that communication and feedback between the various approval and referral agencies will occur so that the process of prioritization is transparent.

ENTRO will have a budgeted allowance for the community sub-project program. The community sub-projects funded will be based on the funding available and those projects with highest priority will be funded immediately. The respective National Working Groups may seek supplementary funding from other funding agencies for specific classes of sub-project that may be well received by a funding agency and attract specific-purpose funding, but cannot be financed through ENTRO.

Table 4-2 Criteria for Requiring Field Appraisal[5]

Criteria	Field Appraisal
1. Land must be acquired for a sub-project, an individual or community's access to land or available resources is restricted or lost, or any individual or family is displaced	A field appraisal determines the scale and level of impact. A Resettlement Action Plan (RAP) may then be required according to procedures detailed in Section of the ESMF.
2. A sub-project may restrict the use of resources in a park or protected area by people living inside of outside of it, and affect their livelihoods	A field appraisal determines if sub-project planning is adequate to ensure that the livelihoods of potentially affected people will not be adversely affected, as provided for in Section of the ESMF.
3. A sub-project may affect a protected area or a natural habitat	A field appraisal determines if the sub-project will adequately avoid adverse effects on the protected area or natural habitat, as provided for in Section of the ESMF.
4. A sub-project may have an impact on ecologically sensitive ecosystems (e.g. wetland or marshes)	A field appraisal determines the scale and level of impact. The application may need to be revised to describe how the sub-project will avoid or minimize adverse impacts to ecologically sensitive areas. This may require a distinct Environmental Management Plan (EMP) as outlined in Section of the ESMF.
5. Indigenous people may be adversely affected by a sub-project, or could benefit from it	A field appraisal determines the potential impacts and benefits to these people. An Indigenous Peoples Plan (IPP) may be required for avoiding negative impacts to these people and for including them in the benefits of the sub-project, according to the requirements described in Section of the ESMF.
6. A sub-project will involve or introduce the use of pesticides	A field appraisal determines the scale and level of the concerns. If needed, a Pest Management Plan is prepared according to the requirements of Section of the ESMF.
7. A sub-project may involve, or result in: • Diversion or use of surface waters; • Construction and/or rehabilitation of latrines, septic or sewage systems; • Production of waste (e.g. slaughterhouse waste, medical waste, etc); • New or rebuilt irrigation or drainage systems; or • Small dams, weirs, reservoirs, wells, or water points.	A field appraisal determines the scale and level of potential impact. The application may need to be revised to avoid or minimize potential adverse effects, and may include an Environmental Management Plan as outlined in Section of the ESMF.

5. Environmental Management

5.1 ENVIRONMENTAL ASSESSMENT

Sub-project planning should strive to develop plans and designs in the preparation of sub-project applications to avoid creating adverse environmental and social effects that require specific management. The identification of potentially adverse effects can be aided through careful consideration of the questions asked in the Environmental Checklist (Sample 1 at **Error! Reference source not found.**) and through consultation with members within the community preparing the sub-project application. Tools for engaging the community include:

- Community mapping;
- Action planning;
- Gender division of labor;
- Present and future goal setting
- Level of satisfaction matrices; and
- Ranking matrix

These tools enable the historical issues and community expectations to be established and also enable the identification of sensitivities within the community, particularly in relation to their environment and quality of life.

Where specific adverse effects are identified in completion of the Environmental Checklist, an EMP is required. The EMP should fit the needs of the sub-project and be easy to use. There is no standard format or length. For many sub-projects, only a plan which specifically addresses the effects delineated is required. The EMP may be no more than a few paragraphs or a table. More significant concerns, such as waste management and pest management require a more substantial document due to the importance and complexity of the issues. A typical table layout is shown below.

The basic elements of an EMP are:

- A description of the possible adverse effects that the EMP is intended to deal with;
- A description of planned mitigation measures, and how and when they will be implemented;
- A program for monitoring the environmental effects of the project -- both positive and negative;
- A description of who will be responsible for implementing the EMP; and
- A cost estimate and source of funds.

During preparation of the EMP reference should be made to more general checklists, samples of which are presented in Annex 3.

Table 5-1 presents a template for a project-specific environmental checklist.

Table 5-1 Environmental Management and Monitoring Checklist

ENVIRONMENTAL MANAGEMENT AND MONITORING CHECKLIST

Contract Package: Month/Year:

No	AFFECTED ENVIRONMENT COMPONENT	SOURCE OF EFFECT (Project Activity)	LOCATION	DESCRIPTION OF EFFECT	MANAGEMENT AND MITIGATION PROPOSAL TO REDUCE EFFECT	IMPLEMENTATION OF MANAGEMENT AND MITIGATION (PROCEDURE AND STATUS)

The role of community participation in preparing an EMP cannot be stressed too much since local knowledge is important in identifying, designing and planning the implementation of practical mitigation measures. It is especially important where the success of an EMP depends on community support and action, both in implementing mitigation measures and in monitoring their success. Community participation and involvement in the sub-project planning is critical to project ownership by the community and a commitment to participate in its implementation.

5.2 NATURAL HABITATS

Natural habitats need to be conserved when planning and implementing sub-projects. These are land and water areas whose ecological functions have not been essentially modified by human activities. They include natural forests. Sub-projects cannot be funded if they involve the significant conversion or degradation of natural habitats unless there are no feasible alternatives (including the sub-project site) and the overall benefits from the sub-project substantially outweigh the environmental costs. If a sub-project would significantly convert or degrade a natural habitat, the sub-project needs to incorporate acceptable mitigation measures, such as minimizing habitat loss and establishing and maintaining an ecologically similar area.

Significant conversion means eliminating or severely reducing the integrity of a natural habitat through long-term change in land or water use. It may include, for example, land clearing; replacement of natural vegetation; permanent flooding; and drainage, dredging, filling, or channelization of wetlands. It can occur as the result of severe pollution. And, it can result directly from sub-project activities or indirectly (*e.g.* through induced settlement along a road). *Degradation* means substantially reducing the ability of a natural habitat to maintain viable populations of its native species.

Moreover, sub-projects involving the significant conversion or degradation of critical natural habitats (including forests) cannot be funded. These are natural habitats that:

- Are protected by government (*e.g.* parks, World Heritage Sites) or by tradition (*e.g.* sacred groves); or
- Have known high suitability for biodiversity conservation; or
- Are critical for rare, vulnerable, migratory, or endangered species.

Sub-projects designed to support community-based forest management and development needs to take into account:

- The extent to which the livelihoods of local communities depend on and use trees in the sub-project and adjacent area;
- The participation of indigenous people and poor people in the management of the trees and forests included in the sub-project area; and
- Forest product and forest service issues relevant to indigenous people and poor people living in or near forests in the sub-project area, as well as opportunities for promoting the involvement of women.

Sub-projects involving forest restoration or plantation development need to address the following issues:

- The potential of forest restoration to improve biodiversity and ecosystem functions;
- The potential to establish plantations on non-forest lands that do not contain critical natural habitats;
- The need to avoid conversion or degradation of natural habitats; and
- The capacities of the government, nongovernmental organizations, and other private entities to cooperate in the forest restoration and plantation development.

6. Land Acquisition and Access to Resources

6.1 OP 4.12 – INVOLUNTARY RESETTLEMENT

World Bank Operational Policy (OP 4.12) and Bank's Procedures (BP 4.12) on Involuntary Resettlement will serve as an operational guideline for FPEW implementation.

6.2 RESETTLEMENT POLICY FRAMEWORK (RPF)

OP 4.12 requires that a RPF shall be prepared to provide guidance to communities preparing applications for sub-projects which may require land acquisition or restrict access to resources.

6.2.1 Resettlement Principles

The following principles are applied to resettlement:

- Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs;
- Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons affected by the project to share in project benefits. Affected persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs; and
- Affected persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of the project implementation, whichever is higher.

The WB requires that assets are valued at "replacement cost" to ensure amounts sufficient to replace lost assets and cover transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account for losses that cannot easily be valued or compensated for in monetary terms (*e.g.* access to public services, customers, and suppliers; or to fishing, grazing, or forest areas), attempts need to be made to establish access to equivalent and culturally acceptable resources and earning opportunities.

Affected persons are eligible for resettlement benefits if:

- They have formal legal rights to land (including customary and traditional rights recognized under the laws of the country);
- They do not have formal rights to land, but have a claim to such land or assets provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan; or
- They have no recognizable legal right or claim to the land they are occupying.

A compensation package thus stipulates that all affected populations will be equally eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing, and any such factors that may discriminate against achieving the objectives outlined above.

The rehabilitation measures to be provided are:

- Cash compensation for houses and other structures at replacement cost of materials and labor without deduction for depreciation or salvageable materials;
- Full title to replacement agricultural land or land of equal productive capacity acceptable to the AP;
- Full title to replacement residential and commercial land of equal size acceptable to the AP or, at the informed decision of the AP, cash for replacement land at replacement cost at current market value;
- Cash compensation for crops and trees at current market value;
- Relocation allowances and rehabilitation assistance;
- Sufficient time will be allowed for replacement structures to be built before construction begins;
- Existing cultural and religious practices shall be respected and, to the maximum extent preserved;
- Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition and resettlement and rehabilitation within the agreed implementation period;
- Complementary mitigation and enhancement activities shall be offered to protect socially and economically vulnerable groups such as women-headed families, children and elderly people without support structures and people living in extreme poverty; and
- Grievance procedures shall be established and in place and PAPs informed of them before any resettlement activities begin.

6.3 CULTURAL PROPERTY

Operational Policy 4.11 of the World Bank defines Cultural Property as both remains left by previous human inhabitants (*e.g.* middens, shrines) and unique natural environmental features such as canyons and waterfalls. The Bank does not support projects that will significantly damage non-replicable cultural property and assists only those projects that are sited or designated so as to prevent such damage.

6.4 GUIDELINES FOR LAND ACQUISITION AND ACCESS TO RESOURCES

A Resettlement Policy Framework (RFP) should be prepared using the following major sections:

1. Principles and Objectives

Describe the basic principles and objectives for resettlement under the Project. State that the resettlement objectives are to move (or deprive from resources) as few people as possible consistent with the requirements of sub-projects, and that the general principles of doing no harm, and of avoiding or minimizing resettlement,

are to be followed in all sub-projects. Show why acquisition of land or resources may be needed, and resettlement cannot be avoided in every case. Demonstrate that the commitment is to ensure that affected people are meaningfully consulted, compensated fully and fairly for their losses, and assisted in their efforts to improve their livelihoods and standards of living or at least to restore them. Describe any particular conditions in the Project and sub-projects that may present special problems or opportunities, and show how the resettlement will be done, in principle, so as to overcome risks or take advantage of such opportunities.

2. Legal Frameworks

Review the national laws governing the taking of land or other assets. Because such legal instruments may come from many sources – land and water law, customary law or sharia, land tenure legislation, urban construction regulations, constitutional guarantees of compensation for takings for public utility, and so on – make this section as extensive as is warranted by the case in question. Set out the requirements of the process for taking land or changing access to resources. Discuss discrepancies among the various legal instruments, if found. Summarize what laws and regulations may apply to different categories of affected people. Next, set out any requirements of the Bank for resettlement that apply to the types of cases that may arise in the project. Analyze all gaps between national and Bank requirements, and say how such gaps may be bridged.

3. Estimated Population Displacement and Categories of Affected People

Every effort should be made to estimate eventual displacement, in part to estimate budgets and to evaluate consultation requirements and potential challenges to Project staff. Different categories of those displaced may include, for example, those losing legal title and those without it, those losing lands or those losing housing or those losing both, those losing temporary access or those losing permanent rights, business or residential property. Describe the unit of analysis, whether 'cases' (such as properties or fields), or households or individuals. Describe whether uniform approaches will be taken across all sub-projects, and how records will be kept.

4. Eligibility Criteria for Various Categories of Affected People

Determine the method for setting a cut-off date for eligibility for compensation. Demonstrating that compensation will be paid only to those established in an area, or with certain kinds of assets, early in the Project will help to avoid a "rush" into areas that may come into the Project list of sub-projects later. Such opportunistic invasions of possible sub-project sites constitutes to be a major risk to Projects, especially where sub-projects may be chosen from a very limited set of alternatives that become known publicly. Therefore, depending on the number, sequencing, and magnitude of sub-projects, one or several rolling cut-off dates may be advisable.

Set out the different categories of people that may be affected by sub-projects, and show the types of losses such people may suffer, whether to land, income, rights of access, housing, water sources, proximity to work, and others, and including combinations (house and land, for example). Define the criteria that will be used to identify the eligibility for compensation for each category of affected people. These criteria may include, for example, whether losses are partial or total, whether people

have their own land or also rent land, and what happens when buildings are occupied by more than one business tenant or household. Make the criteria user-friendly, so that those applying the principles to sub-projects 'on the ground' will be able to quickly identify whether people affected are eligible for compensation, and how. Describe who will judge eligibility in difficult cases, for example by the use of neighborhood or village committees, or outside experts, and how such processes will work.

It may be necessary for country approval to define categories of people eligible under national law, and, separately, any others who must be compensated because of the requirements of World Bank policy. The unit of compensation may also need to be defined – individuals, families, collectivities (or all three, because some losses may be sustained by individuals, others by the community as a whole or by associations within it such as religious or farmers' groups). Some impacts may be defined as non-compensable, or as compensable with a generic payment – minor strips of land of a meter or two along a road to be widened in a non-farmed area, for example. Finally, cash payments may be more acceptable when losses constitute a very small fraction of incomes, than when the income source (or residence plot) is so compromised that the entire holding or structure should be replaced. Defining the treatment to be applied to the major variations of all the main types of impacts eliminates the need to negotiate these issues for each sub-project.

5. Valuing Affected Assets

Describe the borrower country's methods of valuing those assets that it deems eligible for compensation, and those that must be compensated under the principles that meet the World Bank's policy requirements. Explain the methods for inventorying assets, assigning values to each type of asset, and coming to agreements with each affected person or group on the total profile of losses and compensation. Present, to the degree possible, an 'entitlement matrix' (example below) which shows the types of affected people, the types of losses, and the forms and amounts of compensatory actions that will be taken for each type.

Example: Procedure for Valuing Compensation Entitlement

A committee including elders, a government representative, a project staff member, and two villagers will visit the affected area. Each asset will be enumerated and inscribed on a register. Values for each types of asset will be pre-printed, shown to the affected person, and set against the type and number of such losses that the individual will sustain. The total compensation for that category of loss will be shown, and the total of all losses shown as well. The inventory and evaluation will be signed and a copy given on the spot to the affected person. The form will say, and the affected person will be notified, that the inventory will not be official until a second signed copy, verified by project supervisory staff, is returned to the affected person. At that time, a copy of the grievance procedure will also be given to the affected person.

6. Organization, Procedures and Responsibilities

Describe the process by which individual RAPs for sub-projects will be prepared and submitted to Project authorities, considered and approved, and how entitlements will be delivered. This process must be integrated into the institutional arrangements

and procedures used by the Project for managing the identification, preparation, approval and implementation of sub-projects. It is expected that extension teams, with Project training, will be able to adequately assist communities in preparing any required RAPs before submitting their application, though specialized technical assistance may be required early in Project implementation or in more complex cases. Refer to more detailed guidance on preparing RAPs. Specify whether some or all RAPs should be reviewed by the Bank, and how this will happen.

Specify that RAPs must be:

- Approved and disclosed to the public before overall sub-project approval can be considered; and
- Implemented before other sub-project activities can begin.

State who in the overall Project organization will be responsible for resettlement, and what facilities the overall resettlement officials will have available to them. If there is no unit or officer(s) with the training and job description to oversee resettlement issues, describe the way in which such capacity will be developed, structured, and given authority.

Partial Example:

A unit with one resettlement officer (RO) will be attached to each provincial project coordination unit. The RO will report to the provincial coordinator. During the first six months, a consultant will oversee resettlement and train this officer.

Partial Example:

Once a sub-project is approved, compensation in kind or in cash will be completed before an affected party is required to move or give up ownership of or access to the asset in question. Where cash is to be paid, the affected person will be given a check provided he/she already has a bank account; if not, cash will be delivered at the district office of the Project.

6. Consultation with, and Participation of, Affected People

Describe how people affected by particular sub-projects will be consulted throughout the process of preparing RAPs.

7. Schedule for Implementing Resettlement Provisions

Set out the schedule by which resettlement will arise and be treated, both in terms of the overall management of the Project and the flow of sub-projects.

Example:

By effectiveness: project resettlement coordinator recruited. Month 6, resettlement oversight coordinator and staff in place, effective. Months 4-8, lower level staff trained in use of screening and evaluation tools, and in community consultation methods. By end of month 12, report on sub-projects with resettlement for year 1 sent to Bank. For each sub-project, resettlement items to be integrated into sub-project calendar. Demonstration that no sub-project to be accepted without completed land acquisition information and either RAP, or statement that no RAP is needed. Schedule to show that no construction will take place where there is resettlement without entitlements paid.

8. Grievance Redress Mechanisms

Describe the mechanisms available to affected people for complaints about aspects of their resettlement treatment. Show how the mechanism will be accessible (in terms of language, distance, and cost) to affected people, and what recourse/appeal from the local grievance mechanism may be available.

9. Budget and Funding Arrangements

Estimate the overall costs of resettlement, including funds for general oversight. Show the sources of funds. Estimate the types and numbers of sub-projects and a nominal resettlement budget based on an estimate of how many sub-projects may involve resettlement.

It should not be difficult to estimate the budget required for 'typical' sub-project resettlement in relatively uniform sector investments, for example if all sub-projects will be drainage schemes, or transmission lines. For projects where different types of sub-projects may be selected with no prior knowledge of probable choices, or where only some fraction of sub-projects may entail involuntary resettlement, estimating total costs may be more difficult.

10. Supervision and Monitoring Arrangements

Provide an appropriate mechanism for supervising the effective implementation of resettlement, either as part of overall sub-project supervision, or separately to affirm that the resettlement objectives for all affected people are achieved. Show how the results of monitoring will be fed back into overall Project implementation. Where appropriate, set up monitoring checklists or templates to focus the work of local monitors.

Partial Example:

> NGO *XYZ* has agreed to serve as the resettlement and social benefit monitor for all sub-projects in Province A. For resettlement, each six months the NGO will select a random sample of sub-projects with resettlement, visit each, and report on the progress of resettlement using the processed described in the PIP. The results will be summarized in a report to the Project managers and the Bank which uses key performance indicators selected by the Project as reporting topics. Qualitative comments on resettlement progress will also be provided.

Example: Resettlement Entitlement Matrix

CATEGORY OF AFFECTED PEOPLE	TYPE OF LOSS	ENTITLEMENTS				
		Compensation for Loss of Structures	**Compensation for Loss of Assets**	**Compensation for Loss of Income**	**Moving Allowance**	**Other Assistance**
Property Owners	Loss of Land	----	Land replacement at new site, plus land clearing by sub-project	Crops at market cost in scarce season	----	Food from WFP during construction of new site
	Loss of structure – residential or business	Compensation at full replacement value not depreciated	Fences (wire or wood) at $3/m Hand-dug wells at $200	For loss of rental income, lump sum payment of 6 months rent per tenant	Moving to be paid by sub-project	Disturbance allowance of $100
Residential tenant	Loss of rental accommodation	No loss of structure, no entitlement to housing at new site	Replacement cost for non-movables if installation was agreed with owner	----	Project-paid moving if notification before deadline	6 months rent; equivalent for disturbance
Business tenant	Loss of premises	----	Replacement cost for facilities that cannot be moved	For loss of business income, payment of half of turnover for 6 months	Project-paid moving if notification before deadline	----
Encroachers (using land)	Loss of land	----	Relocation to resettlement site of choice, with payment of rental fee for land. For crops, fences and wells – as above for owners	----	----	Food from WFP during construction of new site
Squatters (living on site)	Loss of shelter	Compensation at full replacement value for structure, relocation to resettlement site, with payment of site rent	----	Payments in lieu of wages while rebuilding	----	Disturbance allowance of $100

6.5 RESETTLEMENT ACTION PLAN

A Resettlement Action Plan (RAP) should include, at a minimum, the elements outlined below.

6.5.1 Introduction and Resettlement Problem

Describe the sub-project and its location. Identify the executing agency and person(s) responsible for preparing the RAP, along with their qualifications.

Describe the sub-project activities that will cause displacement and efforts made to reduce the number of people displaced. Describe the site and the services currently available (schools, houses of worship, public transportation, health posts, markets, *etc.*) and their distance from the site.

6.5.2 Legal Framework

Provide a brief review of local laws, regulations and procedures on land acquisition and resettlement. Where gaps exist between local laws and World Bank policy, describe the ways to bridge these gaps.

6.5.3 Survey of Affected Properties, Families and/or Businesses

Collect data to complete Table 6-2, Table 6-3, and Table 6-4 below.

Include additional information on dwelling value, willingness to be resettled, consultation meetings, *etc.*

6.5.4 Impacts Caused by Displacement

Provide the necessary level of detail to capture the extent of the impact of displacement. At a minimum complete Table 6-5 and Table 6-6.

6.5.5 Proposed Assistance to Resettled Families

Provide a detailed description of the types of assistance (*e.g.*, compensation, resettlement to new housing, assistance for relocation) to be provided to oustees. Also describe the terms of agreement with oustees and the willingness of oustees to work with the discussed assistance and timetable.

In addition:

- Describe how efforts will be made to restore or enhance incomes;
- Describe how special attention will be given to people who are aged, invalids, single mothers or otherwise in need of special assistance;
- Describe how access to services will be restored or enhanced;
- Show how families or community groups will be preserved;
- Describe measures to reestablish socioeconomic networks; and

- Describe possible impacts on host groups and measures taken to avoid rejection or other negative reactions.

Using Table 6-7 below, identify the solutions agreed to with each oustee.

6.5.6 Responsible Agency

Provide the name of the entity that will be responsible for monitoring and implementation of activities involved in implementing the RAP.

6.5.7 Source of Budget and Cost Estimate

Include the cost of land, housing, moving costs, administrative costs, moving allowances, and settle-in allowances.

Typical costs associated with compensation are described in the following tables. No provision is made for land costs as no formal ownership of land occurs in either Ethiopia or Sudan.

Table 6-1 Typical Replacement Costs

Main Item	Sub-Item	Yield (tonnes/ha)	Price	Unit cost
Crops Ethiopia	Teff	0.8 tonnes/ha	290 USD/tonne	232 USD/ha
	Maize	1.8 tonnes/ha	202 USD/tonne	396 USD/ha
	Sorghum	1.0 tonnes/ha	230 USD/tonne	230 USD/ha
	Sesame	1.0 tonnes/ha	519 USD/tonne	519 USD/ha
Trees Ethiopia	Sapling Euc.			0.7 USD/tree
	Semi -mature Euc.			2.4 USD/tree
	Hops	40 kg/tree/yr	140 USD/tonne	5.6 USD/tree
	Coffee	0.4 tonnes/ha	1750 USD/tonne	700 USD/ha
	Papaya	19.8 tonnes/ha	180 USD/tonne	3564 USD/ha
	Guava	19.4 tonnes/ha	180 USD/tonne	3492 USD/ha
	Banana	32.0 tonnes/ha	140 USD/tonne	4480 USD/ha
	Avocado	25.0 tonnes/ha	180 USD/tonne	4500 USD/ha
	Indigenous trees			17 USD/tree
	Chat	1.5 tonnes/ha	2310 USD/tonne	3465 USD/ha
Houses Ethiopia	Tukuls			275 USD/m^2
	CIS			385 USD/m^2

Fences Ethiopia	Stone			17.30 USD/m
	Bamboo			5.20USD/m
	CIS			8.75 USD/m
	Barbed wire			7.50 USD/m
Crops Sudan	Sorghum	0.8 tonnes/ha	235 USD/tonne	188 USD/ha
	Sesame	0.5 tonnes/ha	530 USD/tonne	265 USD/ha
Houses and fences Sudan	Tukul			420 USD/m^2
	Woven fence			4.00 USD/m
	Thorn bush			1.50 USD/m

6.5.8 Resettlement Schedule

Describe the resettlement schedule, including the activities involved, dates, and budget, along with pertinent comments. Include any follow-up activities to assess whether oustees have been able to reestablish their livelihoods/living situation. This schedule should be tailored to correspond to the schedule for design and construct-ion of the civil works, and should be presented as in Table 6-8 below:

6.5.9 Monitoring/Follow Up Activities

Describe how the responsible agency will follow up the implementation of the Plan and address activities required to achieve the goals of the Plan.

6.5.10 Evaluation

Describe how evaluation of the Plan will be conducted. No later than 6-12 months after the relocation date, the responsible agency should make reasonable efforts to locate and follow up on the relocated families to determine if they have been able to reestablish their livelihoods and living situation. If this is not the case for any or all of the persons relocated, further assistance should be provided by the responsible agency.

Table 6-2 Property (Goods and Assets Affected)

Household number[1]	Business number[2]	Name of household head or business owner	Plot area	Description of houses and construct -ions	Uses of the property (housing, economic activity, other)	Level of effect (total, partial, minimum)[3]	Tenure status (titled owner, owner without documents, tenant, sharecropper etc.)	Employment status of all adults	Comments

[1] Households should be defined as commensal units i.e. people who eat out of the same pot.
[2] Business should be defined as any economic activity.
[3] "Partial" in cases where family/business can develop activities involving listed goods and assets; "Total" where activities cannot be developed as a result of displacement.
[4] If they are not owners, include the name and address of the owner.

Table 6-3 Socio-economic Characteristics of Families

Household number[1]	Name of household head	No. of persons in household	No. of children <13 yrs	No. of adults +60 yrs	No. of students	Sources of income	Place of work or study and distances	Means of transport to place of study/workplace

Table 6-4 Socio-economic Characteristics of Business

Business number	Name of business owner	Age of business owner	Type of activity	No. of employees	Monthly income average	Destination of production	Place of selling	Duration of existence of business in affected location	Comments

Table 6-5 Impacts Caused by Displacement (Households)

Household Number	Loss of Land and house	Loss or decrease of income	Loss or difficulty of access to educational services	Loss of access to health services	Loss of access to public services	Loss of social networks

Table 6-6 Impacts Caused by Displacement (Business)

Business Number	Loss of land	Loss of Business place	Loss or decrease of income	Loss of economic networks	Comments

Table 6-7 Agreed Solutions

Household or business number	Resettlement Solution	Comments

Table 6-8 Resettlement Schedule

Activities	Dates	Budget	Comments
Planning of census and surveys			
Information to people affected			
Conduct census and socioeconomic survey			
Analysis of data and identification of impacts			
Definition of assistance measures			
Relocation/assistance			
Follow-up Visit by Responsible Agency			

6.6 LEGISLATIVE AND INSTITUTIONAL FRAMEWORKS

6.6.1 The Federal Democratic Republic of Ethiopia (FDRE)

The Constitution of the Federal Democratic Republic of Ethiopia (FDRE) has several provisions which have direct policy, legal and institutional relevance for the appropriate implementation of resettlement programs.

Involuntary Resettlement

The Constitution of the Federal Democratic Republic of Ethiopia (FDRE) states that the right to ownership of rural and urban land, as well as all natural resources, is exclusively vested in the state and in the people of Ethiopia. Article 40 of the Constitution indicates that land is a common property of the nations, nationalities and the people of Ethiopia, and shall not be subjected to sale or to other means of transfer.

Resettlement and rehabilitation are recognized civic rights in the Ethiopian legislation. Article 44 of the revised Constitution of 1995 states that all persons who have been displaced or whose livelihoods have been adversely affected by a State Program, have the right to commensurate monetary or alternative means of compensation including relocation with adequate state assistance.

The Constitution also guarantees people whose livelihood is land based (including pastoralists) have the right to have access to land as well as to protection against eviction (Article 40.4 and 40.5). Article 40.8 states that:

“Without prejudice to the right to private property, the government may expropriate private property for public purposes subject to payment in advance of compensation commensurate to the value of property.”

The “Proclamation to provide for the expropriation of land holdings for public purposes and payment of compensation” (No. 455/2005) contains several articles that outline the determination of compensation, compensation for displacement, valuation procedures, establishing property valuation committees, and on complaints and appeals. The proclamation gives power to the Woreda and urban administrations to expropriate and use land for public services.

Part two, article 3, no.1 of the proclamation No. 455/2005 states that:

“A woreda or an urban administration shall, upon payment in advance of compensation in accordance with this proclamation, have the power to expropriate rural or urban landholdings for public purpose where it believes that it should be used for a better development project to be carried out by public entities, private investors, cooperative societies or other organs, or where such expropriation has been decided by the appropriate higher regional or federal government organ for the same purpose.”

Proclamation No. 455/2005 also provides displacement compensation for rural land holdings. Part Three of article 8 states that:

“A rural landholder whose land holding has been permanently expropriated shall, in addition to the compensation payable under Article 7 of this proclamation, be paid

displacement compensation which shall be equivalent to ten times the average annual income he secured during the five years preceding the expropriation of the land."

The proclamation also states that in urban areas, PAPs will be provided with a plot of land (land for land compensation) for their expropriated land to be used for the construction of house, and also be paid compensation for displacement.

6.6.2 Sudan

Involuntary Resettlement

Sudan has no formal policy on Involuntary Resettlement. However, in the wake of the serious flood in 1998, a decision was taken at Federal level to resettle some of the worst affected villages and islands along the Blue Nile and Atbara River. This decision was translated into a Federal 'plan' based on the concept of voluntary relocation rather than according to a formalized policy on involuntary resettlement.

Implementation of the resettlement plan is the responsibility of affected States. In each State, the Ministry of Physical Planning is responsible for the preparation of new settlements sites, and for registering and demarcating plots for basic services (health, education, water, mosque, market place, *etc*.). Once plots are allocated, Ministries from the relevant sectors (health, education, water *etc*.) are responsible for constructing the essential service infrastructure prior to resettlement.

In practice, however, this plan is rarely implemented. Communities that agree to relocate are not entitled to protections under a formalized resettlement policy. The Ministry of Physical Planning may undertake the surveying, demarcation and registration of plots, but communities are expected to use their own resources to build homes, schools, health care units, *etc*.

In the absence of a Policy on Involuntary Resettlement, the following sections of the Interim Constitution serve as guidelines for land rights and compensation in Sudan:

The Interim Constitution

Sudan is a federal country divided into 26 states with special consideration given to Southern Sudan according to the Interim Constitution of 2005. There are three levels of authority: national level, state level and locality level. The powers over land are divided among the various levels as follows:

- At the national level, the federal organs exercise the power of planning, legislation and execution on federal lands, natural resources, mineral and subterranean wealth, inter-state waters, national electricity projects, epidemics and disasters.
- The state organs within the boundaries of the state exercise power on state lands, natural resources, animal wealth, wildlife, non-Nile waters and electric power.
- There are concurrent powers where both federal (national) and state organs exercise power on education, health, environment, tourism, industry and meteorology.

- The Interim Constitution provides for the creation of commissions, particularly on land, to assume among other powers planning and division of lands and forests between federal and state authorities.

Environment and social justice enjoy the protection of the Interim National Constitution of the Republic of the Sudan dated 10 July 2005 wherein:

- Section 24 describes the Sudan as a decentralized State with four levels of government, i.e.
    1) the national level of government with the power to protect national sovereignty, and territorial integrity of the entire Sudan and to promote the welfare of its people,
    2) the Southern Sudan level of government with the power to exercise authority in respect of the people and States in Southern Sudan,
    3) the State level of government with the power to exercise authority at the State level throughout the Sudan, and render public services through the level closest to the people, and
    4) the local level of government, which shall be throughout the Sudan.
- Section 12 requires the State:
    - to develop policies and strategies to ensure social justice through insuring means of livelihood and opportunities for employment.
    - to encourage mutual assistance, self-help, cooperation and charity.

The Interim Constitution has five Schedules (Schedules A-F), which more specifically state the powers of the various levels of government in respect of, among others, environment, land acquisition and conservation of cultural heritage. Such powers include:

Exclusive legislative and executive powers of the national level as stated under Schedule A:

- Natural lands and National natural resources (item no. 15)
- Meteorology (item no. 19)
- Signing of International Treaties on behalf of the Republic of the Sudan (item no. 2 5)
- National Public Utilities (item no. 30)
- National Museums and National Heritage Sites (item no. 31)
- National Economic Policy and Planning (item no. 32), and
- Nile Water Commission, the management of the Nile Waters and trans-boundary waters and disputes arising from the management of interstate waters between Northern States and any dispute between Northern and Southern States (item no. 31).

Legislative and executive competencies (concurrent powers) of the National Government, the Government of Southern Sudan and state governments under Schedule D:

- Health policy (item no. 4),
- Urban Development, planning and housing (item no. 5),

- Delivery of public services (item no. 7),
- Electricity generation and water and waste management (item no. 15),
- Environmental management, protection and conservation (item no. 17),
- Relief, Repatriation, Resettlement, Rehabilitation and Reconstruction (item no. 18),
- Financial and economic policies and planning (item no. 20),
- Water Resources other than interstate waters (item no. 27), and
- Regulation of land tenure, usage and exercise of rights in land (item no. 32).

Article 43 (2) of the Interim Constitution gives the national government the right to expropriate land for development purposes and to compensate owners. There are a number of articles related to natural resource management, protection of cultural heritage sites and respect of traditional and customary regulations related to land ownership. The Interim Constitution also specifies land issues which are under national powers (federal level) and those under the control of states as well as joint powers (concurrent powers) shared by federal and states. The States manage issues related to State lands which are not under national control. These include: management, lease and utilization of lands belonging to States; town and rural planning; and agricultural lands within the State boundaries. The concurrent powers include matters related to urban development, planning and housing, electricity generation, waste management, consumer safety and protection, water resources other than inter-state waters and regulation of land tenure and the rights on land.

Specific details and procedure on land are found in sectoral laws including:

- Land Registration and Settlement Act 1925 provides rules to determine rights on land and other rights attached to it and ensure land registration.
- Land Acquisition Act 1930 gives the government the power to appropriate lands for development purposes. It also states formalities of acquisition and rules governing assessment and payment of compensation. **
- Unregistered Land Act 1970 deems any unregistered land, before the enactment of this law, as being registered in the name of the government.
- The Civil Transactions Act 1984 regulates the different matters related to civil transactions with respect to titles on land, means of land acquisition, easement rights and conditions to be observed by land users.
- Urban Planning and Land Disposal Act 1994 regulates designation of lands for different purposes and urban planning. With respect to land expropriation for public purposes Section13 of the Act recognizes the application of its predecessor – Land Acquisition Act, 1930

** The Land Acquisition Act of 1930 outlines detailed procedures to be followed in the acquisition of land and rules governing payment of compensation for land for public purposes. The procedures for land acquisition in any locality are initiated with a notification by the People's Executive Council in a Gazette stating that it appeared to the President of the Republic to authorize the acquisition of land for public purposes (Section 4). It is only after such notification that it shall be lawful to enter into, bore, set out boundaries, mark or survey the land.

An appropriation officer appointed by the People's Executive Council would notify the occupant of land of the declaration that a designated area of land is to be appropriated for public purposes; call upon persons claiming compensation to appear before him at a place and time (not earlier than fourteen days) and to state the particulars of their claims for compensation (Section 10). He must attempt to agree on the amount of compensation for the land. The Act provides for further steps to be taken with regard to assessment of compensation if agreement is not reached.

Compensation Policy

Policies on land compensation are to be found in the 1925 Land Settlement and Registration Ordinance (LSRO) and the 1930 Land Acquisition Ordinance (LAO). According to these ordinances, land belonging to cultivators who have certified land use rights has to be formally expropriated and the cultivators compensated for the loss.

The 1970 Unregistered Land Act declares that all unregistered land is government land. The declaration was made without recognition of the long established and existing usufruct rights communally enjoyed by village or pastoral communities. This change was an amendment of the 1925 LSRO.

All ordinances state that it is one of the powers of the Settlement Officer to make provision for public roads and rights of way as may be required in the public interest, without being subject to payment of such compensation. The Settlement Officer may, however, decide to award compensation in money or in land in respect to any alteration to boundary, alignment of property, or demarcation of right of way, as he may think appropriate to the circumstances of each case.

7. Safety of Dams

7.1 INTRODUCTION

For subprojects that involve building a new dam:

- The construction of large dams (15 meters or more in height) will not be financed; and
- Small dams (less than 15 meters in height) will be designed by qualified engineers, and will be built by qualified and adequately supervised contractors. Small dams include weirs, farm ponds, local silt retention dams, and low embankment tanks.

Where a sub-project depends on the performance of an existing dam or one under construction (*e.g.* for water supply or power), the safety of the dam must be assured. This is to ensure that it does not fail and cause damage to, or failure of, the sub-project investment. When such a sub-project is being prepared, the Project will arrange for an independent dam specialist to:

- Inspect and evaluate the safety status of the dam, its appurtenances, and its performance history;
- Review and evaluate operation and maintenance procedures; and
- Provide a written Dam Safety Report (DSR) of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam to an acceptable standard of safety.

7.2 PURPOSE AND SCOPE OF WORK:

The purpose of the dam safety assessment is to prepare a reconnaissance-level assessment of quality management of a dam or weir, and of the reliability of the water source. The work will involve initial and wrap-up meetings with personnel responsible for the dam/weir; a field examination; and a Dam Safety Report of findings and recommendations. If deemed necessary, the report will provide terms of reference for more thorough follow-up activities to identify (to feasibility level with cost estimates) the investments and other measures needed to ensure the safety of the dam/weir.

7.3 QUALIFICATIONS OF THE DAM SPECIALIST:

The work will be carried out by a Dam Specialist (DS) of suitable independence from the owner/operator of the dam/weir, and who has not been associated with the design, construction, and operation of the dam/weir. The DS will have appropriate qualifications and substantial experience with the design, construction, operation and maintenance of dams, especially in developing countries.

7.4 INVESTIGATIONS OF OPERATING CONDITIONS

The owner/operator of the dam/weir will provide the DS with the following information:

- Construction year, first impoundment;
- Dam size: height (m), crest length (m);
- Reservoir size (m3);
- Dam type;
- Estimated population downstream that would be threatened by dam failure; and
- Estimated replacement cost.

The DS will discuss with the owner/operator past and current O&M practice with particular reference to:

- Existing records;
- Maintenance logbooks;
- Instrumentation and monitoring;
- Emergency preparedness;
- O&M resources (human and financial); and
- Status of reservoir sedimentation and measures to prolong the life of storage (reservoir conservation).

7.5 INVESTIGATIONS OF STRUCTURAL CONDITIONS:

Depending on the type of dam/weir, a suitable checklist for the inspection activities will be used. Inspection details are left to the DS who will carry out the task, however the inspection report should contain the following information:

a) Construction year, first impoundment;
b) Dam/weir size: height (m), crest length (m);
c) Reservoir size (m3);
d) Dam type;
e) Geotechnical aspects of foundations;
f) Design flood return period (years);
g) Availability of as-built drawings;
h) Spillway reliability assessment;
i) Bottom outlet reliability assessment;
j) Seepage;
k) Deformations, settlements;
l) Conditions of slopes/concrete structures;
m) Active storage (m3);
n) Estimated population downstream that would be threatened by dam failure; and
o) Estimated replacement cost.

7.6 INVESTIGATIONS OF REGULATORY FRAMEWORK:

The DS will:

- Discuss with relevant authorities (regulator, line ministries, utilities, *etc.*) the existing regulatory framework for dam/weir safety;
- Compare the existing regulatory framework, in a matrix format, with comments as necessary, to the "essential elements" identified in the World Bank publication "Regulatory Frameworks for Dam Safety - A Comparative Study" [2];
- Identify opportunities and constraints to the achievement of the "essential elements"; and
- If judged feasible, develop terms of reference for an action plan aimed at achieving the "essential elements" in the national context (priorities, institutional reforms, incentives, enforcements, *etc.*)

7.7 DAM SAFETY REPORT:

The DS will produce a Dam Safety Report that includes:

- Description of the dam/weir, ownership, and regulatory framework.
- Dam safety assessment according to international standards (ICOLD).
- Structural measures required to bring safety to acceptable standards, including a preliminary cost estimate differentiating interventions in three categories: a) emergency (human life at immediate risk); b) urgent (likely to pose a risk to human life, major assets at risk); c) significant (any needed rehabilitation beyond meaningful maintenance).
- Non-structural measures (instrumentation and monitoring, stand-by electricity supply, training, dam safety plans) to be implemented to make dam safety sustainable after rehabilitation; reference should be made to OP4.37 "Safety of Dams", and appendices to the publication "Regulatory Frameworks for Dam Safety - A Comparative Study"[2].
- Preliminary assessment of reservoir sedimentation status, and recommendations aimed at prolonging the life of storage facilities.
- Resources needed for reliable O&M (human resources and recurrent costs).
- Overall assessment of challenges and opportunities for the management of the dam/weir.
- Terms of reference for the preparation of feasibility studies for any required rehabilitation measures (structural and non-structural).

8. Environmental Monitoring and Evaluation

8.1 PURPOSE OF ENVIRONMENTAL MONITORING [3]

The overall objective of performance monitoring is to identify predicted and unanticipated changes to the physical, biological and social environment brought about by the project. This requires baseline information on predevelopment environmental and social conditions, against which development and post-development impacts and mitigation measures can be measured and compared. Deviations from the baseline beyond predetermined limits should trigger corrective actions. In this respect monitoring is a dynamic activity as opposed to passive collection of data.

An effective environmental performance monitoring program should consist of the following elements:

- Monitoring objectives;
- Description of performance indicators which provide linkages to impacts and mitigation
- Measures identified in the EA;
- Description of parameters to be measured, methods to be employed, sampling locations, frequency of measurements, detection limits (where appropriate) and definition of thresholds that will signal the need for remedial actions;
- Institutional responsibilities, timing and timescales for monitoring;
- Reporting arrangements (to the regulatory authorities and the Bank); and
- Costs and financing provisions.

Monitoring objectives must clearly spell out the questions to be answered by measurement activities. By way of illustration, suppose dust generated from a sub-project to construct levees is a concern. If the monitoring objectives are simply to determine whether these emissions will cause a public nuisance, citizen complaints would be a suitable indicator. If the objectives are to ensure that respiratory risks attributed to particulate matter are reduced, an ambient monitoring program for particulate materials with a diameter of less than 10 microns (PM_{10}) would be appropriate.

However, if the objective is to control the health risks from toxic constituents, a more extensive monitoring program focusing on the fate, transport and health effects of these constituents might be necessary. Once the monitoring objectives have been established, both the immediate outcome of the project (for example, minimizing spray drift from application of pesticides in a disease control sub-project) and the longer term environmental impact (ambient concentrations of pesticides in a local lake) should be monitored.

The monitoring program provided in the EMP should clearly show the linkages between specific impacts identified in the EA and indicators to be measured. These linkages should be demonstrated in a way that can be readily understood by

decision-makers. It is not essential to have complete details of monitoring in the EA Report. In some cases further collection of baseline data may be necessary. Nevertheless, the EMP should describe the process through which final monitoring arrangements will be agreed. Associated costs, funding and institutional needs (training, legislative or regulatory) required to complete the plan should be identified. The costs (including personnel, sampling and analytical charges) are integral to the project, and therefore will need to be factored into loan negotiations.

Any monitoring program requires allocation of responsibilities. The task of assigning roles can be aided by the use of the matrices developed to show linkages between impacts and monitoring. This can help establish the appropriate level of expertise for particular tasks, and in assigning functions to different organizations. Cross-checking can be facilitated by comparison of results from different monitoring sources, including local communities. For example, the effectiveness of bans on timber extraction by contractors can be verified using aerial photography supplemented by field observations.

The recipients, structure and intended usage of monitoring reports should be clearly identified. It is imperative that the reporting structure ensures that non-compliance is rapidly brought to the attention of the appropriate decision makers, to facilitate timely corrective actions. In addition, the structure, content and timing of reporting to the Bank should be designed to facilitate supervision and provide background for Bank missions.

Adherence to the monitoring and supervision schedule should ensure that the necessary mitigation measures are completed in a timely and satisfactory manner. It should also assist personnel involved in monitoring and supervision (particularly where responsibilities change), by providing a succinct summary of the agreed environmental requirements. To reinforce effective meshing of environmental and other project requirements, financial disincentives can be utilized. Refusal to disburse funds unless work is done in compliance with environmental requirements is a standard sub-project condition that could also be elevated to the funding agreement level.

In addition to assessing predicted impacts, monitoring may also reveal unanticipated impacts. Effective supervision ensures that corrective action is taken commensurate with the scale of such impacts. This can significantly influence project costs, which underlines the importance of accurate and timely reporting. Redesign or mobilization of contingency funds may be required.

8.2 ANNUAL REVIEWS

It is expected that annual reviews will be carried out by a third party (*e.g.* an independent local consultant, NGO or other service provider) that is not involved in the Project.

Annual reviews should be undertaken after annual reports have been produced and before WB supervision missions visit the Project.

8.2.1 Objectives [5]

The objectives of annual reviews of ESMF implementation are two-fold:

- to assess Project performance in complying with ESMF procedures, learn lessons, and improve future performance; and
- to assess the occurrence of, and potential for, cumulative impacts due to Project-funded and other development activities.

The annual reviews are intended to be used by Project management to improve procedures and capacity for integrating natural resources and environmental/social management into Project operations. They will also be a principal source of information to Bank supervision missions.

8.2.2 Scope of Work - ESMF Performance Assessment

The overall scope of the performance assessment work is to:

- Assess the adequacy of the sub-project approval process and procedures based on interviews with Project participants, Project records, and the environmental and social performance of a sample of approved sub-projects;
- Assess the adequacy of ESMF roles and responsibilities, procedures, forms, information resource materials, *etc*.;
- Assess the needs for further training and capacity building;
- Identify key risks to the environmental and social sustainability of sub-projects; and
- Recommend appropriate measures for improving ESMF performance.

The following tasks will be typical:

- Review central and district records of sub-project preparation and approval (*e.g.* applications; screening checklists; EMPs, RAPs, PMPs and IPDPs; appraisal forms; approval documents), as well as related studies or reports on wider issues of natural resources and environmental management in the country.
- Undertake monitoring surveys to ensure the commitments and conditions specified in planning documents have been adhered to through sampling of no less than 20% of the total number of conditions and commitments, and analysis of the results to ensure all outcomes have been achieved.
- On the basis of this review, conduct field visits of a sample of approved sub-projects to assess the completeness of planning and implementation work, the adequacy of environmental/social design, and compliance with proposed mitigation measures. The sample should be large enough to be representative and include a substantial proportion of sub-projects that had (or should have had) a field appraisal according to established ESMF criteria (see Section 4.2). Sub-projects in sensitive natural or social environments should especially be included.
- Interview PCU members and State/Region PSC officials responsible for sub-project appraisal and approval to determine their experience with ESMF implementation, their views on the strengths and weaknesses of the ESMF process, and what should be done to improve performance. Improvements may concern, for example, the process itself, the available tools (*e.g.* guidelines, forms, information sheets), the extent and kind of training available, and the amount of financial resources available.

- Develop recommendations for improving ESMF performance.

8.2.3 Scope of Work - Cumulative Impacts Assessment

This part of the annual review assesses the actual or potential cumulative impacts of sub-projects with other sub-projects or development initiatives on the environment, natural resources and community groups. Cumulative impacts result from a number of individual small-scale activities that, on their own, have minimal impacts, but over time and in combination generate a significant impact. For example:

- Deforestation due to the over-harvesting of poles and timber for small-scale construction;
- Decline in groundwater levels or quality due to the construction of numerous wells and the introduction of numerous small-scale irrigation works;
- Overwhelmed or illegal waste and dumping sites due to the inappropriate disposal of increasing amounts of waste materials;
- Illegal poaching of wildlife due to expansion of land under cultivation or increased proximity and access to protected areas through construction of small access roads; and
- Attraction of large migrant populations to communities that have successfully introduced improved social infrastructure (such as schools, health centers or water sources) resulting in overcrowding, depletion of resources (*e.g.* space, supplies, water), *etc*.

The function of this assessment is primarily as an "early warning" system for potential cumulative impacts that might otherwise go undetected and unattended to. It will be largely based on the observations of people interviewed during the field work, and trends that may be noticed by district or regional officials. Where cumulative impacts are detected or suspected, recommendations will be made to address the issue, perhaps through more detailed study to clarify matters and what should or can be done about them.

8.2.4 Qualifications for Undertaking Annual Reviews

The reviews should be undertaken by an individual or small team with training and experience relevant to the likely issues to be encountered (*e.g.* environmental and natural resources management, land acquisition and resettlement, indigenous peoples). They should also be familiar with the methods and practices of effective community consultation, and with typical methods and processes for preparing, appraising, approving and implementing small-scale community development projects.

8.2.5 Timing

Annual reviews should be undertaken after the annual ESMF report has been prepared and before Bank supervision of the Project, at the closing of each year of the Project. Ideally, they should be conducted in conjunction with the annual reviews by the expert group. Indeed, if the necessary expertise is available within the expert group, these tasks could be subsumed under the expert group annual review. It is expected that each review would require 3-4 weeks of field work

(interviews, examination of sub-projects), and that the review report would be completed within 2 weeks of completing the field work.

8.2.6 Outputs:

The principal output is an annual review report that documents the review methodology, summarizes the results, and provides practical recommendations. Distinct sections should address a) ESMF performance and b) cumulative impacts. Annexes should provide the detailed results of the field work, and summarize the number of approved sub-projects by district and their characteristics according to the annual report format (see Sample 3 at Annex 3).

8.3 REPORTING

PCUs are normally required to report annually on their sub-project activities during the preceding year. The content of these reports should include:

- A performance and compliance report which describes the performance and compliance with conditions placed on the project and implementation requirements prescribed. The report should include any monitoring reports, test results obtained and a discussion of lessons learned in project planning, implementation and operation;
- Level of community involvement and contribution to the project, both directly and in-kind;
- Level of technical assistance from outside the community required;
- Lessons learned regarding management of environmental and social issues;
- A record of sub-project transactions and expenditure;
- A dissertation of experience and issues on a year-by-year; and
- Information to assist the annual review process.

A typical annual review form is included at Sample 3 in Annex 3.

9. Public Disclosure

Public disclosure is a requirement of most funding agencies for all environmental and social documentation developed for a project. Before a sub-project is approved, EMPs, RAPs and IPPs are required to be made available for public review at a place accessible to local people (*e.g.* a district administration office) and in a form, manner and language that can be understood by local people. They are generally also forwarded to the funding agency for disclosure at information centers in the relevant country offices and through the agency's website.

Disclosure requirements required by the World Bank are described in OP 4.01, 4.10 and 4.12.

However, it is also good practice to disclose information about the sub-project progressively through the planning of the sub-project. Thus, there is benefit in disclosing the intent of the project to the community early in its inception stage. This enables feedback, not only about issues to be addressed in the required planning documents, which will assist in development of an improved project concept and plan with greater acceptance and ownership within the community.

The disclosure process should also provide adequate time for people to receive information about the project prior to any opportunity to input into the project development process, thus enabling people to present informed considered debate on issues that arise.

10. Capacity Building and Institutional Strengthening

10.1 INTRODUCTION

The environmental and social sustainability of Bank projects that involve funding multiple, small-scale subprojects is highly and unavoidably dependent on the capacity of communities and local and national authorities to carry out the associated design, planning, approval and implementation work. Thus, to ensure that capacity, it is vital that a Project allocates sufficient resources to training, capacity building and technical assistance, especially in the early years. These efforts will not only benefit the Bank project, but will also build local capacity to undertake other development initiatives funded locally or by other donors.

10.2 INSTITUTIONAL CAPACITY ASSESSMENT

The institutional capacity to address the environmental and social management issues across the EN basin varies within each jurisdiction. All three national jurisdictions have formed environmental protection agencies to address environmental management in each country. Responsibility for environmental management is generally spread across agencies rather than being the focused responsibility of one agency. This is consistent with requiring environmental protection to be an integrated part of the business of an agency or corporation. However, there is only limited capacity below the national level of government to address environmental requirements, although there are often laws promulgated at state/regional level to provide for local environmental protection requirements. Both Sudan and Ethiopia lack the regulatory support for their environmental legislation. Thus, in preparation of sub-projects, and their EMPs. RAPs and IPPs, the community proponents should propose suitable standards by which the sub-project should be implemented.

Resources dedicated to environmental protection are limited in all jurisdictions. As a consequence there is little capacity to monitor environmental performance at local levels or across industries, except for major industrial establishments. Thus there is a need to support institutional groups to implement the intent of this ESMF and to monitor the performance of the sub-projects. There is a need to extend responsibility for environmental protection into the regional Water Resources Department (WRD) as required in legislation in Ethiopia, and under similar development in Sudan and Egypt.

Outside of government, there is significant capacity within NGOs, private consultants and academic institutions to assist the community to develop and monitor sub-projects. The requirement for the programs will be to co-ordinate those resources to make them available to the community. Within the overall Project budget, resources have been identified to meet this need.

In Sudan and Ethiopia, there is evolving legislation and regulations that are drafted awaiting parliamentary approval to enable their enactment. Such requirements already exist in Egypt. All jurisdictions have administrative procedures to assist the approval and implementation of sub-projects. Many of these procedures are administered by ministerial interests, such as agriculture, water and mines, but are

coordinated in the approval process by the agency responsible for environmental protection.

10.3 DEVELOPMENT OF ENVIRONMENTAL AWARENESS AND KNOWLEDGE

At community level, there is little awareness of environmental issues that arise in development and implementation of flood preparedness and mitigation strategies. As part of the overall raising of awareness at community level (for individuals, villages and district government) the FPEW Project proposes a significant training program which includes the raising of awareness and development of community knowledge of environmental and social issues.

This program will run over a seven-year period during Phase 1 and Phase 2 implementation with the aim of introducing these concepts, and others associated with FPEW, to the community. It is proposed that this program will implemented through an implementing consultant which will engage local NGO members and recent graduates with relevant educational background. The team introducing these concepts at village level will then provide the extension services to the community to assist in the preparation of sub-project applications.

Within the seven-year period, many villages in the catchments in the EN Basin in Sudan and Ethiopia will be provided with this training. The program provides for training of the village, then review and follow-up in the subsequent year. It is expected that after the initial training the communities will begin to prepare sub-projects for consideration.

The objective of the training is to:

- Support representatives and leaders of community groups and associations, organized in community Floodplain Action Groups (FPAGs) to prioritize their needs, and to identify, prepare, implement and manage the environmental and social aspects of their sub-projects;
- Ensure that local government officials have the capacity to assist communities in reviewing their subproject proposals, and in supervising the implementation of sub-projects; and
- Strengthen local NGOs and other service providers to act as extension teams to provide technical support (including basic EMPs, RAPs, IPP, and PMPs) to communities in preparing their sub-projects.

The training is expected to produce:

- Awareness-raising for participants who need to appreciate the significance or relevance of environmental and social issues.
- Sensitization to the issues for participants who need to be familiar enough with the issues that they can make informed and specific requests for technical assist-ance; and
- Detailed technical training for participants who will need to analyze potentially adverse environmental and social impacts, to prescribe mitigation approaches and measures, and to prepare and supervise the implementation of management plans. This training will address such matters as community participation methods; environmental analysis; using the ESMF checklist; preparing EMPs,

RAPs, PMPs, IPDPs. *etc.*; ESMF reporting; and subproject supervision and monitoring.

The training program provides for the training of trainers by international and national social specialists in an expert group appointed by the implementing consultant on behalf of ENTRO. These trainers then develop teams who will work with communities for a week per month over an eight-month period to build awareness and create the knowledge and skills required to develop community sub-projects through a variety of training methods.

10.4 TECHNICAL ASSISTANCE

General technical assistance is being provided to various groups within the agencies responsible for FPEW in each country. A component of this work will see training and extension teams work with local government staff in each country in preparing initial on-ground projects and involve them in assessment of the initial sub-projects as they are rolled into national projects.

Specific technical assistance will be provided by the expert group working with the training/extension teams in the preparation of training and guidance materials. These specialists will be available to provide advice on complex issues that arise and to establish liaison links with approval authorities to enable documentation to be prepared to the level required to meet WB and legislative requirements.

11. Implementation Budget

A budget for implementation of this ESMF is included in the overall budget for the FPEW Project at Section 2.8 of the PIP.

Annex 1 Summary of Consultations

Note: This is a summary only. A complete set of meeting notes is provided in volume 3 of the TBP.

Country	Date	Ministry/ Department	Name/ Designation
Ethiopia		MWR/ Hydrology	Mr Deksios Tarekegn/ Head
	January 25, 2006	Ministry of Water Resources	Ms Semunesh Golla, Mr Selomon Kebede, Mr Dawit Teffera (MWR), Dr John Porter (SMEC)
		MWR/ Hydrology	Ms Semunesh Golla/ National Flood Coordinator / Team Leader
		MWR	Mr Tefera Beyene/ ENSAP Team Member
	January 11, 2006	ENTRO	Abdulkarim Seid (RFC, ENTRO); John Porter (SMEC)
	February 10, 2006	Ministry of Water Resources	Teshome Atenafe (Head, Irrigation & Drainage Dept) [MWR], Dr John Porter, D Danton (SMEC), Semunesh Golla (NFC for Ethiopia)
		MWR/ Irrigation & Drainage	Mr Teshome Atenafe/ Head
		MWR/ Hydrology	Mr Dawit Teffera/ Data Processing Team Leader
		MWR/ Hydrology	Mr Solomon Kebede/ Instrumentation Team Leader
		MWR/ Hydrology	Mr Mohammad/ Data Analyst and Mr Belete/ Hydrological Modeller
		MWR/ Dam & Hydro Design	Mr Michael Abebe/ Head
		MWR/ Boundary & Transboundary Affairs	Mr Musa Mohammad/ Head
		MWR/ Abbay Basin Institutional Development	Mr Fekahmed Negash/ Team Leader
		MWR/ Administration	Mr Tamene Gossaie/ UNICEF Projects Coordinator/ TaskForce for Water Supply & Sanitation
		MWR/ Contract Administration	Mr Leulseged Tadesse
	January 24, 2006	Ministry of Water Resources	Ms Semunesh Golla, Mr Tefera Beyene (MWR), Mr Diriba Koriche (NMSA), Dr John Porter (SMEC)
	February 1, 2006	National Meteorological Agency	Diriba Korecha (MSA), Dr John Porter, D Danton, Yilma Seleshi S (part) (SMEC), Semunesh Golla (NFC from MWR)
		NMA	Mr Kidane Asefa/ Director General
		NMA	Mr Diriba Koriche/ TL Weather Forecasting and Early Warning (WFEW), Member, RWG.
		NMA/ Meteorological Analysis & Forecast	Mr Amare Babu/ Head

Country	Date	Ministry/ Department	Name/ Designation
		NMA	Mr Seid Amedie/ Team Leader, Met. Communication Team
		DPPA DPPA DPPA DPPA	Mr Guluma Sobokssa/ Project Evaluation & Monitoring Team/ RWG member Mr Teshome Erkeneh/ Head, Early Warning Department Mr Getachew Abate/ Engineer, Early Warning Department Ms Tiruwork/ Team Leader, Project Evaluation & Monitoring
	April 17, 2006 11:30am	Bahir Dar City Administration Office	Keberome Negusie (Engineer), Yonas Michael (A/RFC, ENTRO); Dr John Porter, Assefa Addisu (SMEC)
	April 17, 2006 2:30 pm	Food Security Coordination & Disaster Prevention Office, Bahir Dar	Amlaku Asres (Regional Head), Tarakegn Ayalew (Team Leader, Early Warning & Disaster Prevention Department) Yonas Michael (A/RFC, ENTRO); Dr John Porter, Assefa Addisu (SMEC)
	April 17, 2006 9:30 am	Amhara Region Water Resources Development Bureau, Bahir Dar	Dr Alemayehu Mekonnen (Head , Water Supply Department) Yonas Michael (A/RFC, ENTRO); John Porter, Assefa Addisu (SMEC)
	April 18, 2006 2:30 pm	Wereda, Fogera Woreda	Kibret Mahmud, Administrator, Fogera Woreda. Yonas Michael (A/RFC, ENTRO); John Porter, Assefa Addisu (SMEC)
	April 18, 2006 11:00am	Nabega Kebele in Fogera Plain	Several villagers (approx.10), including the Chairperson of the Kebele Administration and probably two other members of the Kebele Administration. Guide provided by DPPA office, Fogera woreda. Yonas Michael (A/RFC, ENTRO); John Porter, Assefa Addisu (SMEC)
	May 12, 2006	Ministry of Water Resources	Ms. Semunesh Golla, National Flood Coordinator, MOWR, Hydrology Department Dr. Angela Impey, Social Assessment Specialist, SMEC
	May 12, 2005	ENTRO (Eastern Nile Technical Regional Office)	Dr. Wubalem, Social Development Officer Mr. Assefa Adissu, Social Assessment Specialist, SMEC Dr. Angela Impey, Social Assessment Specialist, SMEC

Country	Date	Ministry/ Department	Name/ Designation
	May 15, 2006	Food Security and Disaster Prevention and Preparedness Office (DPPO), Amhara Regional Office, Bahir Dar	Ato. Tarekegn Ayalew Yehuala, Disaster Prevention Team Leader, DPPO Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 15, 2006	Office of City Administration, Bahir Dar	Ato. Yayeh Addis, Mayor of Bahir Dar, Office of City Administration Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	April 15, 2006	Organization For Relief And Development In Amhara (Orda), Bahir Dar	Ato. Getu Hailu, Project Design, ORDA Ato. Semegne Eshete, Project Design, ORDA Ato. Debebe Digafe, Disaster Preparedness, ORDA Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 15, 2006	Community Consultation: Kebele 11, Bahir Dar	Group of Weito Women Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 16, 2006	Fogera Woreda Administration Office, Woreta	Ato. Kibret Mohamud, Woreda Administrator Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 16, 2006	Community Consultation: Kimbaro Village, Shina Kebele, Fogera Woreda	Ato Fenta Tadesse, Woreda Administration, Social Affairs Section Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 17, 2006	Fogera Woreda Agriculture And Rural Development Office	Ato. Abraham Muche Zemelak, Deputy Head of Agriculture and Rural Development Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 16, 2006	Red Cross, Bahir Dar Regional Branch	Ato. Gebrie Alebachew, Director, Regional Branch Section Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC

Country	Date	Ministry/ Department	Name/ Designation
		Fogera Woreda	Women Association Leaders Weizero (Mrs) Kasetch Yirdaw, Chairperson of women's association Weizero (Mrs) Yehzibu Berhe, Deputy Chairperson of women's association
	May 17, 2006	Community Consultation, Fogera Plain	Ato. Fenta Tadesse, Social Officer, Woreda Administration (Woreta) Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 17, 2006	KEDISTA HANA Kebele	Ato. Alemu Teshome, Development Agent of Animal Husbandry, Kedista Hana Kebele Office Ato. Zenabu Getahun, Kebele Administrator Ato Jemal Ahmed, Deputy Kebele Administrator Ato. Fenta Tadesse, Social Affairs Officer, Fogera Woreda Administration Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 18, 2006	Woreda Offices, Dembiya Woreda	Ato. Desalegne Mula, Deputy Administrator, Dembiya Woreda Ato. Gizat Dishale, Vice Director, Dembiya Woreda Agricultural and Rural Development Office Ato Chalew Tegegne, Head, Dembiya Woreda, Agriculture and Rural Development Ato Abebaw, Irrigation Agronomist, Dembiya Woreda, Agriculture and Rural Development Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 18, 2006	Ministry of Water Resources	Ato Deksios (Head, Hydrological Services) [MWR], Dr John Porter, Dr Yilma (SMEC)
	May 19, 2006	Bahir Dar Fisheries Research Centre	Ato., Dereje Tewabe, Acting Manager OF Fisheries Research Centre Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC

Country	Date	Ministry/ Department	Name/ Designation
	May 19, 2006	Red Cross, Bahir Dar	Ato. Gabrie Alebachew, Director, Regional Branch Section Dr. Angela Impey, Social Assessment Specialist, SMEC Ato. Assefa Addisu, Social Assessment Specialist, SMEC
	May 19, 2006	National Meteorological Services Agency	Kidane Assefa (Director), Dula Shanko (Dep.Director), Diriba Korecha (MSA), Dr John Porter, Dr Yilma (SMEC)
		Kidist Hana kebele	Ato Zenabu Gethun – Administrator of the Kebele Ato Amsalu Ambaw – Head of Organizational affairs for EPRDF at kebele level Ato Setegne Ayele – chairperson of Mengistawi Budin Gashaw Welelelaw – Resident
		Kidist Hana kebele	Ato Girma Gedame - Kebele Justice and Security head Ato Tezera Wasse - Kebele militia Ato Asnakew Alemneh - Kebele militia Militia Ato Gebre Gete - Kebele militia Ato Getaneh Derso - Secretary of Mengistawi Budine Ato Asmare Melake - Health committee
		Tach kokit and Abiwana Tihewa Kebeles	Ato Yalew Tadesse - Tach kokit Kebele Administration and Security head Ato Marew Teshome - Tach kokit Kebele Head for popular participation Ato Marew Gelaw – Kebele Administrator Abiwana Tihewa Ato Takele Kasse – Resident Abiwana Tihewa Ato Mohammed Hussien – Resident Abiwana Tihewa
		Shina Kebele	Ato Teseganew Mesfin – Kebel Administrator Kes Yeshanew Belete – Kebele miltia commander and member of woreda council
		Nabega Kebele	Ato Alemu Takele – Kebele Administrator Ato Tegene Yeshaw – Justice and Security
		Fogera Woreda Agriculture and Rural Development Office	Ato Getachew Tegene - DPP Desk Officer

Country	Date	Ministry/ Department	Name/ Designation
	June 23 and 25, 2006	Dembia Woreda Arebiya Aba Libanos kebele	Ato Take Melesew - Kebele Administrator Ato Gebeya Meles - Resident Ato Chekol Gebre - Resident
		Debirie Zuria (Robit) kebele	Asrate Assefa - Kebele - Public relations officer Abebe Takele - Resident Ato Fente Kasse - Kebele Administrator Mekonen Mandefro - Member of Kebele Administration
	June 23 and 25, 2006	Tana Woyine Kebele	Ato Asrate Assefa – Public Relations (Debre zuria) Abebe Takele – Resident Amare Kasse - Kebele Administrator Koyachew Takele – Resident
		Dembia Woreda Administration Office and Agriculture and Rural Development office	Ato Yedeme Yshi Alem - Woreda Administrator Ato Chalew - Head Agriculture and Rural Development Office Ato Abebaw - Agronomist
	June 20, 2006	Libo Kemkem Woreda, Addis Zemen	Ato Mengistu Amsalu - Woreda Administrator Ato Desalegen Demissie - Woreda Administration Office head Ato Dar eske dar Teka – Head Woreda Agriculture and Rural Development Office
	June 26, 2006	Amhara Food Security & Disaster Prevention Office	Ato Amlaku (Head, FS&DP Office, Amhara), Duleep Danton (Institutional Specialist, SMEC), Assefa Addisu (Social Assessment Specialist); at the FS&DP Office
	June 26, 2006 3:30pm– 4:30pm	Amhara WR Development Bureau Office	Ato Alemeyehu Mehonea (Deputy Bureau Head, WS&S, WRDB), Ato Mulualem Ashenaf (Head, Irrigation O&M Department), Duleep Danton (Institutional Specialist, SMEC), Assefa Addisu (Social Assessment Specialist)
	June 27, 2006	Agricultural Head of the Libo Kemkem Woreda	Ato Dareskadra Teka (Head, Agriculture), Duleep Danton (Institutional Specialist, SMEC), Assefa Addisu (Social Assessment Specialist)
	June 28, 2006	ORDA (Organization for Rehabilitation and Development of Amhara)	Ato Debebe Digafie (Manager, DPRP, ORDA), Duleep Danton (Institutional Specialist, SMEC), Assefa Addisu (Social Assessment Specialist)

Country	Date	Ministry/ Department	Name/ Designation
		Bahir Dar City Negede Woyito Community, Kebel 16 or Tana Kebele	Ato Mohammed Anteneh – Head of the Mosque Ato Ayichew Yaregal

Country	Date	Ministry/ Department	Name/ Designation
Sudan		Civil Defense Organ	Gen. Abdulhamid Hadj Hamad/ Director Lt.Col. Roden Loro Karlo
		Ministry of Irrigation and Water Resources MIWR MIWR	Mr Hayder Bakhiet/ Director Nile Waters Department/ NFCordinator Dr Salaheldien Yousef/ Chairman, WRTO Ms Tagreed Abdel Rahim, Hydrologist, Forecast Center
		Humanitarian Aid Commission HAC	Mr Harim Mohamedal Khalid/ Deputy Head, Emergency Unit Mr Yasser Mohammed/ Head, Early Warning Unit
		Civil Engineering Dept, University of Khartoum	Prof Gamal Abdo/ Head Dr Barsi, Dr Kamal Bashar, Dr Bhakti, Engr Hatim Eisa/ Hydrology and Water Engineering
		UNESCO Chair in Water Resources	Prof Abdalla A Ahmed/ Director Dr Kamal Bashar
		Sudan Meteorological Authority	Saber Ali Taho, A/Director General; Musa Ahmed Fota/ Director, Forecast Centre; Mohamed Suliman; Ismail Fudl el Moula/ Director, Finance & Admin; Haroun Abdalla/ General Director, Training, Research & Information
	February 5, 2006	Civil Defense Organization	General Abdulhamid Hadj Hamad (Director), Lt.Col.Roden Loro Karlo [CDO] Dr John Porter, D Danton, (SMEC) Hayder Bakhiet (NFC for Sudan) Abdulkarim Seid (RFC, ENTRO)
	May 7, 2006	Civil Defense Organization	Lt.Col.Roden Loro Karlo (Chief, Operations Center) [CDO], 3 assistants Dr John Porter, Yousif Fadlalla, (SMEC)

Country	Date	Ministry/ Department	Name/ Designation
	June 26, June 27 2006	Civil Defense Organization	Meeting 1: Dr. John Porter (Team Leader, SMEC), Mr. Steve Opper (Emergency Management Systems Specialist, SMEC), Mr. Hayder Y Bakheit (Director, Nile Waters Dept, MIWR), Lt. Col. Roden Loro Carlo, an Assistant Commissioner in the Sudan N/CDO) and head of their Technical Department Meeting 2: Dr. John Porter (Team Leader, SMEC), Mr. Steve Opper (Emergency Management Systems Specialist, SMEC), Mr. Opper (from The Project Team), Lt. Col. Carlo (N/CDO)
	June 26, 2006	Civil Defence Organization	Lt-Col. Roden Loro Carlo, one other official [CDO], Hayder Bakhiet (National Flood Coordinator) [Min.of Irrigation & Water Resources], Dr John Porter, Stephen Opper (SMEC)
	January 29, 2006	FRIEND Nile Project office, at Nile Water Research Centre outside Cairo	Dr Mohammed Sonbel (NRI) Dr John Porter (SMEC) Dr Abdulkarim Seid (ENTRO)
	February 5, 2006	Humanitarian Affairs Commission	Harim Mohamedal Khalid (Dep.Dir., Emergency Unit),Yasser Mohamed (Head, EarlyWarningSystem Dept), Sufian (EWS) [HAC], Dr John Porter, D Danton, (SMEC), Hayder Bakhiet (NFC for Sudan), Abdulkarim Seid (RFC, ENTRO)
	May 7, 2006	Humanitarian Affairs Commission	Bakheit Abdalla Yagoub (Dep.Dir., Head Emergency Department),Yasser Mohamed (Head, EarlyWarningSystem Dept) [HAC], Dr John Porter, Yousif Fadlalla Ahmed, (SMEC)
	June 26, 2006	Dams Implementation Unit	Tagelsir Ahmed Mohamed (Chair, High Technical Committee), Dr Ahmed el Tayb Ahmed el Hassan (Resident Engineer) [Merowe Dam Project Implementation Unit], Hayder Bakhiet (National Flood Coordinator) [Min.of Irrigation & Water Resources], Dr John Porter, Stephen Opper, Yousif Fadlalla Ahmed (SMEC)

Country	Date	Ministry/ Department	Name/ Designation
	May 6, 2006	Dam Projects Implementation Unit	Tagelsir Ahmed Mohamed (Chair, High Technical Committee) [Merowe Dam Project Implementation Unit], Dr John Porter, Yousif Fadlalla Ahmed (SMEC)
	February 8, 2006	Ministry of Engineering Affairs	Elsheikh M Tom [HAC] – engineer in charge of river engineering works, Dr John Porter, D Danton, (SMEC), Hayder Bakhiet (NFC for Sudan), Abdulkarim Seid (RFC, ENTRO)
	February 4, 2006	Ministry of Irrigation & Water Resources, Nile Water Directorate	Hayder Bakhiet (Director) (MoIWR), Dr John Porter, D Danton, Yousif Fadlalla Ahmed (part) (SMEC)
	May 6, 2006	Ministry of Irrigation & Water Resources	Ibrahim Salih Adam (Deputy NBI program/ ENSAPT Leader) (MoIWR), Dr John Porter, Yousif Fadlalla Ahmed (SMEC)
	May 9, 2006	Ministry of Irrigation & Water Resources	Omer Mohamed el Zain (Information Admin./National GIS Consultant/Nile Basin WR Products – omersquare@hotmail.com; mobile +249-912-990643) (MoIWR); Mohamed Sharif (Env.& Development Services – Sharifs@eudoramail.com; phone +249-183-770447; mobile -912-975388), Dr John Porter, Yousif Fadlalla Ahmed (SMEC)
	June 26, 2006	Ministry of Irrigation & Water Resources	Hayder Bakhiet (National Flood Coordinator) [Min.of Irrigation & Water Resources], Dr John Porter, Stephen Opper (SMEC)
	June 27, 2006	Ministry of Physical Planning & Public Utilities	Eltahir Osman Eltahir (Dir., Infrastructure Section), Abdulhalim Ahmed Yassmil (Manager, Survey Dept.) [MPPPU], Hayder Bakhiet [MIWR, NFC for ENTRO], Dr John Porter, Yousif Fadlalla (SMEC)
	May 8, 2006	Ministry of Physical Planning and Public Utilities	Eltahir Osman Eltahir (Dir., Infrastructure Section), Dr Salah Mahmoud Osman (Dir., Khartoum New Structure Plan), Abdulhalim Ahmed Yassmil (Manager, Survey Dept.) [MPPPU], Dr John Porter, Yousif Fadlalla Ahmed, (SMEC)

Country	Date	Ministry/ Department	Name/ Designation
	June 12, 2006	MWRI Planning Sector	Mohamed Abdel Ati (Nile Forecasting Center), Dr John Porter (SMEC); Ahmed Fahmy
	January 30, 2006	Nile Forecast Center, at MoWR&I HO	Dr Mohammed AbdelAti (director), Mamdouh Ansar (hydrologist), Mamdouh Hassan (GIS) (NFC), Dr John Porter (SMEC), Dr Abdulkarim Seid (ENTRO)
	February 8, 2006	Remote Sensing Authority	Dr Amnar (Director) [RSA] – located on U.of Khartoum campus, but under Min.of Science & Technology (according to pamphlet) or Min.of Higher Education & Technology (according to Yousif fax 16Feb), Dr John Porter (SMEC), Hayder Bakhiet (NFC for Sudan), Abdulkarim Seid (RFC, ENTRO)
	May 9, 2006	Remote Sensing Authority	Dr Amna Ahmed Hamid (Director), Dr Ganawa (email taib123@hotmail.com; phone +249-912-589116) [RSA], Dr John Porter, Yousif Fadlalla Ahmed (SMEC)
	May 8, 2006	Sudan Meteorological Agency	M A Abdelgadir (Director-General), Ismail Fudl el Moula (Dir, Finance & Admin), Haroun Abdalla (Gen.Dir. for Training, Research & Information), Saber Ali, Fatima Yahya (Dir, Engineering), Attia Khalafalla [SMA], Dr John Porter, Yousif Fadlalla Ahmed, (SMEC)
	February 5, 2006	Sudan Meteorological Agency	Saber Ali (A/Director-General), Musa Ahmed Fota (Dir, Forecast Center), Mohamed Suliman, Ismail Fudl el Monla (Dir, Finance & Admin), Haroun Abdalla (Gen.Dir. for Training, Research & Information) [SMA], Dr John Porter, D Danton, (SMEC), Hayder Bakhiet (NFC for Sudan), Abdulkarim Seid (RFC, ENTRO)
	June 27, 2006	Sudanese Red Crescent	Dr Bahaa elDin (General-Secretary), Sami Mahdiadam (Deputy, Programs), Mohd Ahmed elAmin (Office Mgr), Rahama Mhd Ibrahm (Flood Risk Reduction Coordinator) [S Red Crescent], Dr John Porter, Mustafa Babiker (SMEC)

Country	Date	Ministry/ Department	Name/ Designation
	February 6, 2006	Umbenin village, Singha mahaliya, Sennar State	Village elders, villagers, school teacher, Dr John Porter, D Danton (SMEC), Abdulkarim Seid (RFC, ENTRO),
	February 4, 2006	University of Khartoum, Civil Engineering Department	Dr Gamal Abdo (Head of Dept), Kamal Bashar (UNESCO Chair in Water Resources), Dr Bhakti(?) lecturer, Eng.Hakim Sisa lecturer [UoKhartoum], Dr John Porter, D Danton (SMEC), Hayder Bakhiet (NFC for Sudan), Abdulkarim Seid (RFC, ENTRO)
	May 9, 2006	University of Khartoum, Civil Engineering Department	Dr Gamal Abdo (Head of Dept), Kamal Bashar (UNESCO Chair in Water Resources), Dr M Akode Osman (hydraulics) [UoKhartoum], Dr John Porter,Yousif Fadlalla Ahmed (SMEC)
	February 7, 2006	Wawusi village, North Khartoum mahaliya, Khartoum State	Village leader, villagers Dr John Porter, D Danton (SMEC), Abdulkarim Seid (RFC, ENTRO), ???? (MIWR), ???? (consultant)
	April 28, 2006	Tuti Island	Mr. Mahomed Zein-Elabdeen Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	April 29, 2006	Ministry of Irrigation And Water Resources	Eng. Ibrahim Salih Adam, Vice-Chairman, Water Resources Technical Organ Eng. Yousif Fadlalla Ahmed, Eng. Ibrahim Adam Ahmed, National Coordinator of ENSAP, Watershed Management Project. Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	April 29, 2006	Civil Defense Organization	Eng. Ibrahim Salih Adam, Vice-Chairman, Water Resources Technical Organ Eng. Yousif Fadlalla Ahmed, Eng. Ibrahim Adam Ahmed, National Coordinator of ENSAP, Watershed Management Project. Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC

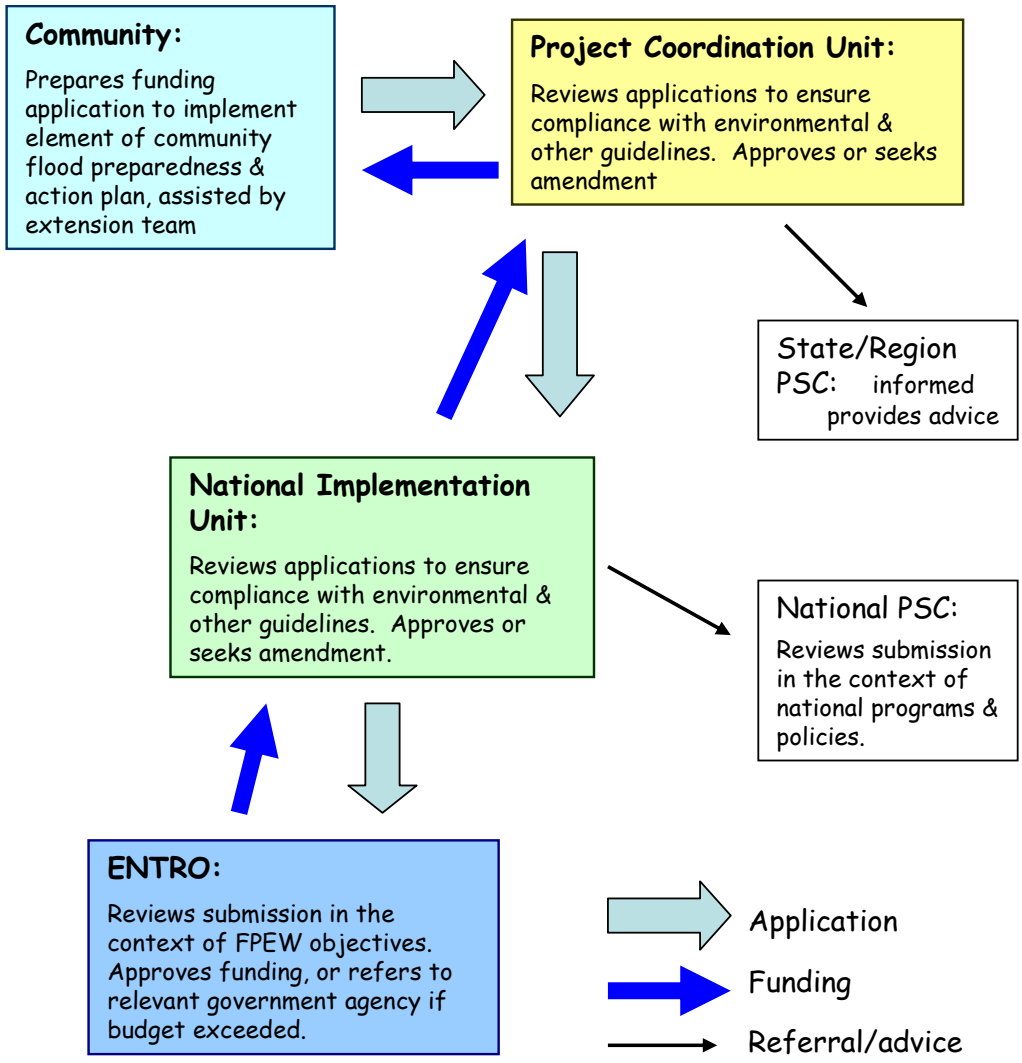
Country	Date	Ministry/ Department	Name/ Designation
	April 29 2006	Civil Defense Organization	General Hamadnallah Adam Ali, Deputy Director-General, CDO Khartoum General Abdel-Hameed El-Haj Ahmed, Director, Technical Administration, CDO, Khartoum Colonel Lt. Roden Loro Karlo, Director of Operations and Central Information, CDO, Khartoum Lt. Kamal Shawir, Operations, CDO, Khartoum Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	April 29. 2006	Ministry of Irrigation And Water Resources: Nile Water Directorate	Engineer Tagreed Abdel Rahim, Civil Engineer, Hydrology Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	April 30, 2006	Sudanese Environment Conservation Society (Secs)	Professor Suad M Salaiman, Health and Environment Advisor, SECS Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 1, 2006	Ministry Of Engineering Affairs, Atbara	Engineer Salah Ahmed Ali, Ministry of Physical Planning, River Nile State, Atbara Engineer Al Karim Ahmed, Ministry of Physical Planning, Director-General, River Nile State, Atbara Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 1, 2006	Sudanese Red Crescent Society (Srcs), Atbara	Mr. Abil Mohamed Abdel-Latif, SRCS, Atbara Mr. Salah Ahmed Hiwaytullah, SRCS, Atbara Mr. Alaaeldin Abdel Wahab, SRCS, Atbara Mr. Hashim Mighani, SRCS, Atbara Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC

Country	Date	Ministry/ Department	Name/ Designation
	May 3, 2006	Ministry of Irrigation And Water Resources, Sinnar	Engineer Mu'utasim Awad, Works Manager of Sinnar Dam, Ministry of Water Resources Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 3, 2006	Sudanese Red Crescent Society, Singa	Mr. Ibrahim Ali Ibrahim, Director, SRCS, Singa Mr. Isam Gumaa, Training and Information Officer, SRCS. Singa Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 4, 2006	Ministry of Irrigation And Water Resources, Sinnar	Engineer EL-HADI EISA (in charge of river gauge readings, Sinnar State) Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 6, 2006	Ministry of Irrigation And Water Resources, Dongola	Engineer Hafiz Mergani, Director of Technical Office Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 6, 2006	Ministry of Irrigation And Water Resources, Dongola	Engineer Hajias Mohamed Kheir, (Assistant to Director of Technical Office) Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 7, 2006	Sheikh Sherif Village (Near Dongola)	Ahmed Hassan Satti (local resident, farmer and 1999 flood victim) Dr. Angela Impey, Social Assessment Specialist, SMEC Dr. Mustafa Babiker, Social Assessment Specialist, SMEC
	May 22, 2006	Ministry of Physical Planning, Sennar State, Singa	Mr. Ali El-Medani Hamed-Elneel, Director-General Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC
	May 23, 2006	Mahaliya, Sennar State, Dinder Town	Ali Abdel-Wahab, Director of Agriculture Awadelseed Rabih Jabir, Agricultural Technician Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC

Country	Date	Ministry/ Department	Name/ Designation
	May 23, 2006	Um Temek Village, Dinder Mahaliya, Sennar State	Twenty four villagers (all males) including all age groups (elders, adults, youth and school boys) Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC
	May 27, 2006	Seidon Administrative Unit, Ed Damer Mahaliya, River Nile State	Mr. Ali, Administrative Officer Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC
	May 28, 2006	El-Shireik, Abu Hamad Maliya, River Nile State	Three men from Artul Island Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC
	May 29, 2006	Ed Dabba, Northern State	Elbagir Ahmed Ali, Executive Director, Maliyat Ed Dabba, Tayfoor Mohamed Salih, Administrative Officer, Ed Dabba Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC
	May 29, 2006	Ed Damer Maliya, Ed Damer River Nile State	Mr. Farah, Executive Director Mr. Salah, Deputy Executive Director Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC
	May 31, 2006	Dongla Mahaliya, Dongla, Northern State	Abuelgasim Mohamed Osman, Executive Director Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC
	May 31, 2006	Dongla Mahaliya, Northern State	Ms Huda Osman Awad, temporary secretary, Office of the Executive Director and resident of Magasir Island Dr. Babiker Mustafa Ahmed. Social Assessment Specialist, SMEC

Country	Date	Ministry/ Department	Name/ Designation
Egypt		Ministry of Water Resources and Irrigation / Nile Forecasting Centre	Mohamed Abdel Aty/ Manager/ NFCoordinator Mamdouh Hasan/ GIS specialist Mamdouh Ansar/ Hydrologist
		MWRI/ Nile Research Institute	Dr A F Ahmed/ Director Dr Karima Attia/ Head, Erosion & Sedimentation Dept.
		MWRI/ Nile Water Research Centre	Dr Mohamed Sonbel
		MWRI/ Nile Protection Sector	Abdel Hafiz Shalaby/ Head
	January 29, 2006 9:10 am	MWRI/ Nile Water Sector, National Office of NBI	Mr Yasser Elwan/ Director of Information/ RWG member Mr Magdy Sayed Ahmed/ RWG member
	January 29, 2006 12:00pm	Nile Research Institute, at Nile Water Research Centre outside Cairo	Dr Ahmed (Director), Dr Karima (NRI) Dr John Porter (SMEC) Dr Abdulkarim Seid (ENTRO)
	June 12, 2006	Nile Water Sector	Yasser [Mohamed Yasser Elwan] (Nile Water Sector / National Focal Point person), Dr John Porter (SMEC); Ahmed Fahmy (at beginning only)
	June 13, 2006	Nile Research Institute	Dr Karima Attia, Dr Ahmed Fahmy Ahmed [Director] (Nile Research Institute), Dr John Porter (SMEC); Ahmed Fahmy

Annex 2 Sub-project Flowchart[4]



Annex 3 Aids to ESMF Documentation Requirements[5]

Note: These forms/checklists were taken directly from *World Bank (2005); Environment and Social Management Framework for World Bank Projects with Multiple Small-Scale Sub-Projects – A Toolkit; Africa Region, The World Bank, February, 2005*

Sample 1 General ESMF Checklist

NAME OF PROJECT Application No.

Sub-project Name:

Sub-project Location:

Community Representative and Address:

Extension Team Representative and Address:

Site Selection:
Rate the sensitivity of the proposed site according to the criteria provided in Table S1-1. High ratings indicate a higher risk of adverse environmental and social effect, suggesting that greater emphasis on environmental and/or social planning may be required to avoid, mitigate or manage potential adverse effects.

Table S1-1 Environmental Sensitivity Analysis

Issues	Site Sensitivity			Rating
	Low	Medium	High	
Natural habitats	No natural habitats present of any kind	No critical natural habitats; other natural habitats occur	Critical natural habitats present	
Water quality and water resource availability and use	Water flows exceed present demand; low intensity of water use; potential water use conflicts expected to be low; no potential water quality issues.	Medium intensity of water use; multiple water users; water quality issues are important	Intensive water use; multiple water users; potential for conflicts is high; water quality issues are important	
Natural hazards vulnerability, floods, soil stability/erosion	Flat terrain; no potential stability/erosion problems; no known volcanic/seismic/flood risks	Medium slopes (<3%); some erosion potential; medium risks from volcanic/seismic/ flood/tropical storms	Mountainous terrain; steep slopes; unstable soils; high erosion potential; volcanic, seismic or flood risks	
Cultural property	No known or suspected cultural heritage sites	Suspected cultural heritage sites; known heritage sites in the broader area of influence	Known heritage sites in the project area	

Issues	Site Sensitivity			Rating
	Low	Medium	High	
Involuntary resettlement	Low population density; dispersed population; legal tenure is well defined; well defined water rights	Medium density population; mixed ownership and land tenure; well defined water rights	High population density; major towns and villages; low income families and/or illegal ownership of land; communal properties; unclear water rights	
Indigenous peoples	No indigenous population	Dispersed and mixed indigenous populations; highly acculturated indigenous populations	Indigenous territories, reserves and/or lands; vulnerable indigenous populations	
Safety of dams	No dams in the project area	Dams in the area managed by a recognized water resource agency	Dams in the area managed by individual landholders or communities	

Completeness of Sub-project Application

Does the sub-project application contain, as appropriate, the following information?

	Yes	No	N/A
Description of the proposed project and where it is located			
Reasons for proposing the project			
The estimated cost of construction and operation			
Information on how the site was chosen, and what alternatives were considered			
A map or drawing showing the location and boundary of the project including any land required temporarily during construction			
The plan of the physical works (e.g. layout, buildings, other structures, construction materials			
Any new access requirements or changes to existing road/village layouts			
Any land that needs to be acquired, as well as who owns it, lives on it or has rights to it			
A work program for construction, operation and decommissioning the physical works, as well as any site restoration needed after completion			
Construction methods			
Resources used in construction and operation (e.g. materials, water, energy)			
Information about measures included in the sub-project plan to avoid or minimize environmental and social effects			
Details of any permits required for the project			

		Yes	No	N/A
A	**Type of project Will the project:**			
1	Support animal husbandry or processing?			
2	Involve the construction or rehabilitation of small dams, weirs or reservoirs?			
3	Support irrigation schemes?			
4	Support rural water supply and sanitation schemes?			
5	Build or rehabilitate rural roads?			
6	Involve solid waste management?			
7	Involve community forestry?			
8	Involve small-scale aquaculture?			
9	Involve leather processing?			
10	Involve Food processing?			
11	Involve community healthcare facilities and the management of healthcare waste?			
12	Build or rehabilitate any structures or buildings?			
13	Support agricultural activities?			
14	Le located in or near an area where there is important historical, archaeological or cultural heritage site?			

		Yes	No	N/A
15	Be located within or adjacent to any areas that are or may be protected by the government (e.g. national park, national reserve, world heritage site) or local tradition, or might be a natural habitat?			
16	Depend on water supply from an existing dam, weir or other water diversion structure?			
If the answer to any of the questions 1 – 16 is "Yes", please use the indicated Guidance Notes or section(s) of the ESMF for guidance on how to avoid or minimize typical adverse effects and risks				
		Yes	No	N/A
B	**Environment Will the project:**			
17	Risk causing the contamination of drinking water?			
18	Cause poor water drainage and increase the risk of water-related diseases such as malaria or bilharzia?			
19	Harvest or exploit a significant amount of natural resources such as trees, fuel wood or water?			
20	Be located within or nearby environmentally sensitive areas (e.g. intact natural forests, wetlands, mangroves) or threatened species?			
21	Create a risk of increased soil degradation or erosion?			
22	Create a risk of increased soil salinity?			
23	Produce, or increase the production of solid or liquid wastes (e.g. water, medical, domestic or construction wastes)?			
24	Affect the quantity or quality of surface waters (e.g. rivers, streams, wetlands) or groundwater (e.g. wells)?			
25	Result in production of solid or liquid waste, or result in an increase in waste production, during construction or operation?			
If the answer to any of questions 17-25 is "Yes", please include an Environmental Management Plan (EMP) with the sub-project application.				
C	**Land acquisition and access to resources. Will the sub-project:**			
26	Require that land (public or private) be acquired (temporarily or permanently) for its development?			
27	Use land that is currently occupied or regularly used for productive purposes (e.g. gardening, farming, pasture, fishing locations, forests)?			
28	Displace individuals, families or businesses?			
29	Result in the temporary or permanent loss of crops, fruit trees or household infrastructure such as granaries, outside toilets or kitchens?			
30	Result in the involuntary restriction of access by people to legally designated parks or protected areas?			
If the answer to any of the questions 26-28 is "Yes", please consult the ESMF and, if needed, prepare a Resettlement Action Plan (RAP).				
D	**Indigenous people Are there?**			
31	Any indigenous groups living within the boundaries of, or nearby, the project?			

		Yes	No	N/A
32	Members of indigenous groups in the area who could benefit from the project?			
If the answer to questions 31 or 32 is "Yes", please consult the ESMF and, if needed, prepare an Indigenous Peoples Plan (IPP).				
E	**Pesticides and agricultural chemicals Will the sub-project:**			
33	Involve the use of pesticides or other agricultural chemicals, or increase existing use?			
If the answer to the question 33 is "Yes", please consult the ESMF and, if needed, prepare a Pest Management Plan (PMP).				
F	**Dam safety Will the sub-project**			
34	Involve the construction of a dam or a weir?			
35	Depend on water supplied from an existing dam or weir?			
If the answer to questions 34 or 35 is "Yes", please consult the ESMF and, if needed, prepare a Dam Safety Report (DSR)				

CERTIFICATION

We certify that we have thoroughly examined all the potential adverse effects of this sub-project. To the best of our knowledge, the sub-project plan as described in the application and associated planning reports (e.g. EMP, RAP, IPP, PMP), if any, will be adequate to avoid or minimize all adverse environmental impacts.

Community representative (signature): ……

Extension team leader (signature): ……

Date: ……

For Official Use Only

Desk Appraisal by Review Authority

□ **The sub-project can be considered for approval.** The application is complete, all significant environmental and social issues are resolved, and no further sub-project planning is required.

□ **A field appraisal is required**

Note: *A field appraisal must be carried out if the sub-project:*

- *Needs to acquire land, or an individual or community's access to land or available resources is restricted or lost, or any individual or family is displaced;*
- *May restrict the use of resources in a park or protected area by people living inside or outside of it;*
- *May affect a protected area or a critical natural habitat*

- *May encroach onto an important natural habitat, or have an impact on ecologically sensitive ecosystems (e.g. rivers, streams, wetlands);*
- *May adversely affect or benefit an indigenous people;*
- *Involves or introduces pesticides;*
- *Involves or results in: a) diversion or use of surface waters; b) construction or rehabilitation of latrines, septic or sewage systems; c) production of waste (e.g. slaughterhouse waste, medical waste); d) new or rebuilt irrigation or drainage systems; or e) small dams, weirs, reservoirs or water points.*

The following issues need to be clarified at the sub-project site:

……
……
……

A Field Appraisal report will be completed and added to the sub-project file.

Name of desk appraisal officer (print): ……..

Signature: ……..Date: ……..

Sample 2 Environmental and Social Field Appraisal Form

NAME OF PROJECT

Application Number:

Part 1: Identification

1. **Project Name:** (for example: "Kawala Primary School Rehabilitation")

2. **Project Location:** (for example: "Kilwa, Ngoro District, Western Kenya")

3. **Reason for Field Appraisal:** Summarize the issues from the ESMF Checklist that determined the need for a Field Appraisal.

4. **Date(s) of Field Appraisal:**

5. **Field Appraisal Officer and Address:**

6. **Extension Team Representative and Address:**

7. **Community Representative and Address:**

Part 2: Description of the Project

8. **Project Details:** Provide details that are not adequately presented in the sub-project application. If needed to clarify sub-project details, attach sketches of the sub-project component(s) in relation to the community and to existing facilities

Part 3: Environmental and Social Issues

9. Will the project:	**Yes**	**No**
• Need to acquire land?		
• Affect an individual or the community's access to land or available resources?		
• Displace or result in the involuntary resettlement of an individual or family?		

If "Yes", tick one of the following boxes:

- ❑ The Resettlement Action Plan (RAP) included in the sub-project application is adequate. No further action required.
- ❑ The RAP included in the sub-project application must be improved before the application can be considered further.
- ❑ A RAP must be prepared and approved before the application can be considered further.

	Yes	No
10. Will the project:		
• Encroach onto an important natural habitat?		
• Negatively affect ecologically sensitive ecosystems?		

If "Yes", tick one of the following boxes:

- ❑ The Environmental Management Plan (EMP) included in the sub-project application is adequate. No further action required.
- ❑ The EMP included in the sub-project application must be improved before the application can be considered further.
- ❑ An EMP must be prepared and approved before the application can be considered further.

	Yes	No
11. Are there indigenous people living in the sub-project area who could benefit from, or be adversely affected by, the sub-project?		

If "Yes", tick one of the following boxes:

- ❑ The Indigenous Peoples Plan (IPP) included in the sub-project application is adequate. No further action required.
- ❑ The IPP included in the sub-project application must be improved before the application can be considered further.
- ❑ An IPP must be prepared and approved before the application can be considered further.

	Yes	No
12. Will this project involve or introduce pesticides?		

If "Yes", tick one of the following boxes:

- ❑ The Pest Management Plan (PMP) included in the sub-project application is adequate. No further action is required.
- ❑ The PMP included in the sub-project application must be improved before the application can be considered further.
- ❑ A PMP must be prepared and approved before the application can be considered further.

	Yes	No
13. Will this project involve or result in:		
• Diversion or use of surface waters?		
• Construction and/or rehabilitation of latrines, septic or sewage systems?		
• Production of waste (e.g. slaughterhouse waste, medical waste, etc.)?		
• New or rebuilt irrigation or drainage systems?		

If "Yes", tick one of the following boxes:

- ❑ The application describes suitable measures for managing the potential adverse environmental effects of these activities. No further action required.
- ❑ The application does not describe suitable measures for managing the potential adverse environmental effects of these activities. An Environmental Management Plan must be prepared and approved before the application is considered further.

14. Will this project require the construction of a small dam or weir?

Yes	No

If "Yes", tick one of the following boxes:

- ❑ The application demonstrates that the structure(s) will be designed by qualified engineers, and will be built by qualified and adequately supervised contractors. No further action is required.
- ❑ The application does not demonstrate that the structure(s) will be designed by qualified engineers, and will be built by qualified and adequately supervised contractors. The application needs to be amended before it can be considered further.

15. Will this project rely on water supplied from an existing dam or weir?

Yes	No

If "Yes", tick one of the following boxes:

- ❑ The application demonstrates that a dam safety report has been prepared, the dam is safe, and no remedial work is required. No further action is required.
- ❑ The application does not demonstrate that a dam safety report has been prepared, the dam is safe, and no remedial work is required. A dam safety report must be prepared and approved before the application is considered further.

16. Are there any other environmental or social issues that have not been adequately addressed?

Yes	No

If "Yes", summarize them:

_____

_____

_____

and tick one of the following boxes:

- ❑ Before it is considered further, the application needs to be amended to include suitable measures for addressing these environmental or social issues.
- ❑ An Environmental Management Plan needs to be prepared and approved before the application is considered further.

Part 4: Field Appraisal Decision

- ❑ **The sub-project can be considered for approval.**
  Based on a site visit and consultations with both interested and affected parties, the field appraisal determined that the community and its proposed project adequately address environmental and/or social issues as required by the Project's ESMF.

- ❑ **Further sub-project preparation work is required before the application can be considered further.**

The field appraisal has identified environmental and/or social issues that have not been adequately addressed. The following work needs to be undertaken before further consideration of the application:

_____
_____
_____

All required documentation such as an amended application, EMP, RAP, IPDP or PMP will be added to the sub-project file before the sub-project is considered further.

Name of field appraisal officer (print): .....

Signature: ..... Date: .....

Sample 3 Annual Report Form

NAME OF PROJECT:……
……
……

Application Number:

1. Name of District or Local Government: ……

2. Name and Position of Review Authority Completing the Annual Report:
……

3. Reporting Year: ……

4. Date of Report: ……..

5. Community Sub-projects: ……
……
……

Please enter the numbers of sub-projects in the following table. (Note: The types of sub projects should be the same as those listed in Section B2 of the ESMF.)

11.1 TYPES OF ACTIVITIES	**Approved this year**	**Application included an ESMF checklist**	**Field Appraisal**	**EMP**	**PMP**	**RAP**	**IPDP**	**DSR**	**Specific TA**
Water Supply									
Water point rehabilitation									
Hand dug wells									
Water harvesting facility									
Water treatment plant									
Hand pumps and mechanized boreholes									

11.1 TYPES OF ACTIVITIES	Approved this year	Application included an ESMF checklist	Field Appraisal	EMP	PMP	RAP	IPDP	DSR	Specific TA
Sanitation and Waste Management									
Waste disposal facility									
Transportation, Communication and Energy									
Tertiary/secondary roads									
Tertiary/secondary road culverts/bridges									
Footpaths									
Rural telephone									
Agriculture and Markets									
Terracing									
Community grain stores									
Natural Resources Management									
Anti-erosion interventions and soil fertility restoration									
Stream and river bank protection									

6. Were there any unforeseen environmental or social problems associated with any sub-projects approved and implemented this year? If so, please identify the sub-projects and summarize the problem(s) and what was or will be done to solve the problem(s). Use a summary table like the one below.

Sub-project	Problem(s)	Actions taken	Actions to be taken

7. Have any other environmental or social analyses been carried out by other public or private agencies in your district/province? If so, please describe them briefly.

……
……
……

8. Have you noticed any particular problems with implementing the ESMF in the past year (e.g. administrative, communications, forms, capacity)? If so, please describe them briefly.

……
……
……

9. Training: Please summarize the training received in your district/province in the past year, as well as key areas of further training you think is needed.

Group	Training Received	Training Needed
Review Authority		
Approval Authority		
Extension Teams		
Communities		

Prepared by: ……..

Signature: ……..Date: ……..

Annex 4 Mitigation Measures

Issue	Objective	Strategies
Soil erosion	Soil erosion is limited to minor rilling that does not hinder batter stabilization or produce turbidity in runoff water and streams	1. Avoid release of water onto natural slopes at single points. Release water over reverse sill contour drains with a run distance of sill which is 25% of the length of the feed drain length. 2. Use stop structures to avoid energy development on water flows which exceeds the energy required for movement of the soil particles. 3. Establish steps in cut batters (such as on river and stream banks) with a 10% backslope in the foot of the step. 4. Conserve and replace topsoil on exposed surfaces. 5. Establish rapidly covering vegetation on batter slopes. 6. Develop a stable mixed layer vegetation on the batter slopes 7. Establish drop drains to move water down batter slopes.
Vegetation	Maximize conservation of existing vegetation.	1. Minimize the extent of clearing to be undertaken in vegetated areas by reducing the work footprint to the minimum required for an environmentally stable structure. 2. Reduce the area to be cleared by minimizing the amount of clearing required outside the work area 3. Place all service areas on already cleared land. 4. Chip all vegetation removed and incorporate them into topsoil for respreading. 5. Replace all trees and shrubs removed during the construction process on the basis of 15 tree seedlings and 50 shrub seedlings planted per tree or shrub removed. 6. Conserve topsoil and respread it over all areas disturbed. 7. Rip all trafficked areas to a depth not less than 300mm at the completion of works to encourage revegetation.

Issue	Objective	Strategies
Flora	Maintain and improve diversity of natural flora	1. Conserve as much natural vegetation as possible in definition of the road footprint. 2. Avoid areas of natural vegetation where alternatives exist. 3. Use native vegetation species in all revegetation works. 4. Clean down all equipment to be used in vegetated areas to limit weed introduction. 5. Limit the extent of workspaces in naturally vegetated areas.
Rare and endangered species	Conserve IUCN Red Book species	1. Modify work sites to avoid vegetation containing Red Book flora 2. Ensure all Red Book fauna in suitable habitats within the work sites is removed prior to construction. 3. Confine all construction activity to the works footprint in areas where Red Book species occur
Water quality and pollutants	All the water and road runoff will be in the same or better condition than the receiving environment	1. Minimize the flow of runoff from the sub-project area to any water body through design. 2. Provide collection and passive treatment systems where high pollution risks occur. 3. All runoff from work areas will be retained within the work area in which it is placed. 4. When fill or other material is placed into water, a silt screen shall be installed to stop water outside the work site becoming turbid.
Fish and aquatic invertebrates	Maintain water quality in the work area	1. Establish an impermeable barrier between the works area and water bodies to prevent construction activities affecting water quality. 2. All machinery maintenance and refueling operations will be undertaken at a site remote from water bodies. 3. Develop emergency plan to prepare for management of incidents which result in hazardous materials and pollutants spilling to enable impact on fish and aquatic invertebrates in water bodies to be minimized.

Issue	Objective	Strategies
Wetlands	Minimize impact on wetland systems	1. Minimize intrusion of works into wetlands. 2. Limit disturbance to footprint of the works 3. Undertake works in a manner that does not impact in hydrologic regime of wetland. 4. Do not place construction infrastructure and hardstands in wetlands.
Temporary resettlement	Reduce the amount and duration of temporary resettlement required.	Refer to the RAP
Ethnic minorities (EMs)	Seek to improve conditions for EMs during the road development process	1. Prepare an EM development plan for all projects influencing EM groups 2. Implement EM development plan
Construction noise	Maintain noise levels at daytime noise level limits	1. Limit hours of work to 7am to 6pm 2. Check all equipment noise levels do not exceed 85 dB(A) at a distance of 1 meter from the machine. 3. Ensure all silencing on machinery is functional and all noise absorbing panels are in good condition and installed.
Construction waste	Maximize the use of recyclable materials to minimize waste. Dispose of all waste in a manner that is environmentally inert.	1. Use a system of waste segregation to maximize the potential for recycling and re-use. 2. Place all waste into an approved waste disposal or landfill facility outside the river floodplain. 3. All hazardous waste to be separated and sent to specialist sites for disposal outside the river floodplain.
Hydrological regime	No alteration to hydrological regime	1. Modify structures to ensure the surface and groundwater hydrology is conserved. 2. Ensure all backwater effects of drainage structures are minimized.
Changes to livelihoods and subsistence	Limit the impact of the project on the economic status of the project area and surrounding region	1. Resolve issues of compensation quickly to restrict financial impact on individuals 2. Finalize relocation of services with minimal disruption to local businesses and services. 3. Encourage other Ministries to direct funding to developments which will assist poverty reduction and other economic

Issue	Objective	Strategies
		strategies that should flow from improvement of flood preparedness in villages. 4. Maintain access to business and households with frontages to works that are not included in permanent and temporary resettlement proposals. 5. Employ local people in roles that will provide them with training and long-term employment opportunities. 6. Avoid diverting local production toward meeting the short-term project needs to the detriment of the long-term sustainability of local industry. 7. Seek supply of goods sourced from outside the project area from local representatives of the supplier.
Air quality and particulates	Minimize emissions to the atmosphere	1. Promote the monitoring of exhaust emissions from motor vehicles and any construction machinery 2. Ensure the loading of all transport vehicles is monitored to reduce the spillage of materials onto road surfaces and create dust problems
	Minimize emission to the atmosphere from plant and equipment	3. Monitor the quality of exhaust emissions and repair equipment with emissions emitting high levels of particulates (smoke) after start-up. 4. Ensure all production plants (such as brickworks, quarries or concrete batch plants) operate within air emission guidelines specified in the relevant national standard. (Note: If a standard is not specified a suitable international guideline, such as described in the World Bank Pollution Prevention and Abatement Handbook should be used) . 5. Place all production plants at least 500 meters from any residential building or sensitive facility.
Road noise	Maintain road noise to limits commensurate with adjacent land uses.	1. Actively promote implementation of existing national noise emission standards to reduce noise emissions from individual sources. 2. Discourage the use of horns in village areas to reduce traffic noise.

Issue	Objective	Strategies
		3. Reduce speed limits and enforce those limits in residential areas and around sensitive facilities. 4. Reduce speed limits and install traffic calming devices in the vicinity of sensitive facilities 5. Optimize efficiency of transport by minimizing the number of trips in the carriage of materials for construction

Annex 5 References

[1] SMEC(2006); Flood Preparedness and Early Warning Project Preparation – Inception Report; Prepared for Eastern Nile Technical Regional Office, Addis Ababa, March 2006
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