Nile Equatorial Lakes Subsidiary Action Program

FEASIBILITY STUDY AND PREPARATION OF AN INTEGRATED WATERSHED MANAGEMENT PROGRAM AND INVESTMENT PROPOSAL FOR SIO-MALABA-MALAKISI SUB BASIN

Final Report

Annex 2. Community Based Wetlands Management Project

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CHAPTER 1.CBWMP General Presentation

1.1 General Context

Wetland Management is one of the sector projects of the Sio-Malaba-Malakisi Integrated Watershed Management Action and Investment Plan (IWMP). The IWMP has been formulated within the framework of the consultancy services for the Sio-Malaba-Malakisi (SMM) River Basin Management Project, one of the three transboundary integrated water resources management and development projects being implemented within the framework of the Nile Equatorial Lakes Subsidiary Action Program (NELSAP), an investment program of the Nile Basin Initiative.

The SMM basin consists of the Malaba-Malakisi catchment, which originates from the southern slope of Mount Elgon and drains towards Lake Kyoga and the Sio catchment, which originates south of Mount Elgon and drains into Lake Victoria. The SMM catchments have experienced significant land use changes over the past years due to population pressure; as people continue to clear forests and drain wetlands to create new agricultural land and establish new settlements.

The SMM River Basin Management Project targets economic growth opportunities through co-operative management of the shared water resources amongst Nile Equatorial Lakes (NEL) countries, to alleviate poverty, enhance economic growth and reverse environmental degradation. It also contributes towards the wider Nile Basin Initiative (NBI) goal of achieving sustainable socio-economic development through equitable utilization of, and benefit from, the common Nile Basin water resources.

The present report on Wetland Management, as a sector activity proposal, needs to be read in conjunction with the Main Report, which presents the project components.

1.2 Background

1.3.1General catchment conditions

The high population pressure in the SMM basin has led to excessive land fragmentation and has pushed farming activities into marginal areas that are vulnerable to soil erosion and nutrient loss, and increased encroachment of ecologically fragile areas such as wetlands, riverbanks and protected forests for farming purposes. The majority of seasonal wetlands in middle and upper catchment areas has been encroached by expanding cropland.

The SMM basin is experiencing water resources quantity and quality challenges as a result of poor land use management practices, all having their repercussions on wetlands. Within the SMM basin, degradation in upper watershed areas has led to an increase in sediment load and intensity of flash floods. Soil erosion causes water pollution leading to deterioration of aquatic habitats. Coarse fractions have caused siltation of incised riverbeds. This in its turn has increased flooding intensity and hence riverbank erosion, which has further contributed to siltation of beds. The washing of nutrients and organic matter from the rich top soil into streams and rivers is a major cause of eutrophication. Furthermore, excessive deposition of sediments in rivers, lakes and wetlands has caused destruction of fish spawning areas.

The natural resource significance of wetlands in general and anywhere is much reported. In the SMM context they moderate water flows ultimately to the Nile River at the same time as giving potential enhancement to people's livelihood. Wetlands are an important resource and in their natural state provide considerable benefits to the community and to the good maintenance of the water resource.

1.3.2 Review of SMM Wetland Conditions

There are important distinctions between the wetlands in the Kenya and Uganda parts. The Kenya portion of the SMM basin has only half the amount of perceived wetlands as the Uganda part; 8.5 % of the area as against 17.5%. Estimates of wetlands are primarily based on delineation in topographical maps. In fact, a significant proportion of the above percentages include seasonal wetlands, and this seasonality is irregular by itself.

The rivers draining from Mt. Elgon are incised and are characterized by irregular but marked short-term flood events which are often 10 times the base flow. These are likely to have considerable erosive power and preservation of riverbank wetland vegetation is therefore important to moderate this.

The large majority of seasonal wetlands are completely cultivated. The cultivation practices are traditional.

Encroachment decreases downstream westwards to very little wetland modification in the western part of the project area.

Significant flood plain seasonal wetlands along the courses of the Sio, Malakisi and Malaba rivers only begin towards the international border with Uganda.

Permanent wetlands in the SMM have the greatest importance for maintaining beneficial ecological attributes. They are greatly dominated by papyrus. This by itself normally supports very low biodiversity, but these wetlands are extensive enough to have sufficient mixed vegetation to harbour a large biodiversity. The ecosystem as a whole is of prime ecological value to conserve. Permanent wetlands are generally too deep for encroachment.

Nevertheless, there is some encroachment and attempted drainage in the Sio valley wetland, and some old established paddy rice cultivation areas exist.

Wetlands produce papyrus, reeds and trees being harvested for a wide variety of uses. Fish are caught in open patches in permanent wetlands for home consumption.

CHAPTER 2.Justification of CBWMP

Wetland management cannot be separated in any conceptual or organizational manner from the catchment rehabilitation for the whole SMM basin. Wetland management is part and parcel of the management of catchments as a whole. Wetland management will conform to the aims of the catchment management actions and be strongly community development focused.

The proposed activities for the catchment rehabilitation to improve agricultural productivity greatly overlap with developing alternative incomes to alleviate detrimental use of wetlands. Both are directly concerned with reducing poverty. Wetland management may need the involvement of the same local communities, required staffing, institutions and material resources as do the proposed catchment rehabilitation support actions.

The riverbank protection component of catchment rehabilitation is relevant to the objectives of the Wetland management Plan in that the existing vegetation of the riverbanks is a wetland type and is naturally available to be used as renovation material. Agro-forestry and other proposals to improve agricultural productivity have the same objectives as does the diversification proposals of the Wetland management Plan. In the SMM perspective, the Wetland management Plan could even be considered as a downstream extension of the Mount Elgon Ecosystem Conservation/ Management.

The Wetland Management Plan builds on experiences in wetland conservation and management in Kenya and Uganda so far, which are very different.

Examples from Kenya show that some of the main issues arising are related to

- large-scale complex situations,
- inadequate gathering of socio-economic information, or its ignorance at the beginning of wetland development,
- local communities not being given their proper voice,
- shortcomings of a top-down type of catchment management, where there is no integration of use of natural resources into a proper catchment management strategy.

On the contrary, examples of uncomplicated small-scale operations are successful essentially because they are small enough to avoid major institutional complications.

Uganda has an extensive history of wetland conservation. It has taken the initiative in wetland conservation and management in Africa if not the world and now has legal and organizational structures to support the policies to the extent that there is a Commissioner for Wetlands who heads a considerable staff of a Department for Wetlands in the Ministry of Water and Environment. Uganda has an administrative structure specific for wetlands with specialized permanent staff and established policy. It has the potential assets of continuity of activities and

corporate effectiveness. Kenya's dispersal of wetland responsibility between various sectoral agencies has the potential asset of flexibility of approach for different circumstances.

This Wetland Management Plan is designed to address the perceived misuse or degradation of wetlands in the Sio-Malaba-Malakisi (SMM) area. The focus of the Wetland Management Plan, as for the Catchment Rehabilitation and Management Plan, will be on activities that will benefit the farmers through provision of alternative livelihood activities and improvement of incomes and, at the same time are likely to have maximum impact on watershed conservation and wetland functions as well.

Four types (categories) of wetlands have been determined for practical management purposes:

1. Riverbanks with some wetland type vegetation but with no, or very little, flood zone. These are mainly in the upper parts of the catchments and predominantly in the Kenya portion of the SMM area. A sub-project under the Catchment Rehabilitation and Management Project provides for protection of most of these riverbanks.

2. Tributary seasonal wetland areas with some seasonal water retention, also typical of the Kenya portion of the SMM basin. These are now fully encroached for agricultural use; prevailing land pressure would hardly allow conversion into natural wetlands. Management issues do arise from overuse or inequitable use of land and require agricultural more than wetland management corrections. This category includes various potential sites for future small impoundments.

3. Seasonal wetlands with major seasonal flood plains, including substantial unencroached areas, located on the main stream of the Malaba and on the Dumbu River. It is this category where most options for wetland development exist. They are best used in harmony with the natural flood events. That is, crops and grazing at the appropriate stage of flood and recession.

4. Permanent wetlands, located in the lower Sio valley along the Uganda-Kenya boundary, and in the lower Malaba, leading to the Mpologoma wetland and finally joining the Kyoga wetland complex. These have the greatest natural resource benefits of wetlands, and most strongly perform the typical ecological functions of flow regulation for the whole SMM area. The largest proportion is located in Uganda. No drainage should be practiced and encroachment strictly controlled to temporary activities of traditional uses. Water may be diverted from, and returned to, the wetland as part of a diversification of livelihoods to reduce unsustainable exploitation of the wetlands.

The clearly outstanding important permanent wetlands for the SMM area are in the lower Malaba-Mpologoma and the mid to lower Sio valleys. The former is entirely in the Uganda portion of the SMM area and its management would currently be under the protocols of the Uganda Wetlands Management Department but implementation of management will require input initiated through the present Study. There is more of the latter in the Uganda part of SMM than in the Kenya part; about 270 km^2 versus about 35 km^2.

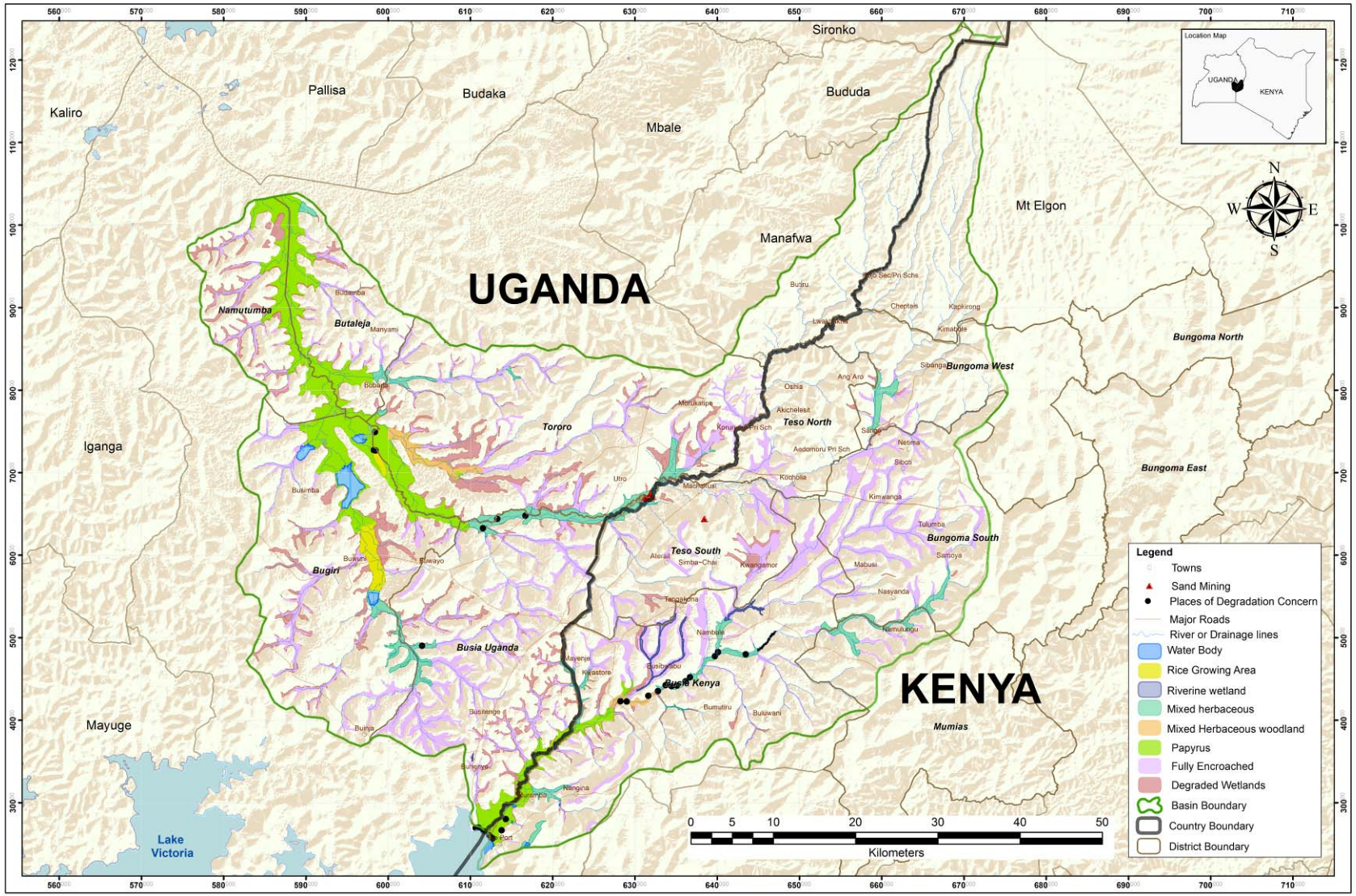
The projects under the Wetland Management Plan will address the latter two of the above categories. Category 3 provides the best opportunities for wetland development in the form of improved livelihoods, as these are not fully encroached yet. Category 4 requires a stronger emphasis on conservation because of its important ecological function in the SMM basin as a whole.

Wetlands and Climate Change

Climate change will have an inevitable medium and long-term impact upon the wetlands because of two factors. Firstly, there will be much greater variability of weather. Wet will become wetter and dry drier. SMM weather is already variable and it has become impossible to predict when, or if, the rainy season will begin in East Africa. Increased severity of flood events gives greater importance to streambank wetland vegetation. The cultivation of upland rice, already limited by droughts, to replace paddy rice grown in wetlands is likely to be further compromised by greater droughts. Major fluctuations in water flow would also impinge upon paddy rice cultivation and aquaculture developments associated with wetlands. Greater importance will thus be put on impoundments to maintain water flow (multi-purpose reservoirs).

Secondly, traditional farming methods are based upon predictable seasonality and so attempting intensifying such methods as is advocated for combating wetland encroachment may have only limited success. A shift in crop type and cultivation methods is probably inevitable, but farmers would need the required knowledge and investment capability to do be able to do this. It would be reasonable therefore to propose extension service investment in the form of a fund to be drawn on as a response to farmers' requests.

Wetlands will assume more importance than they have presently in their function of damping out variability of flood events. But the need to control discharge and volume by managed impoundments will remain. There will be times when emergency irrigation is wanted, although how much cannot be known yet. And if fish farmers run short of water they will informally duct more from the wetlands.



Map 1 - 2 Wetland Degradation Map

Constraints

Constraints to wetland management are related mainly to the intrinsic constraint to delineation of wetlands in order to identify and quantify spatial management units. Determination of wetland types and their extent is bound to be tentative and is always a generalization. The current decision taken by Uganda to issue a definition of wetlands and wetland types through objective parameters is a very valuable move; the NELSAP programme may be a link for other neighbour countries to adopt or adapt Ugandan regulation on this point, to avoid or minimise the confusion among definitions; a periodic review should be planned to update the resulting Wetland maps.

A significant proportion of wetlands are classified as seasonal. Under the peculiarities of the climatic regime their seasonality is irregular. Besides, due to long term encroachment, the natural status of wetlands is uncertain. A wetland rehabilitation option would often pose problems, because ecologically it is not clear what it is to rehabilitate. In addition, most gross area estimates of wetlands in both Kenya and Uganda are based on aerial surveys done for topographical maps. The extent of such wetter areas in these maps is often sociologically defined by a local community customary usage rather than by clear ecological features.

For the purpose of this study, delineation of wetlands is done as a compromise between the units shown on the topographic maps, and those identified from Google Earth imagery. The first one provided the overall layout of the wetland pattern; the second one provided the possibility to update the picture from the original topographic maps to the present situation.

Another issue which can become a constraint is the fact that wetland management is based very much on community development. This implies an unpredictability constraint in anticipated outputs of community development activities because of normal human vagaries. Estimates of anticipated outputs to a certain extent will have to be based on expert judgements and experiences elsewhere.

Finally, inadequate enforcement of existing laws and regulations is a constraint in any area of natural resources which in theory has a protection status, but where land pressure leaves no other option but encroachment.

The project designed for permanent wetlands aims at better conservation through a more intensive stakeholder involvement in planning and implementation, resulting in a stronger sense of project ownership and a higher commitment to sustainable models of resource utilization.

In practice the different legislations of Uganda and Kenya is unlikely to be a major constraint because cross border interaction is presently very good and is likely to continue to be, irrespective of legislative matters (see below). Kenya's spread of wetland responsibility between various agencies does potentially create problems for integrating wetland management into the total catchment rehabilitation but there are advantages of flexibility in this.

CHAPTER 3.CBWMP Overall objective and key outputs

1.3 Project Overall Objective

The Overall Objective of the Wetland management Plan conforms to that of the catchment management aims to «*improve the living conditions of people while protecting the environment*».

In this it is crucial that all wetland management activities are focused on the communities involved and that they in turn are willing contributors to the activities. A Wetland Management Plan is to a large extent a community development plan.

As per TOR, specific wetland management objectives are « *To support catchment management practices and traditional and other environmentally benign human activities that improve the local community's livelihood but which retain the essential ecological benefits and functions in the main wetlands* ».

The main outcomes will be:

- To halt ecosystem damaging encroachment of permanent wetlands.
- To develop equitable uses of larger seasonal wetlands.
- Development of alternative sources of livelihood.
- Capacity building for Community to implement proposed alternative livelihood options.
- Improved technical resources and extension services.
- Improved structure for planning and monitoring catchment rehabilitation activities, and for sensitization, training and mobilization of communities.

1.4 Project Specific Objectives

The specific objectives of the CBWMP are the followings:

- Operationalise mechanisms and tools for community driven wetland management
- Improve farmer's access to service delivery and inputs
- Promote sustainable wetland utilization in the watershed
- Livelihood productivity is increased and better secured
- Support farmers in implementation of alternative sources of livelihoods for improved income and food security
- Enhance farmers networking to promote best practices in wetland management

1.5 Key Outputs

The sub-project key outputs are the followings:

A. Targeted Wetlands Management Units are identified and mapped according to various categories and Wetlands Management Plans are produced for each watershed units

B. Wetlands Management Committees are established and operational for each Wetlands Management Unit

C. FFS are established and operational in each Wetlands Management Unit

D. GIS facilities and training are provided at the district level

E. Extension staff are equipped and trained to organize, facilitate and provide on-going support to operational FFS and apply participatory extension approach for wetlands sustainable wetlands valorization development; Research institutes are identified and involved in specific supportive tasks

F. Local manufacturers and retail sector are able to supply and maintain tools and equipment suitable for new techniques and practices

G. Nurseries are operational and seedlings available for agroforestry

H. Revolving funds / micro-credit mechanisms is established and accessible to farmers for new investment in agriculture, artisanal, eco-tourism activities

I. Farmers adopt and apply promoted new activities, techniques and practices like fish farm integrated units, Fruit orchard, honey…

J. Community-private partnerships for products commercialization (example for honey production) are created and Farmers have access to market for their cash production

K. New Eco-tourism, handicraft production activities and small scaled enterprises are developed in the water shed

L. Knowledge networks for exchanging experiences are established at local and transboundary levels

CHAPTER 4.Provisional Project benefits

1.6 Environmental conservation

Wetland conservation: The process for wetland conservation is holistic in nature, and can only be effective if the whole soil and water cycle is protected, from upstream to downstream in a same river basin; indeed part of the causes in reduction of wetland areas is linked to the progressive siltation due to sediment movement in the upper reaches of the rivers. Yet biological and engineering techniques applied at the level of a wetland unit will participate in mitigating erosion processes and loss of flood plain areas; therefore contributing to decrease of silting water bodies and water storage.

Ecological functions: Increasing the diversity of crops and trees in the wetland areas is associated with positive environmental outcomes because of the role trees and plants play in larger ecosystem functions. Trees, if correctly selected, can improve soil quality in various ways: root systems prevent soil erosion, leguminous species fix nitrogen and improve nutrient recycling, and detritus from trees increases the organic content of soil.

Climate Change adaptation: Global climate models forecast changes in rainfall pattern and temperature leading to shorter rains of higher intensity, with drought spells of similar duration or frequency with the current ones, but more intense. Under such conditions, the recommendations brought by the project tending to a more varied set of income sources for each household based on diversification of crops will act positively.

With this increase in varieties, selection of plants should be guided for improved soil cover leading to a decrease in soil erosion.

1.7 Income generation

Poverty reduction: Conservation Agriculture projects can reduce poverty directly by providing higher yields for most products, in a highly significant level, with progressive efficacy. Development of non-agricultural activities such as beekeeping or production of aromatic and medicinal plants will also act in favour of poverty reduction. These activities, moreover, can be handled mostly by women.

Reducing vulnerability*:* Crops diversification is a strong argument towards reducing the vulnerability. Development of Conservation agriculture techniques through improvement of soil moisture during longer periods is also a resource against climate change.

Access to micro credit for new investments and development of complementary income generating activities will also participate in facilitating initiatives from persons or groups currently less favoured.

Diversification of products and source of income: The sub-project, while increasing yields will also contribute to introducing of new products and cash crops. Enlargement of the production will contribute to secure income and livelihoods and income.

Market access: Agroforestry contribution to poverty reduction is dependent on people's access to product markets. Market access can be improved through construction of roads, development of farmer organizations to increase the bargaining power of producers, or with direct support establishing contact between producers and traders

1.8 Institutional strengthening

Access to technical advice and professional network:. The double capacity building process intended for the SMM programme is expected to give good results in term of professional advice: first at community level group through the Farmer Field School process, and then at coordination level promoting exchanges among the different groups.

CHAPTER 5.Classification of intervention areas

The project under the Wetland Management Plan will be concerned with the latter two of the wetland categories described below:

- Seasonal floodplain wetlands provide the best opportunities for wetland development in the form of improved livelihoods, as these are not fully encroached yet. Improved sustainable livelihoods would for example be based on:
  - Ditches dug in the floodplain of seasonal wetlands to increase the retention period of floodwater thereby allowing more time and area for growing seasonal crops.
  - Advising on the optimum use of seasonal grazing of the draw down area.
  - Improving the type and extent of fuelwood and fodder production.
  - Domestic pollution control by encouraging eco-toilet use where socially acceptable.
  - Encourage fruit orchard cultivation.
  - Organization of beekeeping community groups.
- Permanent wetlands requires a stronger emphasis on conservation because of its important ecological function in the SMM basin as a whole. Typical examples of improved sustainable livelihoods are for example
  - Increase of captured fish through enlargement of the fish breeding and refugia areas by cutting channels in the existing permanent wetlands.
  - Where permanent swamps have been encroached upon, to encourage an efficient ridge and furrow agricultural method.
  - To expand the extent and type of fish culture systems.
  - To establish fish-farm integrated units.
  - Improve or establish sustainable papyrus cropping coup areas.

For the investment strategy to be efficiently focused and not ineffectively dissipated too thinly across a wide geographical area, a number of specific locations has been selected for a first implementation phase (of five years). It is anticipated that donors will realize the necessity of longer term commitments (of about 10-15 years at least) as to cover as many of the wetlands in these categories as possible.

CHAPTER 6.Location of intervention areas

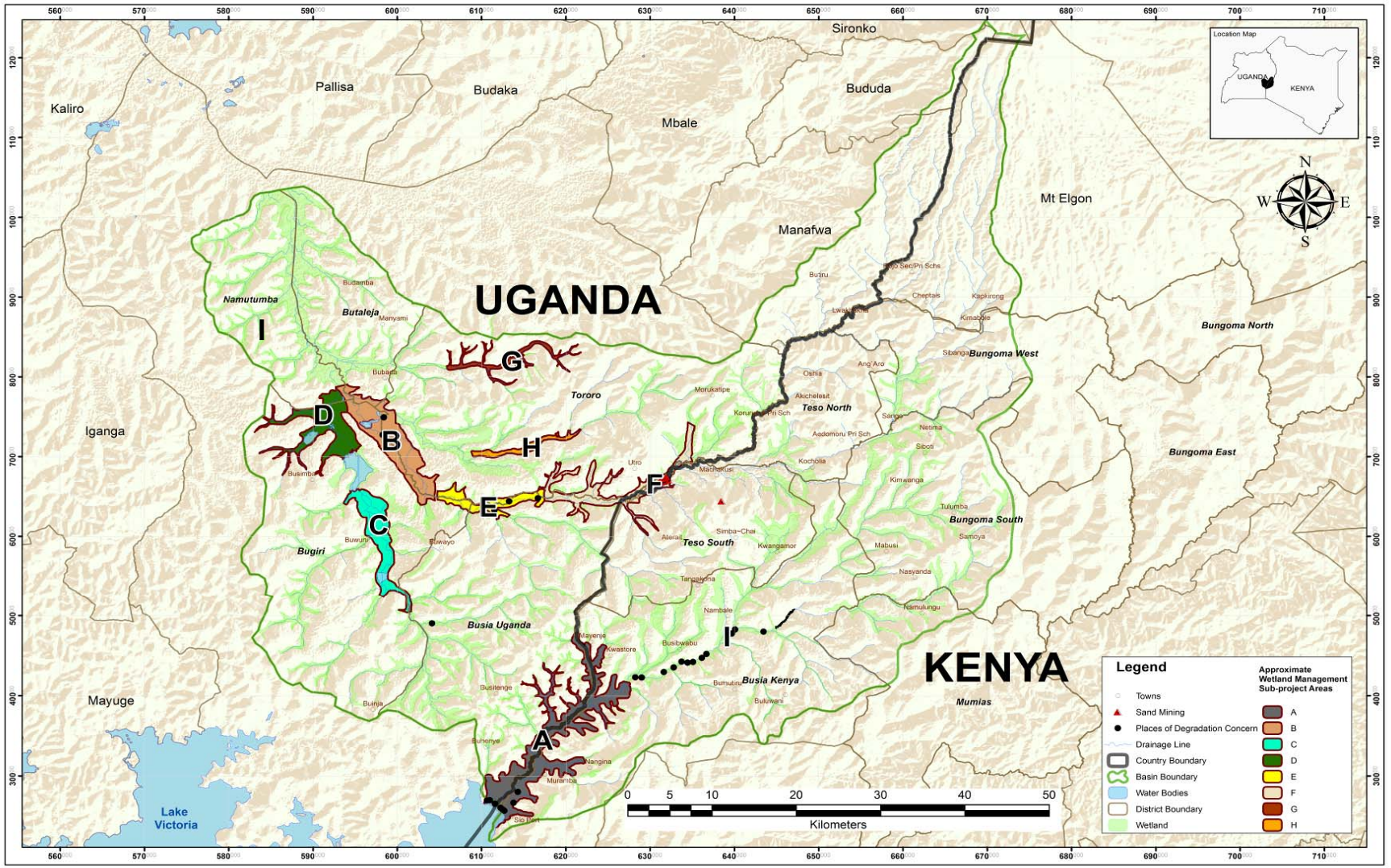
The Wetland management Plan provides for one project with 8 sub-projects. Selected Sub-project areas are listed in Table 1 below (areas A-I), and depicted in Map 1-2: Location Map of Wetland Management Sub-Projects.

The criteria for selection included:

- Values/functions of wetlands not yet lost.
- Current customary usages.
- Existing initiatives for wetland management.
- Population pressure on cultivated lands.
- Low population density in permanent wetland areas with high bio-diversity potentially to be gazetted as protected area.
- No existing dominant commercial investment.
- Accessibility.

The proposed sub-project locations have already received some initial management attention or concern but, excepting Sio-Siteko and Popera, they do not have all the necessary socio-economic information to formulate a management plan suitable for the specific local circumstances. Precise evaluation of costs of interventions will be refined when this information is available.

There are in addition many scattered locations of limited extent which justify attention in the course of ongoing routine management. These were depicted on the wetland degradation map (as places of degradation concern), and are also included in Map 1-2 of this report, showing the Location Map of Wetland Management Sub-Projects.



Map 1 - 2 Location Map of Wetland Management Sub-Projects

Area	Name	Main district(s)	Wetland category	Area km^2	Villages	Population Affected**	Contents
A	Sio-Siteko	Busia Kenya. Busia Uganda. Samia	Permanent	80	Lumino*, Manango* (Samia), Bulwenge*, Buyadeti* (Busia U), Lwanda*, Muramba* (Busia K).	228,000	Refinement of existing management plan: handicraft, apiary, poultry private woodlots, crocodile farm… Support/Capacity building in agriculture and agroforestry
B	Malaba-Mpologoma	Bugiri Tororo	Permanent	91	Bugobi*, Bubada*, Bugagere*, Hanjehe,Hisiro, Wumbwa, Lugulo, Maho, Buwega, Kisoko, Makenya, Budembe, Nakitaka, Magongolo, Busaba, Bingo, Mulanga, Namugwera,	41,000	Control of rice development. Population expansion. Open water fishing. Formation of user groups
C	Kibimba-Namasere	Bugiri Namutumba	Permanent	54	Bulugui*, Kayango*, Ruwakiro, Buwafu, Namugange, Bugai., Bugunda, Butundula, Namwambi, Bulesi	13,700	Control of rice extension. Fast population expansion Management plan required.
D	Nakwera	Bugiri	Seasonal - Permanent	48	Bulanga*, Nakitaka*, Bukubansiri, Bulalo, Kasokwa, Nabiwere, Wanenga.	9,800	Agricultural improvement with storage. Fishing, apiary, orchard development. Capacity building in specific areas
E	Iyolwa	Tororo Busia	Seasonal - Permanent	48	Iyolwa*, Bumanda*, Patumbu, Pasimbi, Chawalo-Sirongo, Kayawalo, Gule, Nyamulinde, Nyamera.	15,000	Agricultural improvement. Wetland use diversification
F	Mid-Malaba	Tororo Teso South	Seasonal	68	Paboni*, Kayoro*, Apoli, Ubalyo.	21,300	Agricultural improvement. Wetland use diversification
G	Nagongera	Tororo/Nagongera	Seasonal	40	Nagongera*, Rubuler*, Mukwana-Kijwala, Moriwe, Nyamanda, Wichmana, Mahanga, Awanya, Mukiya, Mifumi, Kisok, Opradamwere, Bunawale, Buwesa, Busabi, Dumbu, Budembe.	19,700	Agricultural improvement. Data collection, management plan Fishing, apiary, orchard development Formation of user committees
H	Popera	Tororo	Seasonal	25	Magola*	8,000	Socio-economic survey and Management plans are available. Paddy encroachment.
I	Mpologoma	Namuntumba	Permanent	20	Magada*, Bulange*, Namutumba	120,000	Fish ponds, bee keeping, eco-tourism, papyrus handicraft, crop diversification

Table 1: SMM WETLANDS MANAGEMENT SUB-PROJECT AREAS

* Priority Town or Village to start wetland management initiatives within the large areas of interest.

** Potential population which could finally be affected by wetland management in the whole area. The initially involved population may be smaller.

CHAPTER 7.Project description

1.9 Project Activities

In order to address the above issues in the respective zones of the watershed, four complementary activities have been designed:

Activity 1: Capacity Building for Community driven wetlands management

- GIS development
- Creation of Wetlands Management Committees
- Training sessions for technical officers and extension staff and CBO's leaders
- Implementation of FFS and stakeholders forum
- Production and dissemination of technical and communication supports

Activity 2: Seasonal wetlands (flood plains) management

- Development of village nurseries to support agro-forestry
- Community support for implementation of improved techniques and practices and Support for marketing of products and commercial community-private association for honey production
- Support of suppliers, providers of local hire services and manufacturers of tools and machinery
- Revolving funds for establishment of diversified activities (fruit orchard commercial production, bee keeping, fuel wood production..)

Activity 3: Permanent wetlands management

- Community support for implementation of improved techniques and practices
- Support access to market
- Support of suppliers, providers of local hire services and manufacturers of tools and machinery
- Investigate tourism development opportunities
- Revolving funds for establishment of fish farm integrated units

1.10 Means

Wetland management is to a large extent synonymous to community development, the more so in areas with permanent wetlands where management (and conservation) measures may constitute the main part of all measures to be taken.

The project will make use of the experience gained in initiating wetland management activities. This specially applies to the Uganda side with its operational administrative structure for wetland management. Preparatory activities have already been carried out for several locations, for example for Sio-Siteko – Sub-project A, and for Popera – Sub-project – H, both of which have also been shortlisted for implementation under the present investment proposal. These areas already have had investment in important socio-economic information, there has been some analysis of it, and stakeholders and responsibilities have been identified. However, none of this background information has been developed into a proper wetland management plan yet, and there is now an opportunity to do so. It is also a wise choice to build upon and to take existing work onward, and by this means to limit disruptions caused by in intermittent or unavailable funding.

The above listed sub-project areas have varying extent, ranging between 25 and 305 km². The larger areas should preferably be divided into logistically manageable portions of about 25-30 km² comparable to the Popera sub-project. This means that project areas may cover 1 to 4 basic wetland management units.

The wetland management plan for the Sio-Siteko area (sub-project A) has been the result of a trans-boundary effort, with involvement of stakeholders from both countries. Plans for these two sub-projects were preceded by intensive stakeholder consultation/sensitization and socio-economic base line surveys.

The project will review these two plans, and update these where necessary. In particular, it will see to the creation of a sound local institutional structure for implementation and subsequent management and maintenance of newly created assets. At the basis of this structure will be Groups or Committees, composed of representatives of the main stakeholders, and charged with management of the above mentioned units of about 25-30 km². Representatives will in the first place come from the local communities and interest groups, but will also include technical officers from government institutions and other organizations, who can provide advise on technical matters, on regulations to be respected, on formulation of bylaws to support site specific resource conservation, and on networking with other relevant organizations (private service providers, credit facilitators, manufacturers of small implements, marketing organizations).

Project-employed Community Mobilization Officers (CMOs) will guide this process of institution building. They will work together with District Technical Officers (DTO) from the Wetland Department or NEMA.

The 6 main districts affected by the sub-projects, are: Bugiri, Butaleja, Tororo, and Busia districts in Uganda; and Busia, and Teso South districts in Kenya, and possibly Namatumba in Uganda and Samia in Kenya.

Training will be given to staff of the above 8 districts. It is anticipated that the above districts (8 or 6 in number) will appoint 1 coordinating DTO per sub-project.

CMOs will not directly impose institutional arrangements. They will guide discussions wherein communities or interest groups are shown that improved resource management has its implications and requires a certain degree of organization to come to collective decisions and actions. This is for the simple reason that communities and interest groups need to become aware of the fact that the "anarchistic" exploitation of resources practiced so far, is not a sustainable solution. In this way stakeholders will have an important say in the way they organize themselves, which will stimulate the sense of project ownership. The process of institution building will not be a single event, but a continuous process of about 2 to 3 years with possible shifts in emphasis and with an anticipated gradually decreasing intensity.

For other project areas, the CMOs will guide the sensitization and mobilization process from its beginning, in cooperation with the technical officers from the Wetland Department (Uganda) and NEMA (Kenya). For these areas they will organize the baseline surveys or "preliminary resource survey" to take place and initiate the stakeholder consultation and sensitization process. Elements to be included are

- Wetland resources and their estimated value.
- Present utilization and amounts and/or extents.
- Numbers of people are involved, human potential and appropriate Population structure for proposed activities.
- Interested stakeholders.
- Community organization.
- Identification of conflicting interests and opinions to resolve them.

This information is essential for any community development project before any subsequent plan can be formulated and investment allocated. Planning will involve various community meetings to establish mutual agreements. If this is not done properly the project will fail.

A conventional time needed for surveys is usually one month for an area with an extent of about of 25 – 30 km². A survey would focus on one village within this area but draw on people in the whole area. Areas and focus villages are identified above for the SMM basin. There are 6 areas and 13 villages identified in the list of sub-projects in Table 1-1, which require surveys. Sio-Siteko and Popera sub-projects already have substantial amounts of information but will require visits for public awareness reminders of the previous work.

Technical aspects will be taken care of by District Technical Officers, who have a good knowledge of possible measures for improved management and improved livelihoods.

The project will support the production or collection of extension materials for the purpose of knowledge transfer to community level.

For innovative or more advanced measures, technical officers will be trained by a wetland management specialist employed by the project.

The sensitization and mobilization process will finally result in an overall plan per basic wetland management unit. The plans per basic unit will then be aggregated into an overall plan for the sub-project area, from which annual plans will be formulated for implementation. For introduction of specific alternative livelihoods, for example fish pond construction, eco-tourism activities or honey production, a separate plan can be made.

The project will provide the necessary inputs for implementation. Inputs will include planning tools, at community level and at the level of coordinating government institutions (Districts Wetland Departments in Uganda and NEMA in Kenya), and inputs required for installation of improved livelihoods, which cannot be provided locally. For the purpose of increased project ownership, participating communities will as much as possible provide inputs themselves: they would provide manual labour, and will be trained to produce their own planting material for biological measures such as tree production.

Since the type of implementations will much depend on communities' preferences, precise quantification of necessary implementation inputs is not possible. Tentative and flexible budgets will be reserved to facilitate implementation.

For each project area, a training needs assessment will be carried out, covering the various levels of participating stakeholders. On the basis of accumulative needs, a training program will be defined and implemented. Training may include formal training by project specialists or specialists in partner organizations, and on-the-job training for technical officers by project specialists, and for all stakeholders by CMOs. In addition, exchange visits will be organized between sub-projects or with other areas of interest within the SMM basin.

GIS will be an important planning tool and is given more detailed attention in the following section.

GIS facilities and training for a management database

Uganda already has a digitized database and mapping system for wetlands and so is appropriately equipped.

Kenya has now started to make a wetland atlas. This involves aerial surveys made and interpreted by the DRSRS of specific areas designated by the Sub-Committee for Wetlands. The results are being distributed to a team of specialists from sectoral government departments (wildlife, lands, agriculture, fisheries, etc.) and other institutions (National Museum, universities) who ground-truth and collect detailed ecological, taxonomic and socio-economic data. The work is co-ordinated by the Sub-Committee for Wetlands. An official document is then produced for the area concerned for the Ministry of the Environment. So far, six wetlands of national iconic value together with their catchments have been completed (Nakuru, Naivasha, Elmentaita, Bogoria,

Baringo, Eldoret) all of which except one are Ramsar listed wetland sites.

The SMM Study requires maps and database produced which ought to be compatible with the national databases. To be useful for SMM area wetland management the data must be easily accessible to District Officers. For this purpose, basic software and related GIS hardware facilities should be available in all 8 SMM Districts involved. The software would be on a dedicated computer allowing internet access to maps and information from a central source at an administrative centre suitably located for the SMM area. This central source would also have a dedicated computer facility but with GIS software for spatial analysis and for building the cumulative database. Both locations would need suitable printers.

Districts would be able to access all information from the central facility but would not be able to put any digital information into the system. This would avoid losing control of inputs, misuse, errors and improper logs of entries. The use should have passwords for the designated users and have a single access channel for wetlands management information. All information, including continually updated information, from Districts will be supplied to the central facility for input. Any corrections and clarifications can be controlled in this way prior to insertion into the database. The data should be based on standardized checklist sheets to include for each location of interest:

- Geographical co-ordinates.
- Wetland types.
- Civic area.
- Stakeholders.
- Wetland uses current.
- Degradation features.
- Socio-economic relevant data.
- Interventions possible and proposed.
- Management actions current.
- Roads and other infrastructure services.
- Towns and settlements.
- Specific features of interest.

The district officer in charge of the database should be equipped with a GPS unit for locating the exact positions of an item of management interest in the wetland area of his responsibility. Short training programs will be needed for the designated operators.

The facility is suitable for linking up with investments for other projects.

Progressive management

The introduction of improved uses of wetlands should follow a sequence of increasing technological and logistical complexity. Investment in structures and engineering can only be

successful subsequently after the benefits of improved use of the existing natural conditions are appreciated. It is therefore proposed that initial activities should need only training sessions and extension work. Simple technologies include

- Rehabilitation through a replanting program of locations of wetland erosion; introduced through selected demonstration sites.
- Increase of captured fish through enlargement of the fish breeding and refugia areas by cutting channels in the existing wetlands.
- Ditches dug in the floodplain zone to increase the retention period of floodwater thereby allowing more time and area for growing seasonal crops.
- Where permanent swamps have been encroached upon, to encourage an efficient ridge and furrow agricultural method.
- Advising on the optimum use of seasonal grazing of the draw down area.
- Improving the type and extent of fuelwood and fodder production.

For the investment strategy to be efficiently focused and not ineffectively dissipated too thinly across a wide geographical area, the strategy initially needs to have a limited number of specific locations. The common feature of the locations is that they should be good examples of wetland management that can be used as exemplars for other similar programs in the SMM area and elsewhere.

1.11 Quantities

The Wetland Management Plan provides for one project with 9 sub-projects. Selected Sub-project areas are listed in Table 1 above. The table presents the areas that are expected to be involved in the implementation; yet the exact extension, and the schedule to cover the extension, will appear as the result of the participative process with the local Wetland Management Units.

CHAPTER 8. Implementation framework

The project is planned to start with a first phase of five years, anticipating that donors see the necessity of longer term commitment to achieve tangible impacts on watershed conditions.

The project will be carried out from Uganda IWMP coordination office since most wetlands, and most of the proposed sub-project areas are located there. Besides, the project can build on a better established administrative structure for wetland management in Uganda.

The following full time staff members will be posted in the two IWMP coordination offices

- A Wetland Management specialist in Tororo
- A liaison officer in Kenya
- 1 district officer per district (8 persons), working with 2 mobilization officers per district (16 persons)

Inputs will be provided by

- Consultancies of International and national specialists (wetland management, ecotourism …);
- GIS specialists (from the PMU office and the two coordination offices) and GIS trainers, ensuring the setting up and operation of a GIS network, and providing training to staff of line agencies
- Training/Extension specialist.

Some capacity will be reserved for unforeseen ad-hoc consultancies (10 months), for example for a short study of eco-tourism potential.

The project will employ 18 Community Mobilization Officers (CMO). These will work closely together with 9 District Technical Officers (DTOs) detached to the project, one in each sub-project area, by the respective Wetland Management Department (in Uganda) and NEMA in Kenya. The DTO would ideally come from the 8 districts touched by the project, or from the 6 main districts where sub-project areas are located: Tororo, Bugiri, Butaleja, Busia Kenya, Busia Uganda, Teso South.

The Wetland coordination officer (based in Tororo at the IWMP coordination office) with its liaison officer (based in Bungoma at the IWMP coordination office) are responsible of coordination, planning of activities and monitoring process. CMO and DTO together will be the driving force in improved wetland management in sub-project areas. Contacts with other line agencies and stakeholder organizations will be more irregular and according to arising needs.

A Wetland Management Stakeholder Forum will be initiated to provide a platform for general information flow and exchange of views with a multitude of stakeholders which are not all

directly involved in day-to-day project activities. This will also be the level for the project to exchange views with the national Nile Discours Forum in Kenya and Uganda.

For the introduction of new technologies, contacts will be made with specialized organizations in the respective field, and contributions to the project will be effectuated on the basis of signed agreements.

In all technical, administrative or financial matters, the project will directly report to the PMU through technical reports, consultancy reports, progress reports, and monitoring reports. Funding lines will be directly from the PMU to the project; or be directly from the PMU to a partner institution providing services to the project, on the basis of agreements that are also approved by the PMU.

CHAPTER 9.Monitoring

1.3.1Indicators

Performance indicators have been proposed to reflect the progress of the sub-project implementation and impacts of activities undertaken under the different components of the sub-project.

The Performance indicators for sub-project progress and outcomes are presented in the following Table 2.

1.12 Schedule

According to the general schedule proposed for monitoring and evaluation, indicators will be informed to allow drafting of semi-annual and annual reports.

Table 2: Performance indicators for Project 2

KEY OUTPUTS	PERFORMANCE INDICATOR SUB-PROJECT PROGRESS/OUTCOMES	PERFORMANCE INDICATOR SUB-PROJECT IMPACTS
A. Targeted Wetlands Management Units are identified and mapped according to various categories and Wetlands Management Plans are produced for each WMU.	▪ Number of watershed management units identified ▪ Number of Watershed Management Plans edited and ready for implementation	
B. Wetlands Management Committees are established and operational for each WMU	▪ Wetlands management committees established and operational	
C. FFS are established and operational in each wetlands management unit GIS facilities and training are provided at the district level Extension staff are equipped and trained to organize, facilitate and provide on-going support to operational FFS and apply participatory extension approach for wetlands sustainable wetlands valorization development Research institutes are identified and involved in specific supportive tasks	▪ Number of operational FFS and active members ▪ Number of individual farmers applying new technologies and practices ▪ Number of training sessions/visits/workshops and persons trained ▪ Terms of reference for research institutes involvement	▪ Extension staff and farmers familiar with FFS methodology ▪ New techniques and practices in use
D. Local manufacturers and retail sector are able to supply and maintain tools and equipment suitable for new techniques and practices to farmers	▪ Number of trained operators and supplier for each WM committee	
E. Nurseries are operational and seedlings available for agroforestry	▪ Number of nurseries created and operational ▪ Number of seedlings provided	▪ Income sources from nurseries

KEY OUTPUTS	PERFORMANCE INDICATOR SUB-PROJECT PROGRESS/OUTCOMES	PERFORMANCE INDICATOR SUB-PROJECT IMPACTS
F. Revolving funds / micro-credit mechanisms is established and accessible to farmers for new investment in agricultural activities or eco-tourism	▪ Number of beneficiaries	▪ Financial capacities of farmers for investment in new technologies and enterprises
G. Farmers adopt and apply promoted new activities, techniques and practices like fish farm integrated units, Fruit orchard, honey…	▪ Number of fish farms integrated units, average composition and area ▪ List of other activities developed in the each wetlands management units	▪ Livelihood productivity ▪ Stabilization of wetlands areas (decrease of wetland drainage for crop lands settlement)
H. Community-private partnerships for products commercialization (example for honey production) are created and Farmers have access to market for their cash production Farmers have access to market for their cash production	▪ Volume of cash products ▪ Number of Community-private partnerships	▪ Farmers income
I. New Eco-tourism activities, handicraft production and small scaled enterprises are developed in the watershed	▪ Inventories new activities, products and operators and small enterprises in the watershed	▪ Non encroached wetlands cover ▪ Diversified farmers income
J. Knowledge networks for exchanging experiences are established at local and transboundary levels	▪ Stakeholders forums are operational	▪ Level of farmer solidarity and decision power

CHAPTER 10. Costs and benefits

Calculations are based on the assumption that the project includes the development of 22 Wetland Management Units formed with

- One 1000 m² fishpond
- An orchard unit of 1 ha
- A bee keeping unit with 8 beehives

Depending on the priorities expressed by the Farmers Groups and Wetland Management Committees, activities may result different, leading to other elements of cost and benefits, and may also include parts detailed in Annex 1 under the chapters on Agroforestry and Conservation Agriculture.

Net Present Values are calculated for a 12% escalation rate.

All values are presented in thousands of US dollars (USD '000)

Stakeholder analysis

Year	Earnings	Costs	Net Benefits
1	5 636	8 844	- 3 208
2	6 849	6 362	488
3	6 849	4 842	2 007
4	10 017	5 106	4 911
5	10 017	5 106	4 911
6	10 017	5 243	4 775
7	10 017	5 106	4 911
8	10 017	5 106	4 911
9	10 017	5 106	4 911
10	10 017	5 106	4 911
11	10 017	5 243	4 775
12	10 017	5 106	4 911
13	10 017	5 106	4 911
14	10 017	5 106	4 911
15	10 017	5 106	4 911
16	10 017	5 243	4 775
17	10 017	5 106	4 911
18	10 017	5 106	4 911
19	10 017	5 106	4 911
20	10 017	5 106	4 911
Net Present Value (NPV)			***23 711 €***

Project analysis

Year	Earnings	Costs	Net Benefits
1	- 3 208	1 696,50	- 4 905
2	488	1 279,90	- 792
3	2 007	1 181,90	825
4	4 911	1 209,50	3 702
5	4 911	1 175,90	3 735
6	4 775		4 775
7	4 911		4 911
8	4 911		4 911
9	4 911		4 911
10	4 911		4 911
11	4 775		4 775
12	4 911		4 911
13	4 911		4 911
14	4 911		4 911
15	4 911		4 911
16	4 775		4 775
17	4 911		4 911
18	4 911		4 911
19	4 911		4 911
20	4 911		4 911
Net Present Value (NPV)			***18 899 €***
Internal Rate of Return (IRR)			***42%***

2. Wetlands Management Project														
1 WM Field staff = current cost														
Project officers /extension staff 8 persons = 1 per district	pmonth	192,00	192,00	192,00	192,00	192,00	960,00	2,00	384,00	384,00	384,00	384,00	384,00	1 920,00
Community Mobilization facilitators	pmonth	96,00	96,00	96,00	96,00	96,00	480,00	2,00	192,00	192,00	192,00	192,00	192,00	960,00
Advanced farmers = 1 per 1 unit 10% time	pmonth	264,00	264,00	264,00	264,00	264,00	1 320,00	0,10	26,40	26,40	26,40	26,40	26,40	132,00
Subtotal 1									602,40	602,40	602,40	602,40	602,40	3 012,00
2 Equipment/Material														
equipement set for staff	unit	24,00					24,00	1,20	28,80	0,00	0,00	0,00	0,00	28,80
upgrading district division GIS facilities (computer, software, digitizer table,	Lumpsum	8,00					8,00	2,50	20,00	0,00	0,00	0,00	0,00	20,00
subsidiary fund for committee equipement	Lumpsum	22,00	240,00	240,00	240,00	240,00	982,00	1,00	22,00	240,00	240,00	240,00	240,00	982,00
Motorbikes	unit	24,00			8,00		32,00	3,00	72,00	0,00	0,00	24,00	0,00	96,00
Subtotal 2									142,80	240,00	240,00	264,00	240,00	1 126,80
3 Workshops & meetings														
Workshops and meetings	lumpsum	6	6	6	6	6	30	1,75	10,50	10,50	10,50	10,50	10,50	52,50
farmers visits costs by location (10 persons form 6 locations during 3 days/year)	lumpsum	6	6	6	6	6	30	7,50	45,00	45,00	45,00	45,00	45,00	225,00
Subtotal 3									55,50	55,50	55,50	55,50	55,50	277,50
4 Transport & other operation costs														
Transboundary traveling	lumpsum	6	6	6	6	6	30	3,00	18,00	18,00	18,00	18,00	18,00	90,00
Motorbikes operating costs (8 motorbikes)	month	576	0	0	192	0	768	0,05	28,80	0,00	0,00	9,60	0,00	38,40
Subtotal 4									46,80	18,00	18,00	27,60	18,00	128,40
5 Consultancies														
Unspecified consultancies (international) (eco-tourism development feasibility	pmonth	3	2	1	1	1	8	17,00	51,00	34,00	17,00	17,00	17,00	136,00
Unspecified consultancies (national)	pmonth	3	3	2	2	2	12	6,00	18,00	18,00	12,00	12,00	12,00	72,00
Community Mobilization trainer/adviser	pmonth	3	2	1			6	6,00	18,00	12,00	6,00	0,00	0,00	
Training district officers for GIS / data base (international expert)	pmonth	3	3					17,00	51,00	51,00	0,00	0,00	0,00	
Training extension trainer:adviser	pmonth	3	3				6,00	6,00	18,00	18,00	0,00	0,00	0,00	36,00
Preliminary survey and implementation plan	lumpsum	6					6	77,00	462,00	0,00	0,00	0,00	0,00	462,00
Subtotal 5									618,00	133,00	35,00	29,00	29,00	844,00
6 Revolving Funds														
Fund to support Fish Farm Integrated units 1per year/unit	lumpsum	22,00	22,00	22,00	22,00	22,00	110,00	10,50	231,00	231,00	231,00	231,00	231,00	1 155,00
Subtotal 6									231,00	231,00	231,00	231,00	231,00	1 155,00
7 Environmental and Social Monitoring	percent							2,50%	42,41	32,00	29,55	30,24	29,40	163,59
Subtotal 7														
Subtotal 2: Wetlands									1 738,9	1 311,9	1 211,4	1 239,7	1 205,3	6 707,3

Details of Costs and benefits per activity

	Fisheries (per Unit)			Orchard (per ha)			Beekeeping		Project		
Year	Earnings (US$)	Costs (US$)	Net Benefits (US$)	Earnings (US$)	Costs (US$)	Net Benefits (US$)	Earnings (US$)	Costs (US$)	Earnings (US$)	Costs (US$)	Net Benefits (US$)
1	254 017	287 259	- 33 242	-	113 950	- 113 950	2 160	800	5 635 887	8 844 200	- 3 208 313
2	254 017	276 611	- 22 595	53 000	12 550	40 450	4 320		6 849 407	6 361 553	487 855
3	254 017	207 549	46 468	53 000	12 550	40 450	4 320		6 849 407	4 842 171	2 007 236
4	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
5	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
6	254 017	207 549	46 468	197 000	29 950	167 050	4 320	800	10 017 407	5 242 571	4 774 836
7	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
8	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
9	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
10	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
11	254 017	207 549	46 468	197 000	29 950	167 050	4 320	800	10 017 407	5 242 571	4 774 836
12	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
13	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
14	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
15	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
16	254 017	207 549	46 468	197 000	29 950	167 050	4 320	800	10 017 407	5 242 571	4 774 836
17	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
18	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
19	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
20	254 017	207 549	46 468	197 000	24 550	172 450	4 320		10 017 407	5 106 171	4 911 236
NPV			***220 864 €***	***1 078 295 €***		***828 038 €***					***23 710 737 €***
IRR			***61%***			***74%***					***73%***