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IMPLEMENTATION COMPLETION REPORT
(IDA-29080 TF-28663 IDA-29081 IDA-29082 TF-28317)

ON THREE

INTERNATIONAL DEVELOPMENT ASSOCIATION (IDA) CREDITS

AND A

GLOBAL ENVIRONMENT FACILITY (GEF) GRANT

IN THE AMOUNT OF US$ 28.9 MILLION

TO THE

GOVERNMENT OF TANZANIA

FOR THE

LAKE VICTORIA ENVIRONMENTAL MANAGEMENT PROJECT
(LVEMP)

June 27, 2006

CURRENCY EQUIVALENTS

(Exchange Rate Effective)

Currency Unit = Tanzania Shillings
US$ 1 = 1100 Tanzania Shillings

FISCAL YEAR
July 1 June 30

ABBREVIATIONS AND ACRONYMS

AM	Aide Memoires
BOD	Biological Oxygen Demand
BMU	Beach Management Unit
CAPs	Community Action Plans
CAS	Country Assistance Strategy
CBOs	Community Based Organizations
CIGs	Community Interest Groups
CP	Cleaner Production
CPUE	Catch per Unit Effort
DANIDA	Danish International Development Agency
DFID	Department for International Development, United Kingdom
DDT	Dichlorodiphenyltrichloroethane
EAC	East African Community
ECOVIC	EAC Organization for Management of Lake Victoria
ELCOM	Estuary and Lake Computer Model
ERR	Economic Rate of Return
EU	European Union
FAO	United Nations Food and Agriculture Organization
FLT	Fish Levy Trust
FOB	Free on Board
GDP	Gross Domestic Product
GEF	Global Environment Facility
GoK	Government of Kenya
GoT	Government of Tanzania
GoU	Government of Uganda
ICR	Implementation Completion Report
IDA	International Development Association
IEG	Independent Evaluation Group of the World Bank
IFMP	Integrated Fisheries Management Plan
ILMP	Integrated Lake Management Project
KARI	Kenyan Agricultural Research Institute
LVBC	Lake Victoria Basin Commission
LVDP	Lake Victoria Development Program

LVEMP	Lake Victoria Environmental Project
LVFO	Lake Victoria Fisheries Organization
LVFRP	Lake Victoria Fisheries Research Project
M&E	Monitoring and Evaluation
MSY	Maximum Sustainable Yield
MTR	Mid-Term Review
NEMA	National Environmental Management Agency
NGO	Non Governmental Organization
OD/OP	Operational Directive/Policy
PEAP	Poverty Eradication Action Plan
PIC	Project Implementation Committee
PMU/PIU	Project Management/Implementation Unit
QAG	Quality Assurance Group
RPSC	Regional Policy Steering Committee
SAR	Staff Appraisal Report
SIDA	Swedish International Development Agency
SLM	Sustainable Land Management
TDA	Transboundary Diagnostic Analysis
USD	United States Dollar
WWTP	Wastewater Treatment Plan

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TANZANIA
LAKE VICTORIA ENVIRONMENTAL MANAGEMENT PROJECT (LVEMP)

CONTENTS

Project ID: P046837	*Project Name:* TZ-Lake Victoria Environment (IDA)
Global Supplemental ID: P046872 *(Fully Blended)*	*Supp. Name:* TZ: LAKE VICTORIA ENV. PROJ. (GEF)
Team Leader: Ladisy Komba Chengula	*TL Unit:* AFTS2
ICR Type: Core ICR	*Report Date: June 27, 2006*

1. Project Data

Name: TZ-Lake Victoria Environment (IDA) *L/C/TF Number:* IDA-29080; TF-28663; IDA-29081; IDA-29082

Country/Department: TANZANIA *Region:* Africa Regional Office

Sector/subsector: Animal production (25%); Central government administration (25%); General water, sanitation and flood protection sector (20%); Other social services (20%); Tertiary education (10%)

Theme: Biodiversity (P); Water resource management (P); Pollution management and environmental health (P); Environmental policies and institutions (P)

KEY DATES		*Original*	*Revised/Actual*
PCD:	12/28/1992	*Effective:* 03/05/1997	03/05/1997
Appraisal:	06/18/1996	*MTR:* 03/01/1999	03/01/1999
Approval:	07/30/1996	*Closing:* 12/31/2002	12/31/2005

Supplemental Name: TZ: LAKE VICTORIA ENV. PROJ. (GEF) *L/C/TF Number:* TF-28317

Sector/subsector: Animal production (25%); Central government administration (25%); General water, sanitation and flood protection sector (20%); Other social services (20%); Tertiary education (10%)

Theme: Biodiversity (P); Water resource management (P); Pollution management and environmental health (P); Environmental policies and institutions (P)

KEY DATES		*Original*	*Revised/Actual*
GEF Council:	04/01/1996	*Effective:* 03/05/1997	03/05/1997
Appraisal:	06/18/1996	*MTR:* 03/01/1999	03/01/1999
Approval:	07/30/1996	*Closing:* 12/31/2002	12/31/2005

Borrower/Implementing Agency: GOVT OF TANZANIA/VICE PRESIDENT'S OFFICE

Other Partners:

STAFF	Current	At Appraisal
Vice President:	Gobind T. Nankani	Callisto E. Madavo
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2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

	Rating
Outcome:	S

Sustainability:	L
Institutional Development Impact:	SU
Bank Performance:	S
Borrower Performance:	S

	QAG (if available)	ICR
Quality at Entry:		S
Project at Risk at Any Time:	Yes	

The overall implementation performance (outputs) is **Satisfactory**, and the achievement of the development objectives (outcomes) is **Moderately Satisfactory**.

The sustainability is **Moderately Likely**. The Institutional Development Impact is **Substantial**.

The overall Bank Performance is **Moderately Satisfactory** and the overall Borrower Performance is **Moderately Satisfactory**.

The Quality at Entry is rated **Moderately Satisfactory**.

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3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

Background and Context: The Tanzania Lake Victoria Environmental Management Project (TZ-LVEMP) was prepared during the 1994-97 period, and implemented as one of three interlinked fully blended projects financed by credits (International Development Association (IDA)) and a grant (Global Environment Facility (GEF)) from March 1997 to December 2005. The three projects together sought to address the issues of the lake in a regionally integrated way. They were, thus, conceived as contributions to a regional program (based on the *August 5, 1994 Tripartite Agreement*) implemented as three national projects in Tanzania, Kenya, and Uganda, with common objectives and initially identical components. Given the regional nature of the program and interlinkage of the three projects, the LVEMP Implementation Completion Reports (ICRs) for Tanzania, Uganda, and Kenya should be considered individually and in conjunction with each other, in order to understand both the national particularities in performance and the overall outcomes of the investment. The project assessed by this ICR was the first phase of a long-term program.

The observed project design was necessary at that time due to an absence of regional lending instruments for IDA and lack of institutions to implement a regional approach. The three nations recognized the importance of the Lake Victoria ecosystem as a vast shared resource with great potential for economic growth, but one that was under immense environmental stress. Economically it is very important; the fisheries sector is a significant driver of growth, and water supply, biodiversity, transport, and hydro-energy from the lake underpin vital economic activities. Conversely, the lake, if allowed to degrade, will impose substantial economic and environmental liabilities on the countries and communities of the watershed. Enhanced environmental management of Lake Victoria is, therefore, a key element of a sound program of growth, poverty reduction, and proper management of risks.

Lake Victoria is large and, in general, shallow. The lake depends chiefly on rainfall for its inflow, and its extensive watershed covers some of the poorest parts in the three riparian nations. When the projects were prepared, the threats to the lake's ecosystem were understood primarily to be diminishing biodiversity, over-fishing, infestation of aquatic weeds (especially water hyacinth), pollution, and eutrophication. The transboundary nature and rich biodiversity of the lake were recognized, but detailed scientific and socioeconomic knowledge about the resource was insufficient to support proper management. For example, the inventory of flora and fauna was incomplete and not current. The level of catch consistent with maintenance of the stock of Nile Perch was not known. Infestation of water hyacinth was visible, but the response of the species to various measures of control was unknown. The detailed status of quality of the water was not known; nor were major sources of pollution. Finally, the level of the lake has been observed to vary over time as recorded in historic statistics, but detailed knowledge of the underlying hydrology was not sufficient. Moreover, national and regional institutions and capacity relevant for management of Lake Victoria were weak at the outset of the project, and presented challenges during implementation.

The project was designed in a participatory manner with broadly ranging consultation of stakeholders at the local, national and regional levels. Formulation of the project required multiple negotiations and compromise; between scientists and public servants, between advocates of environmental conservation and those of managed growth, between national politicians with short time horizons and development partners seeking a longer term perspective, and between and among national neighbors with a recent history of tension. The objectives and design that emerged from this negotiation enjoyed sufficient consensus to move ahead, but also attracted antipathy of those who did not see their own objectives fully reflected. During the course of implementation, and even in assessment in this ICR, strongly held and conflicting opinions have been the order of the day. The ICR team has sought to assess the project not according to what might have been desired by any among the wide range of stakeholders, critics, and advocates, but by what was stated in the project documents and actually accomplished. Due to the vintage of the project, it is assessed according to the four point scale. The text indicates application of the modifiers introduced under the current six point scale where relevant.

Objectives: In light of the circumstances noted above, the objectives the Lake Victoria Environmental Management Project (LVEMP1) were **"to (i) provide the necessary information to improve management of the lake ecosystem, (ii) establish mechanisms of cooperative management by the three countries, (iii) identify and demonstrate practical, self-sustaining remedies, while simultaneously (iv) building capacity for ecosystem management"**. Co-financing from the GEF helped integrate transboundary environmental issues into the design and provide emphasis on them. As noted above, the project was fully blended.

Assessment of Project Objectives and Design: The project was the first of its kind in the region, with aims and objectives that reflected the nations' developmental priorities, regional objectives, and global goals. Preparatory activities particularly emphasized community participation and gender issues. The objectives as stated above were consistent with the country-based assistance strategy (CAS) and with the global priorities within the mandate of GEF International Waters program. Within the fully blended project, GEF priorities were focused on transboundary aspects such as fisheries (biology and conservation) research, water quality monitoring, capacity building in the riparian universities, support for policy and coordination, and water hyacinth control, with some attention to aquaculture and sustainable use of wetlands. The design reflected realism with regard to the time frame required for sound management of the lake, and was phased. The design recognized the need for generation of knowledge, creation of new institutions, and strengthening of capacity. The objectives of the project were sound and the process of preparation appropriate. Primary emphasis was placed on activities related to fisheries, which were allocated 41 percent of the funds. The remaining funds were spread over the other activities in the initial design. Questions have been raised with regard to the proper balance of emphasis on the various elements of the agenda, but the lack of information and inherent uncertainties associated with the various risks to the lake made *a priori* determination of allocations to the various activities difficult. Given the subsequent increased importance of fishing, growth in the catch, and urgency regarding management of the fishery, one cannot with certainty argue that an alternative allocation of resources among activities would have been superior.

3.2 Revised Objective:

The objectives were stated broadly and not changed during the course of implementation. Emphasis within each of the components changed over time, but within the broadly stated goals for the project. The component level objectives were fluid during the course of the project, and underwent change following shifts in emphasis and focus at key milestones (mid-term, the 2003 stock-taking and in the final phase).

3.3 Original Components:

In the joint Staff Appraisal Report (SAR), dated June 1996, the project had the following components (The overall project cost for all three countries of USD 77.7 million was allocated as indicated):
1) Fisheries Management/ Establishment of the Lake Victoria Fisheries Organization (LVFO) (USD 2.28 million)
2) Fisheries Research, including *four* sub-components, Fish Biology and Biodiversity Conservation, Aquaculture, Socioeconomics, Database (USD 13.33 million)
3) Fisheries Extension, Policies and Laws, including micro-projects (USD 14.09 million)
4) Fisheries Levy Trust (USD 2.03 million)
5) Water Hyacinth Control (USD 8.31 million)
6) Water Quality and Ecosystem Management, including one core project, Management of Eutrophication, pilot studies on Sedimentation and Hydraulic Conditions and the construction of a Model of Water Circulation and Quality in the Lake (USD 9.6 million)
7) Industrial and Municipal Waste Management, including one core project, Management of Industrial and Municipal Effluents, pilots on Integrated Tertiary Industrial and Municipal Effluent Treatment, each, and a component for Priority Waste Management Investments (USD 9.89 million)
8) Land Use and Wetland Management, including two core projects, Management of Pollution Loading (addressing non-point sources of pollution) and Buffering Capacity of Wetlands and four pilots - Assessment of the Role of Agro-chemicals in Pollution, Integrated Soil and Water Conservation, Sustainable Use of Wetland Products, and Afforestation (USD 14.1 million)
9) Institutional Framework, including Support to Riparian Universities and the Coordinating Secretariat (USD 3.98 million)
Please see Section 10, for more details on the components.

3.4 Revised Components:

Due to significant delays in the start-up of the program discussed below, at the mid-term review (MTR) many of the components and sub-components were revised. Work programs were adjusted to facilitate implementation within the existing institutions and according to the mandates of those institutions. This revision entailed somewhat lower expectations regarding cross cutting issues and coordination, but also freed up implementation to proceed within the components. The scope of several activities and components was narrowed, but still within the overall objectives of the program. In the design, activities were differentiated according to whether they were lake-wide or geographically focused pilots, an approach that was largely maintained during implementation with adjustment as the components were revised. Changes within the components created some confusion regarding the links between the components and overall effort, and the relatively weak coordination among components did little to restore focus on strategic objectives. Despite a tendency toward insularity within the components, cross cutting issues were important; e.g., the cross-cutting issue of community participation was overseen by an officer in the Secretariat, and this was a suitable arrangement. The scope of the micro projects was expanded beyond fishing communities to include communities in the catchments with good result. The Industrial and Municipal Waste Management component was subsumed into the Water Quality component as was the management of the Pollution Loading (non-point sources of pollution) sub-component. As a result, the component became large and unwieldy. It was functionally oriented towards research while its mandate included management of both point and non-point pollution sources. These changes were largely a reorganization of the components and did not translate into a restructuring of the project with different objectives or sub-objectives. The final list of components and sub-components in Tanzania at the end of the project, with major changes indicated, is listed in Section 10, table 1.

3.5 Quality at Entry:

Moderately Satisfactory. LVEMP charted new ground both in the countries and in the Bank. It was a regional project addressing transboundary concerns during a time when little regional cooperation existed between the riparian countries and few regional instruments and institutions were available. The project design was consistent with CAS and country developmental priorities and the preparation was highly consultative. The SAR presents a fairly clear design that is technically sound and describes the path of the overall program. Importantly, its approach was based on the Lake Basin ecosystem perspective and it included the main thematic areas addressing the key environmental issues afflicting the Lake. This helped lay the basis for the subsequent development of a common vision for the management of the transboundary resource. The first phase emphasized research and collection of data. Critics have argued that greater weight should have been accorded, even in the first phase, to creation of environmental management tools and their application in management that would have achieved a measurable change in the environmental indicators of the lake. Those who hold this view recognize the required sequencing; i.e., that knowledge has to precede decisions based on the knowledge, but they argue that more use should have been made of the knowledge. The design was weak in specifying appropriate strategies for translation of data into relevant information and outputs usable for operational management and solutions for the lake as a whole.

The design was optimistic in scope, with a large number of components and requiring coordination between a variety of institutions in each country and between and among countries. The plethora of implementing agencies and activities resulted in complicated budgeting and accounting systems. Capacity to implement was weak, and enhancement of capacity was one of the objectives of the program. Full attainment of objectives would have required not only competent implementation of each of the components in each country, but also regular sharing of findings among components both within and among countries. The structure established (national coordinators and a regional secretariat) was too weak initially to perform adequately, and the shared strategic focus took a long time to emerge. The project did not include a

technical policy and steering committee at the national level specifically mandated to monitor progress on technical issues and ensure coordination among the participating ministries and institutes. The design did not include a logframe because that was not customary at the time. The project very much needed an alternative to the log frame; i.e., a practical guide to action and clarity on the results expected. Key performance indicators were established late in the implementation (in 2004) during an attempt to retrofit a log-frame.

On several relevant dimensions of project design; i.e., consistency of the objectives with the CAS, technical coverage and priorities, and consultation with relevant stakeholders, the design was very strong. On the critical dimension of readiness for implementation it was weak, and this weakness was costly for the performance of the project. Nevertheless, changes introduced at the MTR allowed implementation to accelerate within the components and funds to flow. The changes did not entail a major restructuring of the project or revision of the initial design, and the project was after the MTR largely able to make up for lost time. Because a number of dimensions of design were strong and the deficiency in readiness for implementation was remedied at the MTR, the quality at entry is assessed as being satisfactory, but moderately so.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

The overall implementation performance (outputs) was **Satisfactory**, and the achievement of the development objectives (outcomes) was **Moderately Satisfactory**.

This evaluation assesses the project's performance against the objectives for the first phase:

Provide the necessary information to improve management of the lake ecosystem

The project supported many knowledge-building activities that advanced the understanding of the Lake Ecosystem, particularly in the areas of biodiversity of fish (establishing a baseline), levels and sources of pollution, fish stocks, and hydrology. Great emphasis was placed on data collection and less on analysis, collation and dissemination, although a substantial body of work was taken to the stage suitable for publication. Because the scientific challenge is enormous and ongoing, many findings are provisional. Among the most important that were not known at the outset of the project are the following:

- Biodiversity of fish has declined, but many species thought to be extinct in the watershed are in fact present in refugia in satellite lakes.
- A sustainable catch of Nile Perch is probably within the range of 220,000 tons annually (trawl surveys) to 350,000 tons annually (acoustic survey).
- Point sources of pollution are important locally and have effects on public health, but are not the largest sources of phosphorus and nitrogen exacerbating eutrophication of the lake.
- Eutrophication is primarily due to nitrogen and phosphorus from atmospheric deposition, although the relative contribution of the catchment to it is yet unknown.
- The lake level has varied significantly over time and is highly sensitive to small changes in the balance of inflows and outflows.
- Constructed wetlands can be effective measures to enhance the contribution that natural wetlands make toward water quality.
- Water hyacinth can be effectively contained in the lake through biological control (weevils), but weevils are less effective in the rivers that flow into the lake.

Establish mechanisms of cooperative management by the three countries

The three countries made considerable progress in advancing the regional perspective in both planning and

implementation. The Lake Victoria Fisheries Organization was operationalized, although it requires strengthening. Fisheries sector frameworks were harmonized and regional information exchange was strengthened. Regional synthesis reports were prepared and experiences on catchment management were shared. During the course of implementation of the project, the East African Community (EAC) was re-established and recognized coordination of activities in Lake Victoria as among its priorities. Although the role of the EAC was not foreseen during preparation of the project and required some adjustment in understanding of responsibilities, it has been an important breakthrough in facilitating shared management. The EAC passed the Lake Victoria Protocol and, with its ratification by member states in November 2004, created the Lake Victoria Basin Commission (LVBC) to be based in Kisumu. Subsequently, a common Lake Victoria Vision was developed by the partner states with extensive consultation at the community level. Through the EAC and Lake Victoria Basin Commission, it is expected that the riparian states will be in a much stronger position in the future to act on the enhanced knowledge about the lake by agreeing on common enforcement of standards and regulations, some of which are now on the books but unevenly enforced.

Identify and demonstrate practical, self-sustaining remedies

The project contributed significantly in establishing and strengthening co-management of natural resources. The participatory approach combined with micro-projects proved to be successful and cost-effective while increasing local livelihoods and empowering communities. Lessons learned were relatively well captured in reports. Many of the microprojects remain active without incremental funding. Not all of the micro projects selected by communities had direct relevance to the environmental agenda of the project, but a broad menu including service delivery was foreseen in the SAR. Water hyacinth infestation was reduced to non-nuisance levels through introduction of the weevils, and the symbiotic relationship between the insect and plant populations provides biological sustainability; i.e., when the hyacinth expands, the weevil population grows to bring it back into check. Work of the fish quality laboratory resulted in lifting of the temporary EU ban on import of fish from the lake, and the quality laboratory remains functioning. Better land management in the catchment and wetlands contributed to the reduction of silt and pollution entering the lake but could have benefited from improved targeting through stronger links with relevant ongoing research. The pilots and investments under the industrial and municipal effluent management, however, were problematical. A pilot to test an artificial wetland for municipal treat of effluents at Butuja was constructed, but could not be fully tested due to delayed completion of the waste water treatment plant at Mwanza, which was operationally linked to the pilot. The lessons could not therefore be fully absorbed or scaled up. Municipal and industrial treatment facilities planned with sources of funding outside the project were either delayed or deferred, and hence the interventions to address industrial and municipal pollution under the project were not successful. Untreated municipal and industrial waste continues to flow into the lake.

Building capacity for ecosystem management

Much activity in the project was oriented towards capacity building. Important experience was gained in scientific research and resource management, while technical skills were upgraded and the implementing institutions were equipped. Staff were trained in advanced degree courses (M.Sc. and Ph.D.) and others received on-the-job training and participated in short courses. Capacity building and awareness raising campaigns targeted local communities through a variety of instruments (use of local media, training days, workshops, study tours etc.) A Cleaner Production (CP) program was launched and provided useful lessons in industrial waste management. Capacity building efforts were uncoordinated and opportunistic, rather than based on a well-defined strategy addressing identified needs. Future efforts should be better targeted and impacts of capacity building should be assessed.

Tanzania was able to keep to a steady pace in implementation following changes made after the mid-term

review. The implementation, however, was weakly guided by a strategic orientation toward results and instead achieved sequential incremental progress. The lack of strategic focus impeded prioritization and fed insularity within the components. Activities under the project were weakly linked to the ongoing work of the relevant ministries. Lack of emphasis on cost effectiveness, efficiency, and consistent quality assurance reflected weakness in technical and administrative management. This was a fully blended IDA/GEF project, with shared objectives for both sources of funding. One particular focus of the GEF support was the elaboration of a strategic framework for a large program of investment, particularly on municipal waste management and soil conservation that has not resulted to date, although substantial investment was not foreseen in this phase of the project. The project's lack of success in addressing direct pollution from point sources diminished achievement of goals for water quality. Despite some diminution in accomplishments due to difficulties in implementation, the project is judged to be satisfactory in meeting outputs, and marginally satisfactory in meeting objectives stated for the first phase.

Please see Annex 8 for a Summary of Regional and Transboundary Related Issues.

4.2 Outputs by components:

Please see Figures 1 and 2 in Annex 9 for the Timeline of the Project and Overall Project Structure. Also please see section 10 for details on component objectives, as conceived in the SAR, and outputs.

The following section summarizes the various component outputs. The big components were fisheries, water quality monitoring (including industrial and municipal waste management) and water hyacinth Control.

Fisheries Management

Satisfactory. Support to co-management has improved fisheries management structures or Beach Management Units (BMUs) with local communities being active in revenue collection and in curbing use of illegal fishing equipment, reducing the cost of fisheries enforcement activities to the Government. The component achieved notable success in harmonizing the fisheries legislative and regulatory frameworks among the three countries. Fisheries management has contributed to major sector policies including the new Fisheries Act (2003), and related regulations. Agreement among the riparian countries on sustainable catch, particularly for Nile Perch, and mechanisms to enforce it will form part of the core agenda for the second phase.

Fisheries Research

Marginally Satisfactory. A fish biodiversity and biology baseline was established. A key finding was the discovery of species, thought to be extinct in Lake Victoria, in the satellite lakes. The component suffered from inadequate prioritization and targeting of research efforts. Various outputs were completed but they did not translate into specific strategies or plans (for instance, a strategy for biodiversity conservation the in satellite lakes). Information was poorly accessible and some key reports and books remain to be published. There was also a lack of systematic effort to disseminate key research results in an accessible form to communities through the fisheries management structures.

Water Quality and Ecosystem Management

Marginally Unsatisfactory. The component's activities resulted in increased knowledge of water quality, hydrodynamics, primary sources of nutrients, and factors contributing to water hyacinth occurrence. The main water quality characteristics of the lake have been established. A monitoring network was established, which helped identify the chief source of pollution in the Lake, viz. atmospheric deposition. Various inventories related to pollution were developed but are not linked to management plans. The merged component (including Water Quality, Industrial and Municipal Waste Management, and Management of

Pollution Loading) became overly focused on data collection with inadequate emphasis on identifying actions to address the critical pollution problems in the lake. The activities in tertiary treatment of effluents (primarily constructed wetlands) were not successful and the planned upgrade of the wastewater treatment in Bukoba and Mwanza did not result. Although some progress was made on developing modeling tools (calibrated hydrodynamic module of the Lake Victoria Water Model and Water Quality and Water Hyacinth modules), the introduction of comprehensive lake modeling presented a challenge exceeding existing capacity, and has been only partially accomplished.

Water Hyacinth Control

Highly Satisfactory. The component sought to enhance capacity to control hyacinth, but once a workable solution was identified, moved beyond the more modest initial objective to apply the knowledge. There has been a remarkable decrease (85 percent) in the water hyacinth infestation in the Lake, which is down to non-nuisance levels**.**

Wetlands Management

Marginally Satisfactory. Weak capacity and the lack of clear understanding of the objectives of the component constrained implementation. A baseline on the majority of the wetlands was established, with many scientific outputs, and pilot activities involving communities were conducted to demonstrate the sustainable use of wetland products. The data collected on the wetlands buffering capacity was not used for modeling as planned, as the knowledge gained on the chosen model was very limited. The information gained through the training and studies was not fully transferred to the parent ministry, indicating weak mainstreaming.

Integrated Soil and Water Conservation

Satisfactory. Despite the relatively small size of this component, much was achieved in the course of its implementation. The project facilitated gathering of baseline information and contributed to community awareness on appropriate environmental conservation and the development of land use plans. A survey and mapping of present land use/cover and soil erosion hazard was done. The micro-catchment approach, based on village action plans, was used while emphasizing the individual resource user's needs in developing activities for soil and water conservation. It was shown that sustainable management of land contributes significantly to raising production (by 100 percent in maize and close to 200 percent in paddy, per ha), but adoption rates are low primarily due the high initial costs and uncertainty of benefits, the latter due in part to insufficient awareness on the part of farmers.

Catchment Afforestation

Satisfactory. The component successfully relied on approaches to conserve in-situ forest areas and establishment of commercial nurseries for promoting on-farm afforestation, with a high survival rate (79 percent) through collaboration with communities. Significant outputs resulted, even though the activities were affected by the drought. The component also implemented a strategy for phasing out of the subsidy initially associated with the seedling scheme, which has had a positive impact on the sustainability of the established nurseries. Local benefits (reduction of wild fires and improvements in water quality) have been observed and noted by the beneficiaries.

Capacity Building - Support to University of Dar es Salaam, Faculty of Aquatic Sciences

Satisfactory. The component helped establish the Faculty of Aquatic Sciences, improving facilities for research, supporting a stronger research agenda on Lake Victoria, and increasing the capacity of its staff and students. Two new degree programs for undergraduates were developed and delivered.

Institutional Framework - Support to Regional and National Secretariat

Marginally Satisfactory. The regional secretary, responsible to coordinating the Regional Policy Steering Committee (RPSC) meetings and other regional activities, was also the national secretary, and divided his attention between these responsibilities. The secretary's dual functions limited his attention to each of the areas of responsibility. Nonetheless, implementation in Tanzania followed a smoother path than in the other two countries, despite some delays in accountability, flow of funds, and procurement. The secretariat was based in Dar es Salaam, while the activities of the project were ongoing in Mwanza, and this created challenges in communication and management. The secretariat was closed at the end of the project because the institutional structure agreed upon for the future does not require the regional secretariat. The ICR mission had difficulty attaining information that should have been available through the secretariat, raising questions about the quality of the handover.

Micro-Projects and Community Participation.

Highly Satisfactory. The activities led to increased capacity in the communities, enabling them to improve resource management, with many positive environmental externalities as well as contributing to improved livelihoods. The project targeted service delivery among the Lake basin communities by implementing a range of demand driven projects in health, water, education, sanitation, access roads, afforestation and fisheries sectors. Micro-projects provided strong incentives for communities to interact and implement a range of solutions. A total of 90 projects were initiated out of which 85 were operating as project closure.

4.3 Net Present Value/Economic rate of return:

An ERR was not estimated in the SAR, as is often the practice in projects emphasizing capacity strengthening and institutional reform. The section aims to provide some indicative socio-economic data and a discussion of the observed benefits, corresponding to the potential benefits noted in the SAR.

Among the gross benefits expected in the SAR were avoided losses related to decline in fishery as a result of over-fishing and deterioration in water quality, impacts of water hyacinth infestation, poor quality of water supply for domestic and animal uses, and continued degradation of wetlands.

Fisheries contribute about three percent of the GDP of the riparian countries. Fish harvest for the whole lake is currently estimated to be between 400,000 to 600,000 metric tons (all species) worth USD 400 to 600 millions annually. Estimations of gross employment in this sector range from 500,000 people in Tanzania (Odongkara *et al.*, 2005) including fishers, fish traders, and fish processors and net menders, to about 2.6 million people (National Fisheries Synthesis Report). The fishery export is currently it is estimated at USD 270 million. The total cumulative exports of Nile perch fish and fishery products from Lake Victoria for the last nine years (1995 to 2004) was about 320,000 tons valued at USD 704 million (F.O.B value) of which the Fisheries Division received at total of USD 32.94 million as royalty.

There was a decline in values received from exports due to the import bans imposed by European markets in 1999 and 2002 because of concerns that fish and fishery products were contaminated by pesticides and that overfishing would be exacerbated by the implementation of slot size 50-85 cm in the fish processing plants, respectively. While the ban was in effect, exports were directed to markets with lower prices than in the EU. The project helped implement various management measures and improve quality assurance to address these issues. A rough estimation of the avoided loss, in the period 2000-2005, due to the lifting of the bans is about ***24 million***, while the cost of upgrading the fish quality laboratory was in the range of USD 500,000 and the entire fisheries management component (during the life of the project) was USD 16.3 million.

Domestic consumption estimates vary considerably from a likely USD 100 million to as much as USD 600

million per annum. Fish prices have been stable during the period of late nineties and early 2000's at around one dollar per kilo. FAO data from the period 1978-01 indicate that contribution of fish protein to the Tanzanian population has remained stable since in the 1990's and early 2000's, at the level observed in 1979, after an increasing rate in the 1980s.

Data have not been collected for a sufficient time to estimate definitively the Maximum Sustainable Yield (MSY) for various species and there remain disagreements between Tanzania and Kenya on the one hand, and Uganda, on the other, regarding these estimates. The Tanzanian National Fisheries Synthesis Report estimates MSY for Nile Perch for the Lake to be about 348,184 tons from the acoustic survey and 220,000 tons from the trawl surveys (1999 – 2002 surveys).

The SAR estimated that the wide-range of direct costs on the lake community as a result of the spread of water hyacinth, including those arising from transportation (delays in transport, increased operation costs, loss in fishing time, increased difficulty collecting water, blockage of intakes and loss of production at urban and industrial water supply systems), to about USD 6-10 million per annum. The water hyacinth infestation has been reduced to non-nuisance levels. Indicative avoided costs range between more than **25-40 million** in the period 2000-2005 for the whole Lake**.** The cost of the water hyacinth control activities was **10 million** over the life of the project. (Please see Annex 3)

4.4 Financial rate of return:

The financial rate of return was not estimated in the SAR.

4.5 Institutional development impact:

The overall rating for institutional development impact is **substantial**.

Institutional development was one of the objectives of the project and nearly all the components' activities contributed to it. Significant achievements included the shift in fisheries management towards co-management and a rich experience gained in community based management in the catchment. BMUs and community common interest groups (CIGs) were established providing effective service delivery as well as promoting community participation and empowerment. Fisheries regulatory and policy frameworks were strengthened and harmonized across three countries, although enforcement remains a challenge for the future. The project helped the countries in handling the EU ban on fish exports due to quality concerns by strengthening the quality assurance processes. The project contributed to reducing the significant capacity gaps through training; e.g., 3 PhDs and 25 M.Sc. both locally and abroad in a wide range of disciplines including fisheries science, environmental management, and information systems among others. Numerous others were trained on-the-job and through short courses. Better trained personnel contributed toward stronger institutions. The Lake Victoria Fisheries Organization was created. When the EAC was re-established and became active in the Lake Victoria program, the activities under the project helped in formulation of the Lake Victoria Protocol and subsequent creation of the Lake Victoria Basin Commission.

The impact of the institutional development could have been greater had the training been undertaken in a more strategic and focused way, and the activities supported under the project integrated more effectively and at an earlier stage into the day to day work of the relevant ministries. For component specific details, please see section 10.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

Key factors influencing implementation include: (i) Uneven performance of the other two partners and

limited ability to influence that performance. Progress in Kenya was stalled first by problems with flows of funds and subsequently by a level of performance insufficient to justify extension of the IDA credit. Approval of Uganda's supplemental credit was stalled in Parliament for approximately one year. Activities that required shared funding; e.g., synchronized collection of data, suffered from the varying pace of implementation among the partners. (ii) The falling lake level, by over two meters since 2003, was caused partly by the prolonged drought and partly due to over-abstraction of water for hydro-power generation by one of the partner countries. The falling level had serious impacts on the fisheries and wetlands. Assets of the BMU's (fences, jetties etc) were no longer usable and the spawning grounds were affected. Many wetlands are threatened. The overall ecological and economic impact of this issue has not been estimated but is considered to be large. The project provided a forum for the partners to recognize and begin to address the declining lake level, but avoidance of the decline was not within the control of the Tanzanian government or implementing agency. (iii) The drought also affected implementation of catchment based activities in the soil and water conservation and catchment afforestation components. (iv) The ban on fisheries due to fish quality concerns by the EU, the main market for the commercial Nile Perch, led to additional focus on quality assurance. The ban was occasioned by a concern that was outside the control of the government or implementing agency. The efforts by the project to strengthen quality assurance resulted in the ban being lifted.

5.2 Factors generally subject to government control:

Given the scale of this project in terms of the number of implementing agencies, both management and mainstreaming were concerns. The lack of a national policy and technical steering committee or closer oversight by senior representatives of the implementation agencies impeded prioritization, strategic focus, and coordination. The lack of a distinct pathway for feeding the outputs and results of the project into the mainstream functioning of the implementing agency(ies) was significant and could have been remedied. For example, work on the tertiary municipal waste treatment pilot did not result in plans for scale-up by local governments of the riparian districts (or even the maintenance of that pilot for demonstration). Factors subject to governmental control acted on the positive side of implementation, as well as the negative. Cooperation between the three countries, with free inter-country movement of project implementation staff facilitated the harmonization achieved by the project and enhanced its regional status. The revival of the East African Community (EAC) and the creation of the LVBC cemented the regional linkages, and these outcomes were clearly due to efforts by the riparian governments.

5.3 Factors generally subject to implementing agency control:

Two and half years were required to establish, equip and staff the project. This long start-up period cut into the time for implementation and necessitated a refocusing and narrowing of the project activities. Indicators and targets were not clearly specified, with the result that tracking of progress became ad-hoc and subjective. No explicit mechanism was put in place to ensure that the results from the project were mainstreamed into the long-term plans of the respective agencies. Project coordinators represented the mainline agencies but the degree of their interaction and communication with project staff varied considerably across components. Delays in accountability of funds were a universal problem that continued throughout the project. While the project called for an integrated approach, the various components established only weak linkages and operated largely within their own spheres. Fiduciary aspects were in general effective. With sufficient prescience on the part of the implementing agencies, these factors could have been remedied and would have much strengthened the success of the project.

5.4 Costs and financing:

The appraisal estimated project cost for Tanzania was USD 22.6 million, with external financing, including an IDA credit of USD 10.1 million and a GEF grant of USD 10.3 million for the initial period of 1997-2002. Two supplementary credits were approved, one for USD 5.0 million in 2001 and the second

one for USD 3.5 million in 2004 bringing the total IDA credits to USD 18.6 million. Supplemental financing was justified by the need to coordinate the timing of ongoing project activities with that of the other two partner countries (The slower pace of implementation and disbursement in Kenya and Uganda resulted residual credit amounts in those countries at the point when Tanzania had expended all the initial resources). Actual Expenditure at the close of the project in December 2005 was USD 30.4 million. As work programs within components were revised, resources were reallocated between and among them. For example, the secretariat was originally budgeted for about 5 percent of the cost, and ultimately absorbed around 15 percent of funds. Please see tables in Annex 2.

6. Sustainability

6.1 Rationale for sustainability rating:

Moderately Likely. In assessing sustainability of the project, the ICR team has proceeded with an understanding that much of the investment falls into the category of public goods and services with an ongoing and appropriate role for public expenditure. Sustainability under these circumstances requires evidence of continued commitment by government to allocate the needed public funds, an institutional foundation to assure that activities that warrant continuation will be carried on, and public awareness sufficient to secure continued public support through the electoral process. In this context the first phase interventions are likely to be sustainable due to the following:

Financial sustainability - The Government has made a commitment within the Medium Term Expenditure Framework (MTEF) to include activities initiated under the project in the budget projections and programs for its mainline agencies. The Government has further indicated under the consolidated Tanzania Joint Assistance Strategy supported by a consortium of partners that Lake Victoria will receive support. Tanzania's external assistance is increasingly "on budget," i.e., reflected in the MTEF, and treatment of activities in Lake Victoria in this way signals continued commitment. Further, the Government has committed USD 1 million as its contribution to the Bridging Phase to continue core activities from the first phase prior to the period when the second phase of external funding becomes available. Policy and decision-makers increasingly support the integrated management of the lake testifying to the recognition of the public importance of the longer-term program. The shift from the financial basis of the first phase (largely project-based and not fully included in the MTEF) to that of the second phase will entail careful assessment of which activities to continue, which to expand, and which to wind down. That assessment is not yet complete, and when it is, not all activities will be retained. Nonetheless, a strong basis for financial sustainability of the overall program is in place within the budgetary framework and agreed modes of external assistance to Tanzania.

Institutional sustainability - The project enhanced institutions and generated momentum towards an integrated approach for the management of Lake Victoria and its catchment. Political commitment has been increased through information and creation of awareness among a wide section of stakeholders. The participatory approach and co-management of resources followed by the project, while time consuming to establish, contribute to sustainable results, especially when combined with adequate regulatory and monitoring mechanisms. The strong move towards regional cooperation will help strengthen planning and joint management activities. The Lake Victoria Fisheries Organization is in place and functioning, although it needs strengthening. A decision has been taken to form a comparable organization for water, both quality and level. The Lake Victoria Protocol is ratified by the three riparian states. The EAC has formed the Lake Victoria Basin Commission to serve as a coordinating body. Finally, Rwanda and Burundi, two partners minimally active in the first phase but important for the maintenance of the watershed, have actively sought to join the second phase and are clarifying their relations with the EAC. Because of the increased visibility of the Lake Victoria agenda and its enhanced recognition within the governmental

bodies of the riparian states, the difficulty experience in the first phase of embedding activities in the main ministries will be less problematical in the future. Each of the countries has designated lead ministries, and the "projectized" structure of the first phase will be disbanded and/or integrated into the relevant agencies. For these reasons the outlook for institutional sustainability is good. Internal quality control and management processes (particularly for research) must be strengthened to enhance relevance and assure that the activities mainstreamed into the institutional structure are in fact delivering the needed results.

Environmental sustainability - Achievement of significant positive environmental outcomes in Lake Victoria is a long term process, and the project was appropriately modest in its ambitions in this regard. It did, however, affect, on a limited scale, the inflows caused by erosion through its soil and water and afforestation activities. The project's contribution to reducing effluents through its planned priority investment activities in tertiary treatment was negligible. Continued over-exploitation of fisheries remains a concern, since the present offtake of Nile Perch is not within the range of catch estimated provisionally to be sustainable. The decline in the level of the lake during the first phase confirms the vulnerability of the level to changes in abstraction and precipitation. The research and consultative mechanism put in place under the project contributed toward actions that have drawn attention to the over-abstraction, but it remains to be seen whether further and possibly irreversible damage will be avoided. The lake is presently rising as the rainy season ends, but the longer term prospect is not yet clear. The current status of the fish stock, water quality, and the level of the lake confirm the need for clearly specified environmental indicators in the second phase and agreed and enforceable mechanisms to achieve the indicators. Furthermore, environmental assessment of the micro-projects should be enhanced and built into the environmental capacity of the local governments in the watershed.

For component specific details, please see Section 10.

6.2 Transition arrangement to regular operations:

LVEMP 1 was planned and implemented as the first phase of a long-term program, intending to develop the knowledge base and capacity allowing for subsequent actions in the second phase. Extensions of the first phase (due to the varying implementation pace among the three countries) and the delays in start-up of the preparations for the expected next phase resulted in a funding gap for one and half years. This period, called the Bridging Phase, is being supported by EU and Sida. Due to the decrease in the level of funding, the scale of intervention has been reduced to core LVEMP1 activities allowing a continued momentum to be maintained till the next phase comes online. The bridging phase is required because the second phase is not a linear continuation of the activities and structures of the first, but rather an evolution reflecting the increased role of the EAC, inclusion of Rwanda and Burundi as new partners, integration of activities into governmental structures of the riparian countries, and shift in emphasis toward management and development of the lake's resources (with continuation of the scientific activities of the first phase). The planned second phase is intended to contribute to the achievement of the regional (EAC) Lake Victoria Development Vision of having: “a prosperous population living in a healthy and sustainably managed environment providing equitable opportunities and benefits to the riparian communities.” Its provisional development objectives are to: (i) Strengthen regional and national institutions for coordination of sustainable management of the transboundary Lake Victoria basin resources; (ii) Facilitate environmentally friendly investments in the Lake Victoria Basin; and (iii) Enhance conservation of biodiversity and genetic resources of targeted fish species. The second phase will draw on the lessons learned from the implementation of the first phase and is likely to focus on four main areas: (i) Building the information base for governance and growth; (ii) Strengthening governance of transboundary natural resources; (iii) Enhancing sustainable economic growth; and (iv) Raising public awareness through education and communication. The project costs are expected to be financed by IDA credits, bilateral donors, and borrowers' counterpart funds. Possible GEF support will be dependent on availability of funding under

GEF4 and on completion of the ongoing Regional Transboundary Diagnostic Analysis (TDA) and the Strategic Action Plan (SAP), likely to be completed in November 2006.

7. Bank and Borrower Performance

Bank

7.1 Lending:

Moderately Satisfactory. Identification of the project began in 1992 but preparation began in earnest in August 1994. The Bank helped the three riparian states embark on the first major regional project contributing in part to the renewed EAC cooperation later. The Bank promoted a comprehensive approach to the lake's problems and encouraged community participation and community based activities, gender mainstreaming and stakeholder consultations at a time when the local experience to date had been neither participatory nor inclusive. The Bank's team facilitated a path between the multiple competing views of the problems and the variety of objectives/perspectives for the project evinced by the numerous stakeholders. As noted by the then task team leader, 'almost everything in the project was a carefully crafted compromise.' Given this context, preparation was done in a highly participatory and consultative way. Some of the tensions between the varying views, however, were not fully resolved and were reflected in the implementation of the project. Preparation missions were sufficient but did not fully anticipate or address the lack of capacity and weaknesses in operational management. The project design was strong on conceptual and technical merits but it was not translated by the countries into appropriate institutional set-ups for implementation. Weaknesses in prior planning (especially of financial management and procurement) translated into an effective delay of two and half years. The preparation team appears to have been overly optimistic about the capacity of the implementing agencies to perform. Because the project predated the substantial decentralization of staff and responsibility to the field, the weakness may have been hard for Washington-based staff to observe. Bank preparation missions in 1995 noted that the secretariats were up and running in the three countries, but the early pace of implementation demonstrated that they were operating with severe limitations. The changes introduced at the MTR allowed implementation to accelerate and much of the ground lost was recovered. Given the elements of preparation that were strong and the subsequent correction of those that were weak, the overall assessment of lending is moderately satisfactory.

7.2 Supervision:

Moderately Satisfactory. The chronology of the supervision record shows considerable variation both over time in staffing, approach, and focus. Investment of Bank resources in supervision was considerably greater than in preparation, but still showed an underestimate of the time and resources needed to supervise a regional project of this size. Missions were conducted annually (mostly in the beginning of the project) and semi-annually (mostly during the last years of the project). The supervision teams included specialists, staff and consultants, with different areas of expertise (fisheries, watershed management, institutions etc.). The missions included variously, in addition to the core teams, donor representatives, regional scientific experts and project staff from other riparian states as observers. In the first two years supervision attention was aimed at operationalising the project. Subsequently, and following changes in the implementing arrangements, close supervision and intensive technical support led to rapid disbursements and progress in the various component activities. The Bank assisted greatly in the overhaul of the components, matching them to the institutional structure. It also helped untangle many of the structural issues that had derailed financial and procurement processes (freeze in counterpart funding, tangled procurement). A strong but belated exercise to retrofit a logframe and monitoring indicators was undertaken in 2004 as a result of the stocktaking exercise, conducted in 2003. The subsequent approach of the team was to guide the project in collating the results of the research into specific concrete outputs, resulting in the production of regional and national reports on synthesis and lessons learned.

Successful support for implementation of this challenging project required a team able to focus simultaneously on the big picture and on detail, and the Bank was not consistently able to assure both perspectives. Team leadership changed five teams, and the changes brought varying professional backgrounds and skills. The supervision record indicates significant differences in the framework and approach towards both technical issues and supervision styles by the various teams. This resulted in lack of consistency in the realism of supervision ratings and some gaps in the hand-overs. The teams worked intensively and conscientiously, and contributed toward the realized accomplishment of the project's objectives. The team was, however, not fully able to compensate for relatively weak managerial capacity within the implementing agencies, nor for the absence of a clear focus on strategic objectives and indicators.

7.3 Overall Bank performance:

Overall, the Bank performance is **Moderately Satisfactory**, based on the above assessments. This is consistent with the assessments conducted by the stocktaking exercise, QAG (for supervision of the linked project in Uganda) and IEG (evaluation of the World Bank's Support for regional programs), which found the Bank's performance overall to be satisfactory.

Borrower

7.4 Preparation:

Moderately Satisfactory. The Governments of the three partner states displayed ownership and commitment to the visioning and planning of the project. The SAR was based on project planning documents prepared by each of the countries. The three countries addressed the lack of regional mechanisms needed to implement a transboundary intervention by signing the Tripartite Agreement of 1994 that supported cross-country cooperation and advanced the development of regional frameworks. Structural impediments to implementation, including coordination, capacity, and challenges regarding resource management were not adequately recognized and addressed. Preparation did not put in place management structures that could provide strategic oversight and monitor and guide component activities. This was critical, given the lack of a detailed log-frame, and contributed significantly to the fragmentation of project activities. Significant weaknesses in pre-implementation operational planning, particularly related to disbursements, procurement and institutional coordination, resulted in a lack of readiness for implementation. These shortcomings were largely remedied with the changes in the MTR, as noted above. The same reasoning that pertains to the assessment of the Bank's performance in preparation is operative for the borrower's performance, and the overall assessment is moderately satisfactory.

7.5 Government implementation performance:

Satisfactory. There was a general recognition of the importance of and considerable support for the project activities. The sector policies for fisheries have been directly strengthened through the harmonization of fisheries legislation and policy frameworks among the three countries. The national policy frameworks were strengthened considerably during this period by the Land and Village Land (1999), Water (2002), Forest (supporting joint management of resources, 2004) and Environment (instituting effluent standards and defining roles for environmental management, 2004) Acts. Tanzania also was the only country to have implemented a fish levy (collected by some of the BMUs) at the rate of six percent. The relatively effective disbursement and procurement processes following the MTR facilitated implementation. There was a considerable initial delay in start-up, a result of delays in staffing the secretariat and various component teams, and a reliance on contracted staff. The links between the component teams and the mainline agencies could have been strengthened to allow absorption of scientific information and translation into guidelines or policy messages.

7.6 Implementing Agency:

Moderately Satisfactory. There were seven main institutions/ministries, involved as primary implementing agencies in the projects in Tanzania. The pace of implementation was smoother and more consistent than in the two other partner states. The secretariat and many of the component leaders (implementing agency representatives) were based in Dar es Salaam, while project activities operated out of Mwanza, with a small coordination office there, resulting in challenges in communication. Further, the secretary divided his time between regional and national coordination, with lesser attention to the former. There was considerable variation in the intensity of supervision/coordination by the various component leaders with the result that on-site team leaders, some of whom were contracted, largely managed their own component activities. Although the project suffered from lack of strategic focus as noted above, the implementing agencies in Tanzania were able to maintain a steady pace of activity and flow of funds after the organizational changes during the mid-term review. The performance of the implementing agencies in Tanzania was better than that in the other two countries. Given the interlinkage of the projects, the relatively good performance of Tanzania provided an important managerial externality that shored up the regional effort when the other partners intermittently faltered.

7.7 Overall Borrower performance:

Moderately Satisfactory. Overall, while the performance of the Government could have been enhanced through better oversight of the implementation, the long-term support to the program by Government and the progress in transboundary coordination and management are noted. The performance of the implementing agencies in Tanzania was sufficient to keep activities flowing there and to have positive spillover effects on the partners. For this reason the performance of the borrower overall is rated satisfactory, although moderately so.

8. Lessons Learned

LVEMP1 provided rich experience and lessons derived from successes and disappointments in implementation. Given the longer-term program for management of Lake Victoria, these lesson are particularly relevant.

As is fitting for a project supporting acquisition of knowledge, many of the lessons learned are technical in nature.

Among the most important that were not known at the outset of the project are the following:

- Biodiversity of fish has declined, but many species thought to be extinct in the watershed are in fact present in refugia in satellite lakes.
- A sustainable catch of Nile Perch is probably within the range of 220,000 tons annually (trawl surveys) to 350,000 tons annually (acoustic survey).
- Point sources of pollution are important locally and have effects on public health, but are not the largest sources of phosphorus and nitrogen exacerbating eutrophication of the lake.
- Eutrophication is primarily due to nitrogen and phosphorus from atmospheric deposition, although the relative contribution of the catchment to it is yet unknown.
- The lake level has varied significantly over time and is highly sensitive to small changes in the balance of inflows and outflows.
- Constructed wetlands can be effective measures to enhance the contribution that natural wetlands make toward water quality.
- Water hyacinth can be effectively contained in the lake through biological control (weevils), but weevils are less effective in the rivers that flow into the lake.

Interlinked national projects are vulnerable to failure of one of the partners, and must build in peer

review and assistance, and safeguards in the event that these fail.
The inability to extend the IDA credit in Kenya was a serious problem for both of the other projects and for the regional effort overall. Partners should agree at the design phase to be mutually accountable for performance and mutually supportive when problems arise, so that they can be spotted and remedied early.

Scientific research must be targeted, provide usable information for management decisions and be widely accessible.
Given the resource constraints and urgency of the need better to manage the lake, the monitoring and research undertaken should be targeted, applied, and framed with cognizance of the necessary and sufficient levels of information needed for management. The research should be managed efficiently, bringing in innovative mechanisms such as competitive grants, and subject to peer review for quality control. Outputs from monitoring and research should be widely shared.

Regional projects necessitate greater emphasis on clarity of project objectives, monitorable frameworks, at multiple levels, and adequate mechanisms for governance.
Given the need for regional partners to stay in step with each other, clear objectives, indicators and targets help focus efforts towards results. Coordination and sharing of information are important, but real improvement in the state of the lake will require a mutually agreed set of standards linked to recognized indicators and enforced through agreed mechanisms including both incentives and sanctions. Establishment of such mechanisms is the core agenda of the second phase, drawing on knowledge created during the first and the initial experience with creation of institutions for governance. For instance, the weak motivation for prioritizing waste water treatment pilots resulted from lack of regulations and/or enforcement.

The Basin perspective is critical to address the key environmental issues of Lake Victoria.
The initial focus of the program was on the Lake itself, particularly on fisheries (with 41 percent of allocated resources). The key scientific results underscore the importance of interventions at the Basin level in order to address the problems of the Lake. For instance, the important finding resulting from water quality monitoring indicates that atmospheric deposition accounts for the bulk of pollution in the lake (and part of the deposition may originate outside the basin). Similarly, some water hyacinth originates upstream from the riparian countries (in Rwanda and Burundi).

Capacity building has to address both current and projected gaps.
The project started with varying capacities among the three countries necessitating a careful strategy for need-based and gap-filling capacity building at all relevant institutions (not just research bodies). While the project upgraded skills and equipped institutions it did not project needs and address future gaps. There were long employment freezes in these countries with implications for capacity resulting from generational transitions. The timeline and intensity of capacity building has to be better managed to avoid lack of personnel to implement and scale-up.

Implementation in the future can be undertaken through governmental structures.
The project relied on contracted staff and stand-alone PMUs for implementation. This was probably necessary at the time, but opened the door for insularity, some institutional jealousy regarding pay scales, and adverse incentives (e.g., high costs for workshops and travel allowances). Mainstreaming of implementation within governmental structures is now feasible and is a better approach for the future.

Environmental benefits must be strongly linked to improved livelihoods for local people and communities.
Community based micro-projects were highly successful and helped provide low-cost services on health, education, livelihoods related needs. They served as vehicles for raising awareness and capacity on

sustainable land management, public health and sanitation, gender, and HIV/AIDS. The BMUs, CBOs, CIGs and other community institutions helped empower local decision-making and lead to an increase in livelihood opportunities. This approach was found useful in building community buy-in for activities generating positive environmental externalities pertinent to the Lake's health. There is need for further attention to public health aspects (sanitation and HIV/AIDS), micro-credit access and the socio-economic impacts of increasing migration to the lakeshore.

Good education of the public and parliamentarians is critical for long term sustainability and success. Proper management of Lake Victoria will require a long term commitment of public funds and willingness of people living in the basin to change behaviors. Attainment of both requires relentless and sophisticated investment in public education.

9. Partner Comments

(a) Borrower/implementing agency:
Document shared. Comments to be received.

(b) Cofinanciers:
Document shared. Comments to be received.

(c) Other partners (NGOs/private sector):

10. Additional Information

Component Specific Details on Outputs, Institutional Development and Sustainability

Original Components as in the SAR

The joint SAR (June 1996) defined the following components (with the original total allocations, combined for the three countries, partly indicating the prioritization at the start of the project):

1) Fisheries Management (USD 2.28 million): The project supported the establishment of the Lake Victoria Fisheries Organization with facilities, assets, personnel and operational expenditures. The LVFO was expected to contribute to the improvement of fisheries management, conservation by collaborating with other lake related agencies, coordinating fisheries extension and disseminating information on Lake Victoria Fisheries.

2) Fisheries Research (USD 13.33 million): The program for fisheries research aimed to provide information on the ecology of the lake and its catchment, the biology of its flora and fauna, the impact of environmental factors on the lake system, and socioeconomic implications of use of the lake resources. The information was to contribute towards improved ecological efficiency, greater biodiversity, and ecological balance in the lake ecosystem. This component had *five* sub-components - a) Fish Biology and biodiversity conservation, b) Aquaculture, c) socioeconomic, d) database. Separately stock assessment was being conducted (financed by the EU). It was unclear why this was specified as a project sub-component and how this was to be coordinated with the remaining sub-components.

3) Fisheries Extension, Policies and Laws (USD 14.09 million): This component aimed at harmonizing legislation among the three countries, identifying and establishing closed fishing areas, strengthening enforcement capacity as well as supporting extension activities such as introducing new techniques, small scale aquaculture, strengthening information collection and promoting fishing community organizations. The component also aimed at supporting one fish quality control laboratory and micro-projects in selected fishing villages comprising of small investments in water supply, sanitation, access roads and health.

4) Fish Levy Trust (USD 2.03 million): This component aimed at studying and implementing a system for collecting levies from the fishing industry and using these funds in supporting fisheries and ecosystem management in the lake and its catchment.
5) Water Hyacinth Control (USD 8.31 million): The aim of this component was to establish sustainable long-term capacity for maintaining control of water hyacinth and other invasive weeds in the Lake Victoria.
6) Water Quality and Ecosystem Management (USD 9.6 million): The aim of the program was to elucidate the nature and dynamics of the lake ecosystem by providing detailed information on the characteristics of the waters of the lake. The program was to provide details of limnological changes, model and predict their short and long term consequences, and provide guidelines for ameliorating potentially disastrous changes. There was one core project, Management of Eutrophication, two pilots, Sedimentation and Hydraulic conditions and the Construction of a model of water circulation and quality in the lake, designed to help manage the problems.
7) Industrial and Municipal Waste Management (USD 9.89 million): The program aimed to improve management of industrial and municipal effluent and assess the contribution of urban run-off to lake pollution in order to design alleviation measures. It consisted of one core project, Management of Industrial and Municipal Effluents, and two pilots, Integrated Tertiary Municipal Effluent Treatment and Integrated Industrial Effluent Treatment and a component for Priority Waste Management Investments.
8) Land Use and Wetland Management (USD 14.1 million): This component consisted of two core projects, Management of pollution loading (addressing non-point sources of pollution) and Buffering capacity of Wetlands as well as four pilots - Assessment of the role of agro-chemicals in pollution, integrated soil and water conservation, sustainable use of wetland products, and afforestation. These activities were a combination of information generation studies and piloting/implementation of solution on-the-ground.
9) Institutional Framework (Support to Riparian Universities and the Coordinating Secretariat) (USD 3.98 million): The last component lumped together two sub-components that targeted capacity building, ie Support to the Riparian Universities for strengthening facilities for environmental analysis and graduate teaching, and project implementation, i.e., Maintaining Coordinating Secretariats. One activity, the preparation of a Pollution Disaster Contingency Plan was also included.

It is noted that Fisheries Extension (Component No. 3) included an allocation of USD 3 million towards micro-projects in fishing communities. Community Participation was a crosscutting issue from the beginning. These components combine for a national total external financing of USD 20.4 million and total project costs of USD 22.6 million for Tanzania.

Revised Components

The final list of components and sub-components in Tanzania as prevalent at the end of the project, with major changes indicated, is below:

No.	Component (Implementing Agency)	Sub-Components
1	**Fisheries Management** (Fisheries Division, Ministry of Natural Resources and Tourism)	a) Establishment of Fish Levy trust
		b) Fisheries Co-management
		c) Strengthening of Extension Services
		d) Statistical Data Collection and Frame Survey
2	**Fisheries Research** (Tanzania Fisheries Research Institute-TAFIRI, Ministry of Agriculture and Food Security)	a) Fish Biology and Biodiversity Conservation
		b) Aquaculture
		c) Socio-economics
		d) Information and data base
3	**Water Quality and Ecosystem Management** (Ministry of Water, previously also "and Livestock Development")	a) In-Lake Water Quality Monitoring/Eutrophication
		b) Industrial and Municipal Waste Management [1)]
		c) Management of Pollution Loading
4	**Water Hyacinth Control** (Ministry of Agriculture and Food Security)	
5	**Wetland Management** (National Environment Management Council-NEMC, under Vice President's Office)	a) Buffering Capacity of Lake Victoria Wetlands
		b) Sustainable Use of Wetlands and Wetland Products
6	**Soil and Water Conservation** (Ministry of Agriculture and Food Security)	a) Agrochemicals Management
		b) Soil and Water Conservation
7	**Catchment Afforestation** (Ministry of Natural Resources and Tourism)	
8	**Capacity Building/Support to Riparian Universities** (Faculty of Aquatic Sciences and Technology, University of Dar es Salaam)	
9	**Coordinating National Secretariat (Project management and coordination)** Vice-Presidents' Office	
10	**Micro Projects** (The National Secretariat)	

Components Objectives and Outputs

Fisheries Management

Objective: To improve overall management and protection of fisheries resources in lake Victoria by strengthening both national and regional institutional framework and promotion of conservation

measures.
Beach Management Units (BMUs) actively involved fishery communities in the management of fisheries, monitoring and data gathering, levy collection, enforcement of regulations and so on. The BMUs have not only been focusing on fisheries management and ensuring fish quality but have also provided an entry point into the communities for activities dealing with gender, hygiene and education, which was done primarily through micro projects. The bottom up approach has been successful and linked fisheries management closer to the daily users of the lake resources. The component achieved notable success in harmonizing the fisheries legislative and regulatory frameworks among the three countries. Fisheries management has contributed to major sector and macro policies including the fisheries policy and strategy statement (1997), National Environment Policy (1997) and the new Fisheries Act (2003) and related regulations. Key outputs include: establishment of 511 operational BMUs (15 of them collecting fish levies at the rate of 6 percent); 53 landing sites identified (of which 10 were provided with floating barges); reduction in post-harvest losses; steep decline in illegal fishing (mainly through community surveillance); increased observance of the closure periods; training conducted for fish farmers and extension workers on improved techniques and quality assurance; quality assurance capacity strengthened (6 % improvement of fish quality); biannual frame surveys conducted; and information materials made available in Kiswahili.

Fisheries Research
Objective: To establish a baseline on ecology of the lake, impact of environmental factors on the lake system and socioeconomic impact on resources; restoration of threatened species through aquaculture.
The components activities have been carried out in four subcomponents (Fish Biology and Biodiversity Conservation; Aquaculture; Socio-economics and Information and Database. The following outputs were obtained: 166 papers and documents produced; input into regional GIS biodiversity maps; input into regional bibliography on the Lake Victoria basin; input into regional compendia on fisheries and biodiversity, unpublished/in press; threatened species identified from satellite lakes and stock collected; 141 protected areas identified and gazetted.

Water Quality and Ecosystem Management
Objective: To elucidate the nature and dynamics of the lake ecosystem; to improve management of industrial and municipal effluent and assess the contribution of urban run-off of lake pollution in order to design alleviation measures. (To establish a water quality monitoring network throughout the catchment, estimating the effects of changes in land use planning on pollution loads in the lake, and developing policies and programs to control non-point source pollution)". The latter part (in brackets) was the result of the appending of the Management of Pollution Loading sub-component, during the restructuring of the components; it is really more an activity than an objective. The objective was not well formulated, as it does not have a clear linkage to the alleviation measures, being the main purpose of these activities. It is unclear whether the alleviation measures were to be a part of the output or whether such measures were to follow in the subsequent phases of the project. It is noted that no specific objective was stated in the SAR for the Management of Pollution Loading and Assessment of Role of Agro-chemicals in pollution of Lake Victoria activities. The outputs include:
a) In-lake Water Quality Monitoring: The component has notably resulted in increased knowledge of water quality; hydrodynamics; primary sources of nutrients, and reasons for water hyacinth occurrence. Digital maps are under preparation. National and regional water quality synthesis reports were prepared (Tanzania coordinated the regional reporting on water quality). This was done through analysis of data collected from the water quality monitoring network, which was established. The network includes 29 monitoring stations (planned in a harmonized way by the three countries, with 15 in open waters and 14 near shore). The research effort intensity was higher than a sustainable level (16

lake cruises were undertaken and 4314 profiles obtained. Analyses of 1688 water samples, 284 sediment samples, and 3403 zooplankton/phytoplankton samples were conducted.) Three water laboratories (Mwanza, Musoma and Bukoba) have been rehabilitated/expanded, equipped and supported operationally. Two of these are functioning at present and one is in transition (the one in Bukoba is being re-located due to structural failure).

b) Management of Pollution Loading: A monitoring network was established (28 river gauging stations, 8 atmospheric gauging stations - 3 dry and 5 wet, and 16 additional evaporation/rainfall monitoring stations). Data were compiled, validated and analyzed, and baseline on pollution loading from the non-point sources and from atmospheric deposition was established (most nutrients to the lake coming for the latter – 84% N and 75% P).

c) Industrial and Municipal Waste Management: Inventory and mapping of pollution hotspots along the lake shore was undertaken (including characteristics of urban run-offs from 3 centers and 600 shoreline settlements, and sanitary conditions in shoreline settlements); and inventory/classification of industrial effluents (locations, amounts and quality characteristics of 31 industries and 19 urban centers) was undertaken (Directories for 166 industries, 149 urban centers and 600 shoreline settlements were prepared), with limited follow-up monitoring. Public awareness campaigns were conducted through various media. A Cleaner Production (CP) program in 12 industries was conducted and lasted one year with training from experts from the Ministry of Industries and trade, and Vice President's Office Division of Environment and including a study tour to Denmark supported by DANIDA. Tertiary Municipal Effluent Treatment pilot plant (wetland) was constructed at Butuja, but testing was held up by the completion of the (primary) Mwanza waste water treatment plant (supported by EU).

d) Staff training at various levels was conducted; one Ph.D. and six M. Sc. degrees, six diplomas, and 25 certificates were awarded.

Water Hyacinth Control

Objective: To establish sustainable long-term capacity for maintaining control of water hyacinth and other invasive weeds in the Lake Victoria.

A combination of physical and biological control methods was successfully applied. The outputs include: 530 strategically important sites (landing sites and beaches, water intakes etc.) manually cleared in close collaboration with a local NGO (LANESO); 12 weevil rearing units (WRU) established of which 10 were functional at project close; about 200 million weevils (biological control agents) released over the project's lifespan; training of personnel - one Ph.D. and 3 M.Sc. degrees awarded (of which one was not directly relevant to the component); limited training of community members (2 members, including the caretaker, in each community with a WRU); study tour involving 28 community members; 15 awareness workshops (two of them targeting communities); wide information dissemination (10 radio programs, 6 TV programs, 10 newspaper articles and 2 posters), and the formulation of the Plant Protection (control of Water Hyacinth) rules (based on the Plant Protection Act of 1997 and gazetted in 2001).

Wetlands Management

Objective: To increase knowledge of wetlands buffering processes and of Lake Victoria wetlands; to determine economic potential of the Lake Victoria Basin wetlands products; to demonstrate wise use of wetland resources; and to develop strategies for wetlands management.

The outputs include: inventory and classification of Lake Victoria wetlands; maps produced; buffering capacity of study wetlands investigated, but not leading to any management plans; nutrient loading in four priority areas monitored; a very preliminary assessment of the value of buffering capacity carried out in 2001; three studies assessing the economic potential/benefit from wetland products (primarily macrophytes) and evaluating their contribution to the local communities; preparation of Wetland Management Plans for Simiyu (Magu), Kitaji (Musoma), Rubana (Bunda) and Mabubi (Geita) have

been initiated but not adopted or ratified; capacity strengthening of local NGOs and CBOs to undertake sustainable use of wetlands have been undertaken in pilot areas but have not been replicated to other areas. Awareness and information dissemination on wetlands was carried out using various methods such as meetings, workshops, seminars, posters, brochures, video, radio, TV, newspapers, exhibitions, and study tours. The presentation of scientific papers at national, regional and international conferences was also carried out. Nevertheless, wetland issues are not very well appreciated by the various stakeholders, as it is considered a 'new' issue. Staff at various levels were trained in relevant courses/programs. Demonstration projects were initiated on propagation of wetland macrophytes, fish farming, handicraft and wetland rehabilitation.

Integrated Soil and Water Conservation

Objective: To promote improved land management practices in the Lake Victoria for increased and sustained agricultural productivity and reduce agro-chemicals nutrient and sediment loading into water systems leading to Lake Victoria.

The main activities of this component were promotion of soil and water conservation measures through pilot area testing of technologies (along the Simiyu River Catchment in Magu and Mwitore in Tarime, Mara Region), management of pollution loading and agro-chemicals management. A survey and mapping of present land use/cover and soil erosion hazard has been done. Farmers exchange visits, demand driven on-farm training sessions were undertaken. The main outputs include: 6 soils erosion maps; 2165 farmers adopted soil and water conservation practices; 2572 farmers adopted safe use and handling of Agro-chemicals and the use of the Integrated Pest Management methodology; 103 km contour bunds and ridges constructed, key to the control of non-point pollution; a considerable increase in crop production per unit area (maize has increased from 500 to 1000 kg/ha and paddy rose from 450 to 1350 kg/ha) as a result of these measures; development of five new village action plans for soil and water conservation activities. The component had a considerable degree of community interaction for promoting sustainable soil conservation activities. As the methods used by the component got more streamlined, it was possible to optimize the use of funds and estimate the costs per piloted soil and water conservation technology.

Catchment Afforestation

Objective: To protect vital areas of Lake Victoria catchment by planting trees by involving local communities and institutions

With a relatively clear objective, the component focused their activities in Mwanza Gulf and Mara River, focusing on smaller restricted areas, in order to maximize the impact. It achieved the following: 12 million tree seedlings raised and planted during the project period, with a survival rate of 79 percent (9 million trees); community involvement in conserving natural forests in Bunda and Musoma districts; five new village forest reserves created in the pilot area; communities and component staff involved in surveying, boundary demarcation and mapping of six potential village forests reserves; manual on nursery establishment and management produced; and 10 management plans for natural forests formulated. Awareness raising workshops were conducted with participation from all district leaders, technicians and politicians in all the 15 districts where LVEMP had been active. Microprojects focused on spring protection/rehabilitation and promotion of improved stoves but unfortunately the latter, although highly beneficial, required more man hours than available to sustain, and thus, the activity was stopped. Community awareness was raised through meetings, workshops, seminars, radio and TV programs, newsletter articles and various other extension materials; outreach included 50 contact people per village in 33 pilot villages (approximately 2400 people in all). Capacity of staff was enhanced - Two M.Sc. degrees awarded, 12 short courses and 3 study tours involving staff and farmers conducted.

Capacity Building - Support to University of Dar es Salaam, Faculty of Aquatic Sciences

Objective: To strengthen facilities for environmental analysis and graduate teaching at University of Dar es Salaam.

LVEMP support was directed to capacity building in terms of improving teaching and research, both personnel and infrastructure. The component trained members of staff at various levels including PhDs in aquatic sciences. Project support was instrumental in establishing the new Faculty of Aquatic Sciences and Technology, government funding for which has been improving steadily. Two new degree programs for undergraduates were developed and delivered. Student enrollment increased from a maximum of 15 students per year prior to 2002 to 50 students per year after that. While most of the department's operational budget and resource needs are met through the University, support from the project enabled the participation of the department in training and research specific to the Lake Victoria basin and in improved delivery of services that were included in its work-plan. The acquired equipment facilitated many research projects for graduate students. Two M.Sc. and three Ph.D. students were fully supported by LVEMP with full completion. All, except one M.Sc. graduate who is working with TAFIRI, are working with the University. Additionally, two staff from TAFIRI were trained at the M.Sc. level and they remain with the organization.

Institutional Framework - Support to Regional and National Secretariat

Objective: Responsible for overall monitoring and reporting progress, coordination and information sharing at the regional and national levels.

The Secretariat in Tanzania combined both regional and national coordination and reporting functions. It coordinated RPSC meetings and facilitated harmonizing of a number of regional interventions, regulations, and processes. Its mandate included the coordination of the Expert Panel of Scientists and their input towards quality assurance of the various scientific research being conducted under the project. The secretariat was largely based in Dar es Salaam. It housed the library for the entire project, containing most reports from all countries in hard and soft copies, in addition to other relevant literature. There were seven officers at the Secretariat with two assistants and 12 support staff, totaling 21 people. The extended arm of the Secretariat was placed in Mwanza by the Lake, having two officers including the Senior Operations Officer. The secretariat has been wound up at the close of the project.

Micro-Projects and Community Participation.

The project targeted service delivery among the Lake basin communities by implementing a range of demand driven projects in the health, water, education, sanitation, access roads, afforestation and fisheries sectors. A total of 90 projects were initiated out of which 85 were still functioning as project closure.

Institutional Development

Fisheries Management. The capacity of the Fisheries Division was raised on a number of issues ranging from fish farming over PRA methodologies to micro management through the BMUs. The people trained are associated with the Fisheries Division ensuring that the capacity will sustain and develop the future activities of the Fisheries Division.

Fisheries Research. A considerable amount of information remains with the institution (TAFIRI), which was also enhanced with support for capacity. Many staff completed advanced degree courses, while others received training on a wide variety of disciplines and techniques.

Water Quality and Ecosystem Management. The component has to some degree increased the knowledge of the Water Resources Department regarding the lake's eutrophication and hydrodynamics characteristics, and the establishment and running of monitoring networks. However, the key staff were already highly educated and experienced by the project outset. The ability or dedicated will to translate

increased knowledge and scientific research into formulating achievable pollution reduction measures was weak. Notably, the key staff of the component are on contract, increasing the uncertainty of available capacity for activities once the contract period is over (at the end of the Bridging Phase of LVEMP).

Water Hyacinth Control. The component raised the capacity of the institution internally (two M.Sc. and one Ph.D. degrees were awarded) which also increased the regional capacity and ability to engage in regional information sharing. The increased knowledge resulted from a number of research activities e.g., weevil lifecycle and ability to sustain life in moving waters (rivers). On the other hand, the component did not focus as strongly on raising the community awareness, and involving the communities.

Wetlands Management**.** A lot of baseline information has been compiled under this component that was not fully analyzed. Weakness in capacity (the component had been short of staffs for a long period) was a contributory factor. The component had three consultants, which limited the strengthening of the relevant governmental institutions in wetlands management.

Soil and Water Conservation. The soil maps are useful tools for future management of the land use resource in the catchment, allowing for fact-based interventions to be undertaken. The activities were undertaken in collaboration with the Land Use Planning Department anchoring the activities in an organization, while increasing its capacity.

Catchment Afforestation. The capacity building process under this component, has increased the institutional capacity. There may be some localized gaps, as some of the staff trained under this component were moved to other positions.

Capacity Building: Support to Riparian Universities. There is undoubtedly more capacity developed in the field of aquatic sciences in the country, with the new faculty established. Further, the strengthening of the department facilities has contributed in improving the quality of academic programs offered at the University of Dar es Salaam.

Institutional Framework: National Secretariat. The secretariat has not had the expected level on impact in developing strong and lasting collaborative links between implementing agencies that could have led to greater coordination and jointly planned arrangements.

Microprojects and Community Participation. These activities helped increase buy-in among the communities, raise awareness on the critical environmental issues and help empower communities. The approach was found to be very successful and microprojects were in high-demand.

Sustainability

Fisheries Management. Capacity building at various levels and the strong shift to co-management contribute to the sustainability of the outputs of this component. Tanzania is ahead of other countries in the implementation of the co-management framework, and some BMUs are already collecting revenues (481 of the 511 BMUs are active and 11 CMUs in the satellite lakes are operational). This is likely to enhance sustainability of monitoring, control and surveillance efforts.

Fisheries Research. As stated in the National ICR, research in Tanzania is to a high degree dependent on external resources to undertake research, which also applies to the research in this component. The GOT has committed to use external resources for this purpose, as reflected in the MTEF. Many scientific outputs would benefit from revision and fuller dissemination. Information must be shared more broadly between and among researchers and with the public.

Water Quality and Ecosystem Management. The key staff in the component have been on contract (with considerably higher remuneration than similar governmental positions, as it was difficult to find the requisite capacity in the Ministry that could be located in Mwanza). Some additional data will be collected (core monitoring) in the LVEMP Bridging Phase with the limited funds available. The laboratories will continue operation, hopefully with the trained competent staff, as long as there are

resources for operations. The Lake Victoria Water Model is not operational and suffers the additional risk of having personnel trained on it being on contract. Determination of which activities to continue and the contractual basis for needed staff will be part of the preparation for the second phase.

Water Hyacinth Control. The increase in local capacity to address the problem is likely to contribute to the sustainability of outcomes. BMU participation in monitoring combined with the continuation of tasks of the agency for pest control towards keeping infestation down are also positive features. The weak ownership by the communities of the weevil rearing units is an unfortunate factor that impedes sustainability. Having a paid caretaker on the spot decreased the communities' sense of ownership of the WRUs, and this presents an opportunity to do things differently in the next phase.

Wetlands Management. The information gathered and the wetland maps are valuable resources for supporting future management decisions. Communities are encroaching on wetlands as land is converted to agricultural purposes, pointing to the need for increased awareness and different incentives.

Soil and Water Conservation. In the piloted areas where benefits of increased outputs and other economic incentives are obvious, the farmers will most likely ensure that implemented technologies will be sustained and in some cases maybe even extended and further developed. The poorest farmers are not able to purchase the necessary inputs to undertake such interventions. Linkage with agricultural programs under the ASDP will be important.

Catchment Afforestation. This component involved public institutions (schools, prisons, etc.,), and communities in raising and planting of tree seedlings. It operated central nurseries managed by the district authorities, and supported community-based, and privately owned nurseries as well. The component implemented its exit strategy by decreasing gradually the number of seedlings raised at the central nurseries, while increasing the quantity in the community-based nurseries. In addition, a "token price" was introduced on seedlings, not only to recover part of the costs, but also to attach value to the seedlings. A number of community forest reserves were established, and management plans for other degraded forests and hills were developed. The awareness that has been achieved in the pilot area needs to be monitored in order to keep the momentum going. The approach of involving the communities to the greatest extent is likely to help sustain the planting, and increase the "survival rate" of the planted seedlings.

Capacity Building: Support to Riparian Universities. The project supported the establishment of the Aquatic Sciences department at the University of Dar es Salaam, including training of some of the faculty members, and equipping the laboratory. The government will continue to fund the operational costs of this department, although the intensity of research effort is likely to decline post project, as would the number of students graduating with advanced degrees. The government also provides competitive students loans, which could sustain the enrollment in the department.

Institutional Framework: National Secretariat. The LVEMP secretariat was closed at the end of the project. Coordination of the Bridging Phase activities is being handled by the implementing agency, Ministry of Water. It is not clear if all the information gathered under the project and stored in the library and in several databases of various components has been transferred to that agency.

Microprojects and community participation. Microprojects were largely demand-driven and were oriented to meet self-identified needs. Collaboration with mainline agencies in service-provision also strengthened the likelihood of sustainability.

Annex 1. Key Performance Indicators/Log Frame Matrix

These indicators are formulated in Annex 4 of the **Staff Appraisal Document (1996)**. The indicators were not quantified and tracked systematically. Component specific outputs and achievements have been detailed in Section 10 of the ICR.

Indicators	Achievements at project completion	Comments
1. Building capacity within the riparian universities, the line ministries, LVEMP secretariats and the riparian communities for environmental analysis, conservation and adoption of cohesive management practices on the lake.	University and implementing agencies strengthened; Members of staff trained at various levels (eg. 3 PhDs and 25 M.Sc,); New Faculty of Aquatic Sciences and Technology established; Two new degree programs for undergraduates developed and delivered; Increased student enrollment increased from a maximum of 15 students per year prior to 2002 to 50 students per year post 2002. Numerous others were trained on-the-job and through short courses.	Substantial capacity building activities undertaken, in implementing agencies, the secretariat, and at the local Government and community levels. Better trained personnel contributed toward stronger institutions. A capacity bulding strategy was not developed and efforts were linked to needs identified by the agencies themselves. There was a greater emphasis on fisheries related capacity.
2. Harmonization among the three countries legislation addressing management of fisheries and environment variables important in the lake basin, and improved enforcement of this legislation.	Fisheries regulatory and policy frameworks strengthened and harmonized across three countries; Contributed to major sector and macro policies including the fisheries policy and strategy statement (1997), National Environment Policy (1997) and the new Fisheries Act (2003) and related regulations; Lake Victoria Fisheries Organization created; Contributed to formulation of the Lake Victoria Protocol and subsequent Lake Victoria Basin Commission, under the EAC leadership.	
3. Establishment of the Lake Victoria Fisheries Organization (LVFO)	Achieved	LVFO active and coordinating regional activities. Focus on establishment of Beach Management Units and post-harvest fish quality issues.
4. Completion of gazetting and regulating fish landing sites within pilot zone areas and enforcing acceptable fishing practices within a	Gazetting of 63 landing areas; Co-management through 511 operational BMUs (15 of them collecting fish levies at the rate of 6	BMUs units most advanced in Tanzania under LVEMP.

5 km radius of fishing villages within these areas, with full participation of lakeshore fishing communities.	percent) 511 operational Beach Management Units (BMUs) progressing; reduction in post-harvest losses; steep decline in illegal fishing (mainly through community surveillance); increased observance of the closure periods; 115 Micro-projects implemented; training conducted for fish farmers and extension workers on improved techniques and quality assurance; quality assurance capacity strengthened (6 % improvement of fish quality); biannual frame surveys conducted; and information materials made available in Kiswahili.	
5. Establishing sustainable long-term capacity for management and control of water hyacinth and other invasive weeds in Lake Victoria Basin, through integrated weed control methods and community involvement	Biologically sustainable control of water hyacinth achieved (85% reduction); Strong community involvement in control activities.	Different locations for the weevil rearing stations were used, including schools, fishing villages etc., based on the incentives perceived by the local communities
6. Establishing a lake wide water quality and rainfall monitoring system with agreed parameters to generate information on eutrophication management and pollution control.	Increased knowledge of water quality, hydrodynamics, primary sources of nutrients, and reasons for water hyacinth occurrence; Digital maps (under preparation); National and regional water quality synthesis reports were prepared; Water quality monitoring network established; includeing 29 monitoring stations (planned in a harmonized way by the three countries, with 18 in open waters and 11 near shore); Three water laboratories (Mwanza, Musoma and Bukoba) rehabilitated/expanded, equipped and supported operationally; Inventory and mapping of pollution hotspots along the lake shore; and inventory/classification of industrial effluents (locations, amounts and quality characteristics of 31 industries); Public awareness campaigns conducted through	A substantial baseline information was established. Key scientific results were generated. Emphasis was on data collection. Sampling was episodic, affected by flow of funds problems; capacity sometimes was overwhelmed.

	various media; Cleaner Production (CP) program in 12 industries was conducted for one year	
7. Completing a full inventory and resource survey of Lake Victoria wetlands, and preparing investment proposals for the economic management of these wetlands, including their rehabilitation.	Completed. Maps and wetland inventory available in all countries. and classification of Lake Victoria wetlands; maps produced	More comprehensive wetland management plans were developed for a few pilot areas, using a participatory approach.

Annex 2. Project Costs and Financing

Table 1: Financing Plan for LVEMP Regional Project at Appraisal

Project Component	Govts.	GEF	IDA	Total	Percent
LVFO	0.20	2.10		**2.30**	3
Fisheries Management	1.40		12.70	**14.10**	18
Fisheries Research	1.30	8.80	3.20	**13.30**	17
Water Quality Management	1.00	8.60		**9.60**	12
Industrial and Municipal Waste Management	1.00		8.90	**9.90**	13
Water Hyacinth Control	0.80	4.50	3.00	**8.30**	11
Land Use, Catchment Afforestation and Wetlands Management	1.40	7.40	5.30	**14.10**	18
Support to Riparian Universities + National Secretariat	0.60	3.60	1.90	**6.10**	8
Total	**7.70**	**35.00**	**35.00**	**77.70**	**100**

Table2: LVEMP Tanzania - Appraised Project Costs and Financing Sources by Component (USD '000)

Components (in USD, '000)	IDA	GEF	IDA+GEF	GoT	Total
Fisheries Research	905.00	2611.10	3516.10	392.20	**3908.30**
Fisheries Management	4311.50		4311.50	479.10	**4790.60**
Water Quality Management	2678.30	4037.50	6715.80	812.90	**7528.70**
Water Hyacinth Control	842.30	1263.40	2105.70	234.00	**2339.70**
Wetland Management	200.40	1108.50	1308.90	145.40	**1454.30**
Soil and Water Conservation	362.90		362.90	40.30	**403.20**
Catchment Afforestation	686.70		686.70	76.30	**763.00**
Support to Riparian Universities		287.60	287.60	32.00	**319.60**
Cordinating Secretariat		993.00	993.00	110.30	**1103.30**
Total	**9987.10**	**10301.10**	**20288.20**	**2322.50**	**22610.70**

Table 3a: LVEMP Tanzania IDA Credit - By Expenditure/Disbursement Category

in USD '000	IDA		
Category	**Allocated**	**Disbursed**	**Undisbursed**
Civil works	166.65	165.50	1.15
Vehicles and Equipment	2,225.91	1,884.77	341.15
Consultant Services and Training	3,793.50	3,578.26	215.24
Goods, Works, Services	959.45	850.12	109.33
Operating Costs	3,186.98	3,892.37	-705.39
Unallocated	0.00	0.00	0.00
Special Account	0.00	-38.52	38.52
Totals	**10,332.49**	**10,332.49**	**0.00**

Table 3b: LVEMP Tanzania IDA Supplemental Credits - By Expenditure/Disbursement Category

in USD '000	IDA Supplemental			IDA Supplemental 2		
Category	**Allocated**	**Disbursed**	**Undisbursed**	**Allocated**	**Disbursed**	**Undisbursed**
Civil works	369.02	28.03	340.99	211.08	64.15	146.93
Vehicles and Equipment	479.77	503.17	-23.39	222.89	559.77	-336.88
Consultant Services and Training	2,472.42	1,491.41	981.01	1,092.29	1,497.78	-405.49
Goods, Works, Services	479.72	147.33	332.39	216.98	81.79	135.19
Operating Costs	2,103.40	3,682.48	-1,579.08	1,799.33	1,350.40	448.93
Unallocated	0.00	0.00	0.00	0.00	0.00	0.00
Special Account	0.00	51.87	-51.87	0.00	-11.32	11.32
Totals	5,904.33	5,904.28	0.05	3,542.57	3,542.57	0.00

Table 3c: LVEMP Tanzania GEF Grant - By Expenditure/Disbursement Category

in USD '000	GEF		
Category	**Allocated**	**Disbursed**	**Undisbursed**
Civil works	103.32	143.83	-40.51
Vehicles and Equipment	2,155.06	2,106.37	48.69
Consultant Services and Training	3,586.85	4,369.47	-782.62
Goods, Works, Services	0.00	0.00	0.00
Operating Costs	3,690.18	4,060.03	-369.86
Unallocated	1,092.29	0.00	1,092.29
Special Account	0.00	-52.00	52.00
Totals	**10,627.70**	**10,627.70**	**0.00**

Table4: LVEMP Tanzania - By Component and Financing Sources

Components (in USD, '000)	As of 12/15/05	Percent
Fisheries Research	3,508.58	13%
Fisheries Management	5,735.06	21%
Water Quality Management	5,923.85	21%
Water Hyacinth Control	2,766.67	10%
Wetland Management	2,063.38	7%
Soil and Water Conservation	1,019.58	4%
Catchment Afforestation	1,712.77	6%
Support to Riparian Universities	765.96	3%
Cordinating Secretariat	4,251.23	15%
Total	**27,747.08**	**100%**

Annex 3. Economic Costs and Benefits

A standard ERR was not estimated in the SAR, due to the focus of the project on capacity strengthening and institutional reform. Further, the lack of adequate monitoring and valuation of impacts of various project activities had resulted in sparse data of the kind needed to estimate an ERR. The section aims to provide some indicative socio-economic data and a discussion on the Potential Benefits, as done in the SAR.

The Lake Basin economy is driven by Agriculture and Fisheries (70 percent), including a number of cash crops (including fish exports) and a high level of subsistence fishing and agriculture. It produces in the order of USD 5 billion annually (2000-04), increasing from the estimated USD 3-4 billion, in 1996. Population in the Lake Basin, in that time, has gone up from 25 million to an estimated 30 million people, while general standards of living are between USD 90-270 per capita per annum (based on national figures). The quality of the environment and the status of the natural resources are critical factors in the maintenance and growth of incomes, livelihoods and poverty alleviation opportunities in these countries.

Among the gross benefits expected in the SAR, are avoided losses related to decline in fishery as a result of over-fishing and deterioration in water quality, impacts of water hyacinth infestation, poor quality of water supply for domestic and animal uses, and continued degradation of wetlands.

Fisheries contribute about three percent of the GDP of the riparian countries. Fish production for the whole lake is currently estimated to be between 400,000 to 600,000 metric tons worth USD 400 to 600 millions annually. In Tanzania, sixty percent of total fish production comes from Lake Victoria, the majority of which comes from artisanal fishery. Estimations of gross employment in this sector range from 500,000 people in Tanzania (Odongkara *et al.*, 2005) including fishers, fish traders, and fish processors and net menders, to about 2.6 million people (National Fisheries Synthesis Report). The value of the export fishery of the lake is currently it is estimated at USD 270 million. The Nile perch products are exported to Europe, Australia, Asia, Africa and America. In 2004, the total export was 42,354 tons valued at USD 100.1 million and the total Royalty to Fisheries Division was about USD 6.4 million (Fisheries Division, 2004). The total cumulative exports of Nile perch fish and fishery products from Lake Victoria for the last nine years (1995 to 2004) was about 320,000 tons valued at USD 704 million (F.O.B value) of which the Fisheries Division received at total of USD 32.94 million as royalty.

The sudden drop of the trend for year 1999 and 2002 was due to the import ban imposed by single largest European markets caused by concerns that fish and fishery products were contaminated by pesticides as well as implementation of slot size 50-85 cm in the fish processing plants, respectively. In 1999 total export of Nile perch products was 25,914.079 metric tons valued at USD 55 million (F.O.B. value) and in 2002, total annual export was 29,212.3 tons valued at USD 88 million. The project helped implement various management measures and improve quality assurance to address this issue. A rough estimation, assuming, very conservatively, that the ban caused a 12 percent drop in total exports (based on export data, that indicates exports to other markets and decline in the rate of increase of exports due to increasing CPUE) indicates that this led to an avoided loss of about ***24 million*** in the period 2000-2005, while the cost of upgrading the fish quality laboratory was in the range of USD 500,000 and the entire fisheries management component (for the life of the project) was 16.3 million.

Domestic consumption estimates vary considerably from a likely USD 100 million to as much as USD 600 million per annum. FAO data from the period 1978-01 indicate that contribution of fish protein to the Tanzanian population has remained stable since in the 1990's and early 2000's, at the level observed in 1979, after an increasing rate in the 1980s.

Data have not been collected for a sufficient time to accurately estimate the Maximum Sustainable Yield (MSY) and there have been disagreements between Tanzania and Kenya, and Uganda regarding the estimates. The National Fisheries Synthesis Report estimates MSY for the Lake to be about 348,184 tons from the acoustic survey and 220,000 tons from the trawl surveys (1999 – 2002 surveys). Fish prices have been stable during the period of late nineties and early 2000's at around one dollar.

There have been additional impacts of the sector activities on natural resources that have not been monitored. Boat building spurred by the growth in the commercial fisheries sectors has resulted in over 60,000m3 of wood to be cut, causing deforestation and environmental degradation over a number of islands and at landing sites. The various fisheries management measures are likely to contribute to reducing this impact.

The SAR estimated that the wide-range of direct costs on the lake community as a result of the spread of water hyacinth, including those arising from transportation (delays in transport, increased operation costs, loss in fishing time, increased difficulty collecting water, blockage of intakes and loss of production at urban and industrial water supply systems, to about USD 6-10 million per annum. The Water Hyacinth infestation has been reduced to non-nuisance levels. Indicative avoided costs range to more than **30-50 million** in the period 2000-2005 for the whole Lake**.** The cost of the water hyacinth control activities was **10 million** over the life of the project.

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation				
10/21/1992	*1*	1 TASK TEAM LEADER		
3/1/1993	*3*	1 TASK TEAM LEADER, 1 INSTITUTIONAL DEVELOPMENT OFFICER, 1 CONSULTANT		
4/27/1994	*2*	1 TASK TEAM LEADER, 1 INSTUTIONAL DEVELOPMENT OFFICER		
6/14/1994	*2*	1 TASK TEAM LEADER, 1 INSTITUTIONAL DEVELOPMENT OFFICER		
7/29/1994	*2*	1 TASK TEAM LEADER, 1 INSTITUTIONAL DEVELOPMENT OFFICER		
10/9/1994	*2*	1 TASK TEAM LEADER, 1 INSTUTIONAL DEVELOPMENT OFFICER		
2/11/1995	*2*	1 TASK TEAM LEADER, 1 INSTITUTIONAL DEVELOPMENT OFFICER		
5/26/1995	*2*	1 TASK TEAM LEADER, 1 INSTITUTIONAL DEVELOPMENT OFFICER		
Appraisal/Negotiation				
12/1-22/1995				
05/20-22/1996				
Supervision				
11/25/1997	*9*	TASK TEAM LEADER (1); WATER SANITATION (1); COMMUNICATIONS (1); PROCUREMENT (1); ANTHROPOLOGY (2); PARTICIPATION (1); INFO. TECH. ANALYST (1); MONITORING (1)	S	S
05/02/1998	*5*	TASK TEAM LEADER (1); CO-LEADER (1); PARTICIPATION (1); LIMNOLOGY (1); ANTHROPOLOGY (1)	S	S
01/28/2000	*8*	TASK TEAM LEADER (1); MICRO PROJ/COMM PART. (1); WATER QUALITY	S	S

			LIMNOLOG (1); NORAD OBSERVER (1); INTERNATIONAL WATERS (1); MONITORING AND EVAL (1); ENVIRONMENT SPECIALIST (1); FINANCIAL ANALYST (1)		
	2/12/2001	*5*	TASK TEAM LEADER (1), SOCIO-ECONOMIST (1), LIMNOLOGIST (1), WATER QUALITY (1), COMMUNITY PARTICIPATION (1)	HS	HS
	2/19/2002	*9*	BANK STAFF (7), CONSULTANTS (2)		
	5/5/2003	*5*	TEAM LEADER (1), PROCUREMENT (1), FINANCIAL MANAGEMENT (1), CONSULTANT (2)	HS	HS
	4/19/2004	*5*	TASK TEAM LEADER (1), MICRO PROJECTS (1), LAND MANAGEMENT &AFFORESTATION (1), FINANCIAL MANAGEMENT (1), PROCUREMENT (1), FISHERIES, CAPACITY BUILDING (1)	S	S
	9/20/2004	*7*	TASK TEAM LEADAER (1),MICROPROJECTS, WETLAND (1), LAND MANAGEMENT AFFORESTATION (1), CAPACITY BUILDING (1), FINANCIAL MANAGEMENT (1), PROCUREMENT (1), FISHERIES (1)	S	S
	4/20/2005	*8*	TASK TEAM LEADER (1), SR. SECTOR ECONOMIST(1), SR. SOCIAL DEVELOPMENT SPECIALIST (1), SR. PROCUREMENT SPECIALIST (1), SR. SOCIAL PROTECTION SPECIALIST (1), TEAM ASSISTANT (1), CONSULTANTS (2)		
ICR					
	03/13/2006	*3*	TASK TEAM LEADER/ENVIRONMENTAL ECONOMIST (1), ENVIRONMENTAL SPECIALIST/INDEPENDENT CONSULTANT (1), GEF SPECIALIST/OBSERVER	S	S

		(1)		

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US$ ('000)
Identification/Preparation	n.a.	91*
Appraisal/Negotiation	n.a.	*
Supervision	54**	730
ICR	15	70
Total	n.a.	871

Notes:
* Total amount for Identification/Preparation and Appraisal/Negotiation
** Partial data for the years FY01-05
Amounts include BB and GEFBB funds

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	Rating				
☐ *Macro policies*	○ *H*	○ *SU*	○ *M*	○ *N*	● *NA*
☒ *Sector Policies*	○ *H*	○ *SU*	● *M*	○ *N*	○ *NA*
☒ *Physical*	○ *H*	○ *SU*	● *M*	○ *N*	○ *NA*
☒ *Financial*	○ *H*	○ *SU*	● *M*	○ *N*	○ *NA*
☒ *Institutional Development*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☒ *Environmental*	○ *H*	○ *SU*	● *M*	○ *N*	○ *NA*
Social					
☒ *Poverty Reduction*	○ *H*	○ *SU*	● *M*	○ *N*	○ *NA*
☒ *Gender*	○ *H*	○ *SU*	○ *M*	● *N*	○ *NA*
☐ *Other (Please specify)*	○ *H*	○ *SU*	○ *M*	○ *N*	○ *NA*
☐ *Private sector development*	○ *H*	○ *SU*	○ *M*	○ *N*	● *NA*
☒ *Public sector management*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Other (Please specify)*	○ *H*	○ *SU*	○ *M*	○ *N*	○ *NA*

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance	*Rating*			
☒ *Lending*	○ *HS*	● *S*	○ *U*	○ *HU*
☒ *Supervision*	○ *HS*	● *S*	○ *U*	○ *HU*
☒ *Overall*	○ *HS*	● *S*	○ *U*	○ *HU*

6.2 Borrower performance	*Rating*			
☒ *Preparation*	○ *HS*	● *S*	○ *U*	○ *HU*
☒ *Government implementation performance*	○ *HS*	● *S*	○ *U*	○ *HU*
☒ *Implementation agency performance*	○ *HS*	● *S*	○ *U*	○ *HU*
☒ *Overall*	○ *HS*	● *S*	○ *U*	○ *HU*

The overall Bank performance is **Moderately Satisfactory** and the overall Borrower performance is **Moderately Satisfactory**.

Bank Lending **Moderately Satisfactory**
Bank Supervision **Moderately Satisfactory**

Borrower Preparation **Moderately Satisfactory**
Government Implementation **Satisfactory**
Implementing Agencies **Moderately Satisfactory**

Annex 7. List of Supporting Documents

1. World Bank. Project Appraisal Document on a Proposed Credit in the Amount of SDR7 Million to the Republic of Tanzania Report No2908. Washington D.C. 1996.
2. World Bank. Lake Victoria Environmental Management Program, Project Document, Report No015541-AFR. Washington D.C. June, 1996
3. World Bank. Lake Victoria Environmental Management Program, Staff Appraisal Report, Report No015429-AFR. Washington D.C. June, 1996
4. World Bank. Memorandum of the President, Report No. P-6843 AFR, June 1996
5. World Bank. Aide-Memoirs' from Project Identification Mission in 1992 to last Supervision Mission in December 2005. Washington D.C.
6. World Bank. Lake Victoria Environmental Management Project, Supplemental Credit, Report No.P7519, June, 2002
7. World Bank. Implementation Completion Report, Draft Final Report, December, 2005
8. World Bank. Tanzania - Country assistance strategy (CAS), Report No. 20728, June 2000
9. World Bank. Back To Office Reports for. The Lake Victoria Environmental Management Program (FY1994) Project ID: P040551 –Loan/Credit No.2908:). Washington D.C**.**
10. World Bank. Development Credit Agreement No. 2908-TA, Washington, DC, September 1996
11. World Bank. Agreement Amending Development Credit Agreement No. 2908-1, Washington, DC, February 2002
12. World Bank. Third Annual Poverty Reduction Strategy Paper (PRSP) Progress Report and Joint IDA-IMF Staff Assessment, Report No. 28966, May, 2004
13. World Bank. Supplemental Credit Document, Report No. 29925-TZ, Washington, DC, September 2004
14. World Bank. Second Agreement Amending Development Credit Agreement No. 2908-2, Washington, DC, November 2004
15. World Bank. Legal Opinion on the Second Agreement Amending Development Credit Agreement for Lake Victoria Environment Management Project, December 2004
16. World Bank. Tanzania **-** Supplemental Credit to the Lake Victoria Environmental Management Project), Report No. P7496, November 2001
17. World Bank. Transboundary Diagnostic Analysis and Strategic Action Program Development for the Lake Victoria Basin Project, Report No. 29872, March 2004
18. World Bank. Knowledge and Experiences gained from managing The Lake Victoria Ecosystem, 2005
19. World Bank/UNEP. Discussion Paper on Regional Program for Environmental Management of Lake Victoria, November, 1992
20. World Bank. Tanzania Stocktaking Report, Draft, July, 2003
21. World Bank. Implementation Completion Report, Lake Victoria Environmental Management Project, Period July 1997 – December 2005, Draft Final Report, December, 2005
22. World Bank. Lake Victoria Environmental Management Project, Phase 1, Revised Draft, Scientific Stocktaking Report, Progress during LVEMP1 and Challenges for the Future, Prepared by, Robert Hecky, August 25, 2003
23. Regional Synthesis report on fisheries Research and Management, Jeppe Kolding, Paul van Zwieten, Julius Manyala, John Okedi, Yusif Magaya, Faustino Orach-Meza; Maun, Wageningen, Dar-es-Salaam, December, 2005.
24. Lessons learned report on the Institutional Framework, Dr. Samuel M. Nyantahe, August 2005
25. National Report on National Consultancy for Preparation of Lessons Learnt Report on LVEMP Institutional Framework for the Lake Victoria Basin, Final Report, Dr. Samuel M. Nyantahe, Executive Director, Daima Associates Limited, Dar-es-Salaam, August, 2005

26. Fisheries Management Component, progress 1997-2005, Susan Imende, Component Coordinator
27. Land Use Management Brief, Naro-Kawanda, April, 2006
28. Report on Beneficiary Assessment of LVEMP Supported Micro-Projects in Lake Victoria Basin, Final Report, Julius Otieno Manyala, Consultant, February – April, 2005
29. Protocol on Sustainable Development of Lake Victoria Basin, November 2003
30. World Bank: Independent Evaluation of the Support of Regional Programs, Case Study, Shawki Barghouti, 2006
31. Beneficiary Assessment (B.A) For LVEMP, Components- Soil And Water Conservation, Wetlands Management, Catchments Afforestation, Micro-Projects And Community Participation, by: Professor I.K Musoke, Lead Consultant, Dr. M. Nyirabu, Consultant, Mr. D.K Rweyemamu, Consultant, Mr. C. Kadonya, Consultant, December 2005
32. Beneficiary Assessment (B.A) For LVEMP, Components- Soil And Water Conservation, Wetlands Management, Catchments Afforestation, Micro-Projects And Community Participation, by: Professor I.K Musoke, Lead Consultant, Dr. M. Nyirabu, Consultant, Mr. D.K Rweyemamu, Consultant, Mr. C. Kadonya, Consultant, December 2005
33. Survey and Mapping of Land Use/Cover and Erosion Hazard in Lake Victoria Basin, Final Report, November 2001
34. Scientific Stocktaking Report, Progress During LVEMP1 and Challenges for the Future, Prepared by Robert Hecky, August 25, 2003
35. Third Overall Performance Study of the Global Environment Facility, ICF Consulting and partners, June 2005
36. GEF International Water Program Study, Prof. Laurence Mee, Prof John Okedi, Mr. Tim Turner, Ms. Paula Caballero, Dr. martin Bloxham Dr. Aaron Zazueta, October 2004

Additional Annex 8. Summary of Regional and Transboundary Related Issues

The problems connected to Lake Victoria have always been recognized as regional in nature, but prior to the Project, had not been dealt with jointly by the riparian countries. Once the deteriorating pollution problem and the related emergence of water hyacinth infestation in the lake, as well as the over-fishing became obvious and in the beginning the 1990s, the need for a regional program of actions was recognized. LVEMP came onboard as a regional multi-sectoral comprehensive environmental management initiative with a view to address the problems in a holistic way. The program was launched through a Tripartite Agreement signed on 15th August 1994 in Dar es Salaam covering in the first place the three EAC states. This was inherently challenging given the political situation in the countries. There was a very low level of regional cooperation and no other regional activities succeeded in getting off the ground, other than the preparation and launch of LVEMP at that time. Furthermore, the relations between Kenya and the donor community was strained.

The impact of the degrading Lake environment on the population was serious. Around 3 million people were dependent directly from the fisheries sector activities. In addition, the human activities of the steadily increasing number of people in the basin (today estimated to around 30 million people), in various ways were contributing to worsening the situation. Lake Victoria was, and remains at risk from the major global environmental threats identified by the Global Environmental Facility (GEF) in its Operational Strategy for International Waters:

(a) degradation of water quality due to pollution from land-based activities;
(b) introduction of non-indigenous (and often pervasively dominant and colonizing) species,
(c) excessive exploitation of living resources, and
(d) global climatic changes.

There is concern that the severity of the current drought, which in some parts has largely lasted for three years and has contributed partly to the lake level reduction (the other factor is the drawdown of the Lake for production of hydro-power by a riparian country), might be linked to global climatic changes. The need for support from the Global Environment Facility's (GEF) was thus fully justified and it was a key co-financier of the project, with a grant of 35 million (accounting for 45 percent of the original project cost) in the first phase of the program.

The status of main issues of regional and transboundary nature that have been (and still are) prevalent under the LVEMP, can be briefly listed as follows:

a) Political regional cooperation:

Until LVEMP was launched, the level of cooperation between the three countries at political level had been low since the break-up of the first EAC cooperation in the later 70s. The planning and launching of LVEMP, heavily facilitated by the international community with the World Bank and GEF in the lead, was the first serious attempt to bring the parties together over the management of common resources. Later on, the revitalized EAC was established, which currently is the leading institution for political and overall coordination of the regional efforts. Finally, the Lake Victoria Basin Commission (LVBC) was established in 2005, operational in Kisumu, Kenya from mid-2006, and is now coordinating and facilitating the Lake Victoria Development Program

(LVDP) that encompasses various initiatives in the basin. (Figure 3 illustrates the interactions of LVDP and the EAC Partnership with other main stakeholders, and Figure 4 shows some of the main activities in the lake basin).

b) Technical and scientific regional cooperation:

With the launching of the LVEMP, the regional cooperation between scientists and other scholars gained significant momentum and resulted in sharing of data and methodologies, preparing the base for joint regional planning of research and monitoring activities and standard-setting. Numerous seminars and workshops with regional participants in all the three countries have been held. Communication links have been established, and these will continue to function during LVEMP 2 and under other basin initiatives. Having said this, the regional dissemination of the scientific project papers and reports has not been satisfactory, due to limited capacity and lack of a sound information consolidation and sharing strategy and protocols. Dissemination and regional cooperation in the future will largely be coordinated by the LVBC under EAC.

c) Fisheries:

LVEMP supported the establishment of Lake Victoria Fisheries Organization (LVFO). This organization is now operational with substantial support from the European Union (EU), especially in implementation of the comprehensive Lake Victoria Integrated Fisheries Management Plan (IFMP). The harmonization of the fisheries legislation across the three countries has been a large achievement, considering the competitive nature of the sector reflected in the substantial monetary value of the fish industry and export. In spite of the efforts so far it is clear that the fisheries sector still has some way to go in achieving a sustainable extractive level. Over-fishing is still prevalent, notably in Uganda where the driving force is the increase in export income and the substantial over-capacity in the fish processing industry (capacity utilization is less than 50% at present). Notably, Uganda also disagrees to the level of sustainable fish harvest established by the two other countries. There remains a need for ongoing monitoring of fish extraction combined with additional awareness raising and enforcement of regulations among the fishing communities.

d) Eutrophication of the Lake:

The high level of nutrients entering the lake enhanced the environment for water hyacinth infestation. The infestation was significantly reduced (by around 85 percent) to non-nuisance levels and is the most tangible and visible change on the lake. However, the pollution that contributes to the nutrification remains a concern and is a priority for the next phase. Additional the Kagera River (originating in Rwanda and Burundi), continues as a significant source of water hyacinth, as the bio-control agents perform less well in the rivers as compared to the lake. Research to deal with this problem continues. While data suggests that changes in Phosphorus concentrations are not statistically significant (as noted by the project scientists), the trend and impact of pollution entering the lake during the project period is less clear, given the nonlinear nature of the Lake response to increases in nutrient concentrations. Experts, and indeed a common sense assessment, indicate that the level of pollution, and related nutrients entering the Lake, have increased, with an increased risk of impact on the lake.

This is a function of increased economic activity and a higher population in the basin resulting in

increased municipal and industrial wastewater, and run-off from non-point urban and semi-urban pollution sources, with few measures to treat the discharges. A few pilot measures have been undertaken in the pilot catchment areas in the three countries to decrease the rural non-point pollution through erosion, but these do not accumulate to a significant level of impact. The key pollution sources in the near-shore areas are the surface run-off and wastewater from towns and communities. The pollutants in the open lake waters are largely entering through precipitation (atmospheric deposition) and are likely long-distance transported pollution from the land-based activities (dust from wind, bush fires, etc.). It is not known whether this pollution is coming from within or from outside of the Lake Victoria basin. A GEF supported program is seeking to develop a monitoring program to track the sources of atmospheric deposition.

e) Land degradation in the region:

Land degradation is prevalent in certain areas of the basin, in all three countries. The still common practice of bush fires, contributes partially, both directly and through increased erosion, to atmospheric deposition (that accounts for around 84% N and 75% P) of nutrients into the Lake.. Over-grazing and unsustainable agricultural practices lead to increasing erosion and contribute to the increased silt content in the rivers and subsequent sedimentation at the river months and a certain distance into the lake itself. Rivers contribute to about 23% of total P and 15% of Nitrogen into the lake. The loss of soil nutrients heavily constrains productivity of the land, with a cyclical impact on poverty, livelihoods and resource health. The use of fertilizers is presently limited in the area, but this is likely to change with the quest for improving agricultural productivity. The project has started awareness raising and implementation of healthy farming practices in pilot areas in the basin in all three countries, and these have lead to localized effects of decreased soil erosion, increased yield and income for several farmers. Afforestation activities are expected to have had a limited beneficial impact as well. Other add-on activities in the form of micro-projects (notably protection of water sources, etc.) are supporting the anti-erosion efforts by giving opportunities to harmful practices to the population.

f) The lake level and riparian communities:

An issue which has clearly surfaced during the last two years, is the rapidly falling lake level, which cannot be linked to the LVEMP project, but which affects the outcomes of LVEMP activities. About half the reduction in lake levels can be attributed to the last three years' drought while the rest is a result of the over-abstraction of water for hydropower generation at Jinja, the main energy source of Uganda.

The reduced lake level has significantly and negatively affected the communities living on the lake shore. As the waters at the shore is shallow many places, the lake shore has moved several hundred meter at some locations, leaving the landing piers far up on dry land and making access to the lake difficult with boats and handling of fish more prone to pollution and reduced quality (see attached photo from Musoma). The low water level has also dried up some of the wetlands, resulting in people starting to cultivate in the wetlands (reference to photos form the Musoma and Mara Regions in Tanzania). The retracting lake shore has posed high economic costs on the use and maintenance of water supply infrastructures around the lake. The drying of wetlands also have impact on fish biodiversity, wetland fishing, production and utilization of wetland products for handicraft. In addition, the reduced level threatens the spawning grounds for fish, creating

potentially significant risks to the fishing effort.

g) Other initiatives in the basin:

Figure 4 shows that several initiatives are running concurrently in the basin, all having environmental issues and natural resources as their main topics of concern. There are numerous NGO-based activities, many having transboundary and regional approaches. These activities have so far not been very actively or effectively coordinated, and this has contributed to duplication of efforts and overlapping activities both geographically and thematically. The reasons for this lack of holistic approach to the problems in the region could be many, both resulting from the various donors specific requirements and needs to shows results coming from own financing, to the lack of implementation and coordination capacity with the riparian countries. Hopefully, with the LVBC operation in Kisumu, the challenge of coordination will be more effectively met in the future.

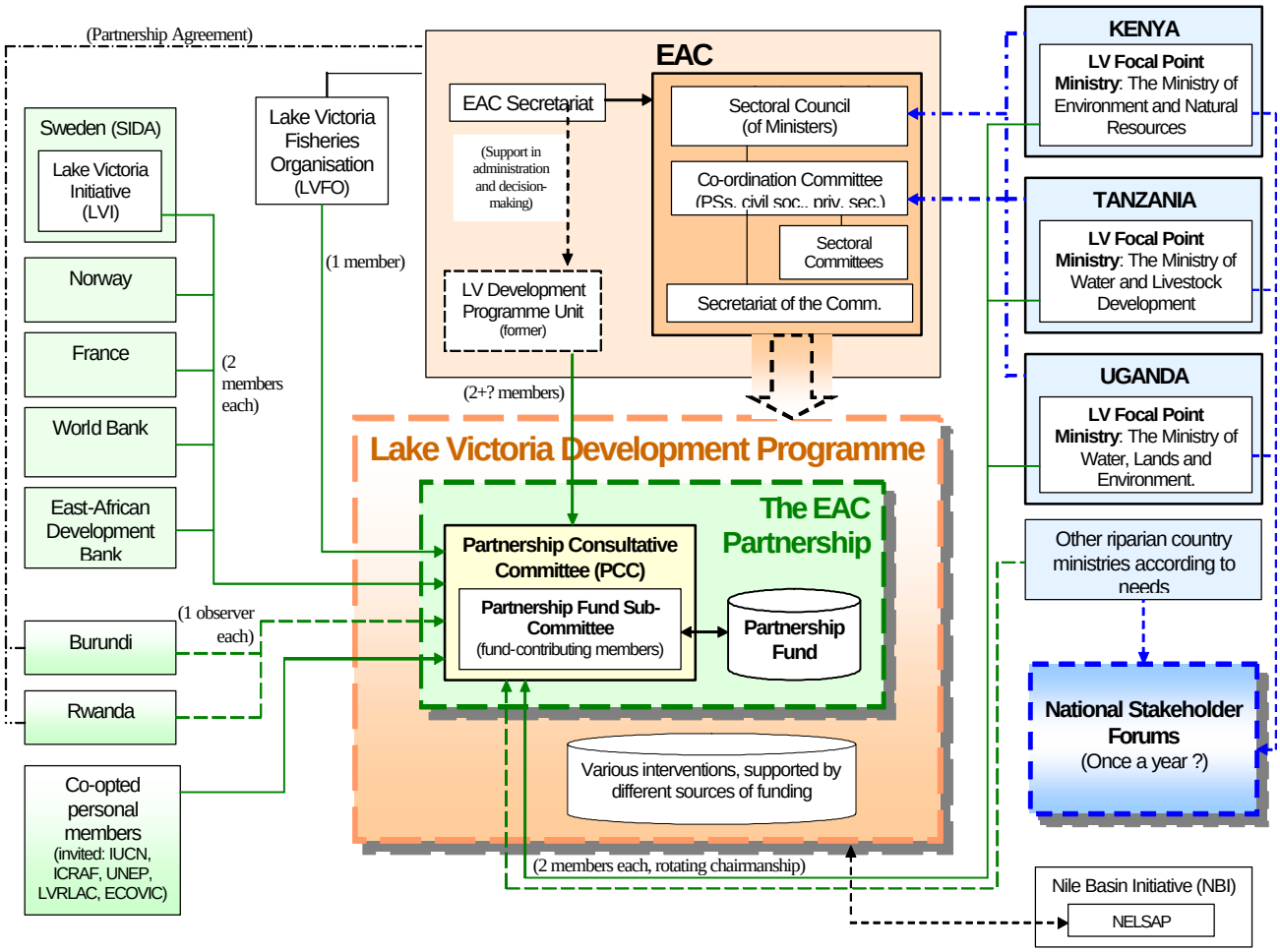


Figure 3: The Lake Victoria Development Programme and the EAC Partnership (Figure from EAC Partnership Fund Review Report November 2005, by Tore Laugerud, NCG)

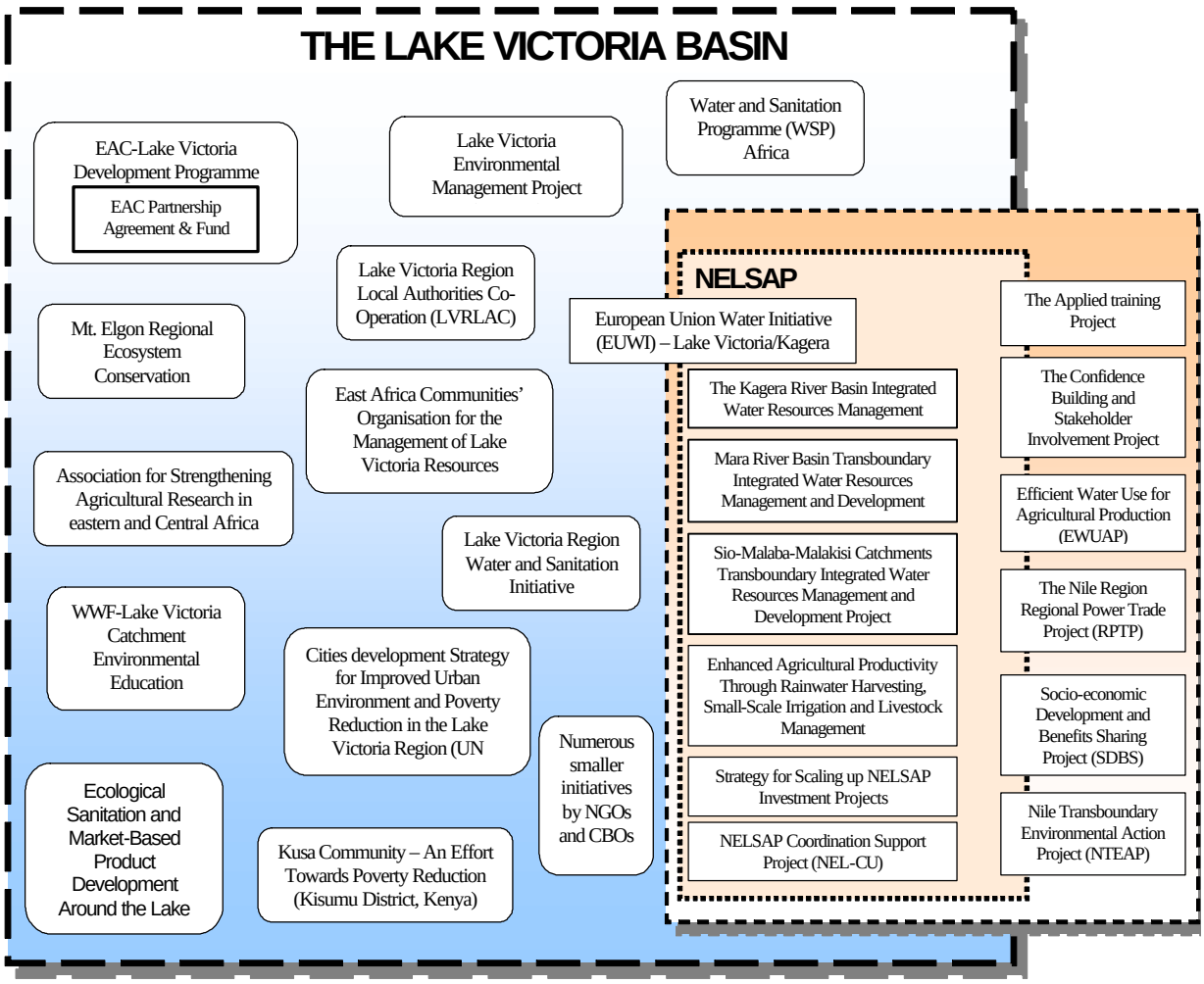
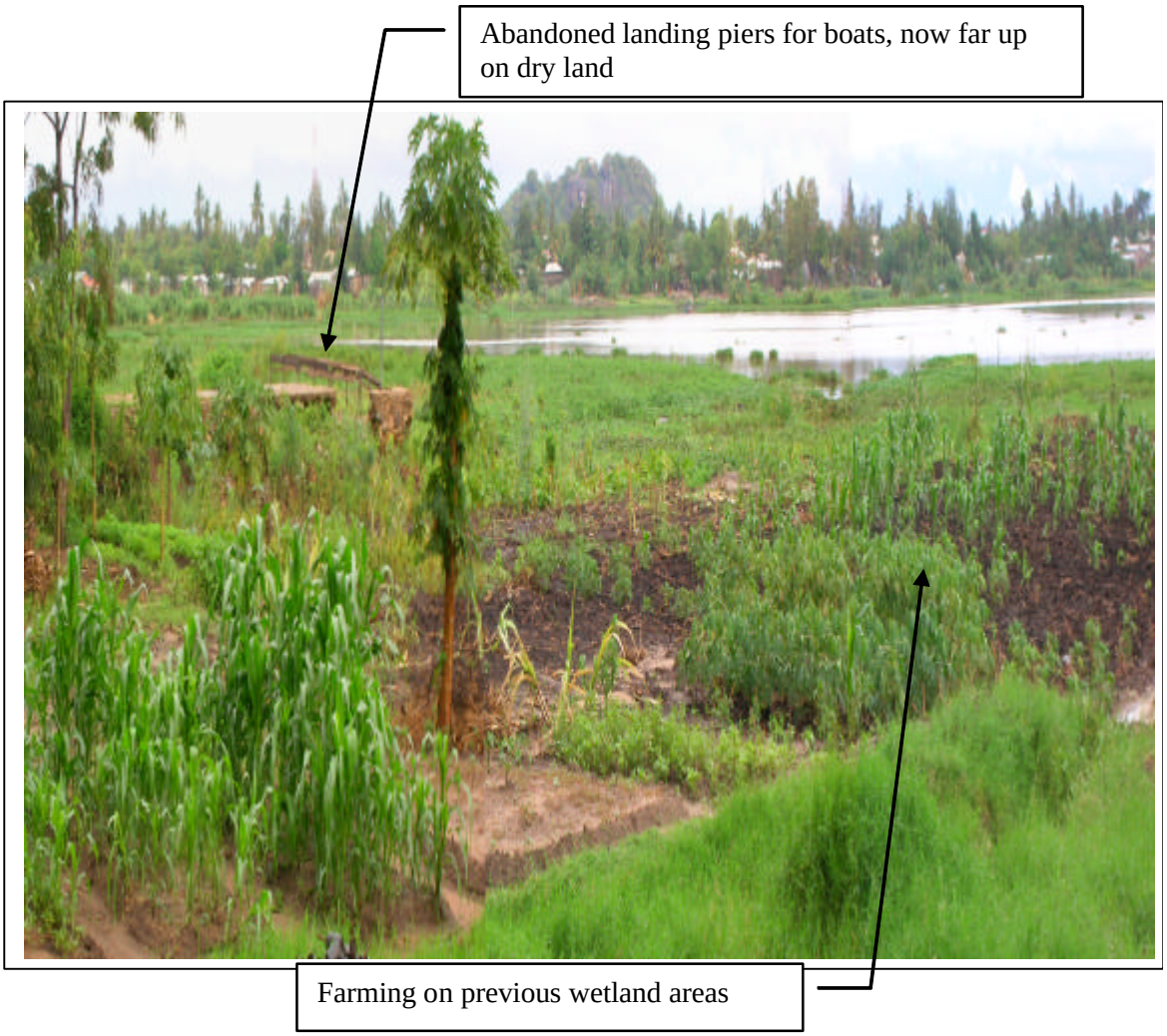


Figure 4: Overview of key environmental interventions in the Lake Victoria Basin *(*Figure from EAC Partnership Fund Review Report Novmber 2005, by Tore Laugerud, NCG)

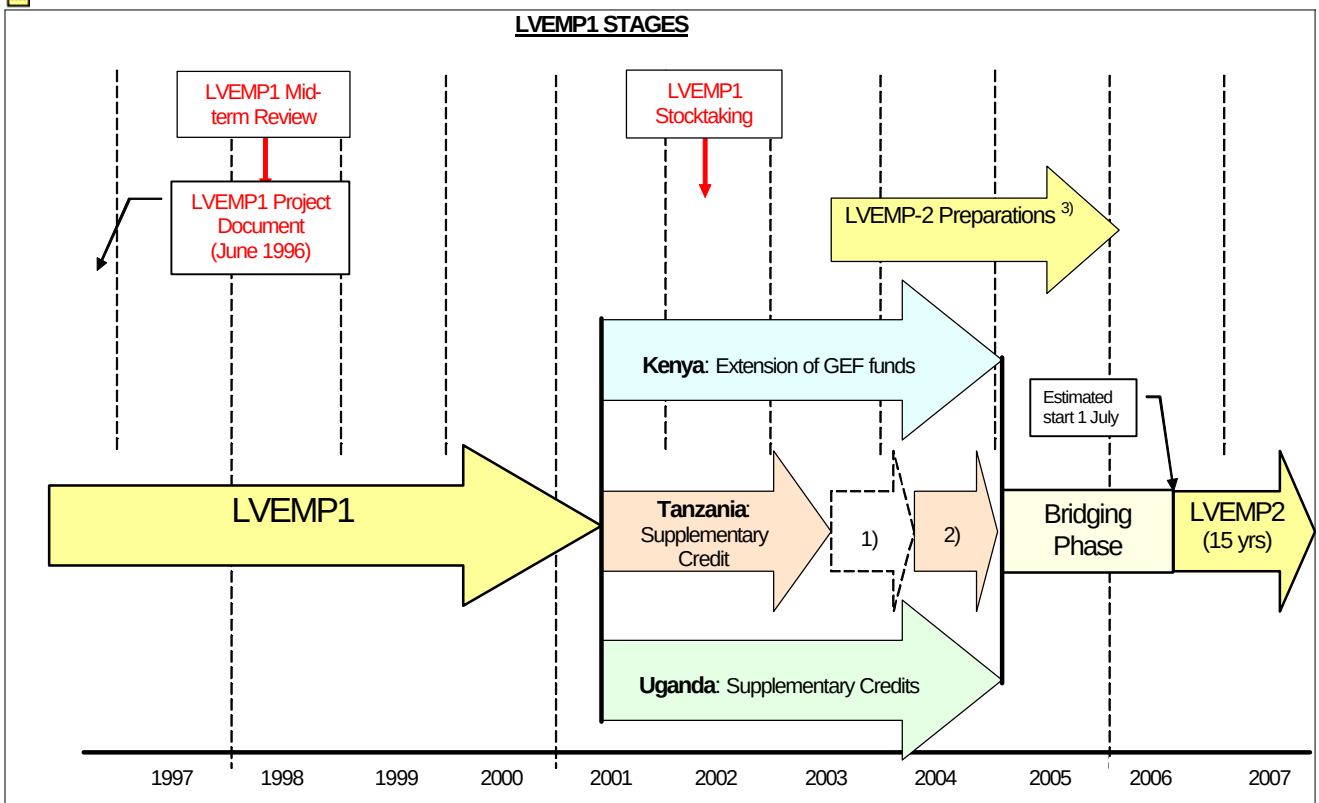


Effects of reduction of Lake Victoria water level at Musoma, Tanzania (© Tore laugerud, NCG March 2006)

Cultivation in dried up wetlands, Musoma, Tanzania (© Tore Laugerud, March 2006)

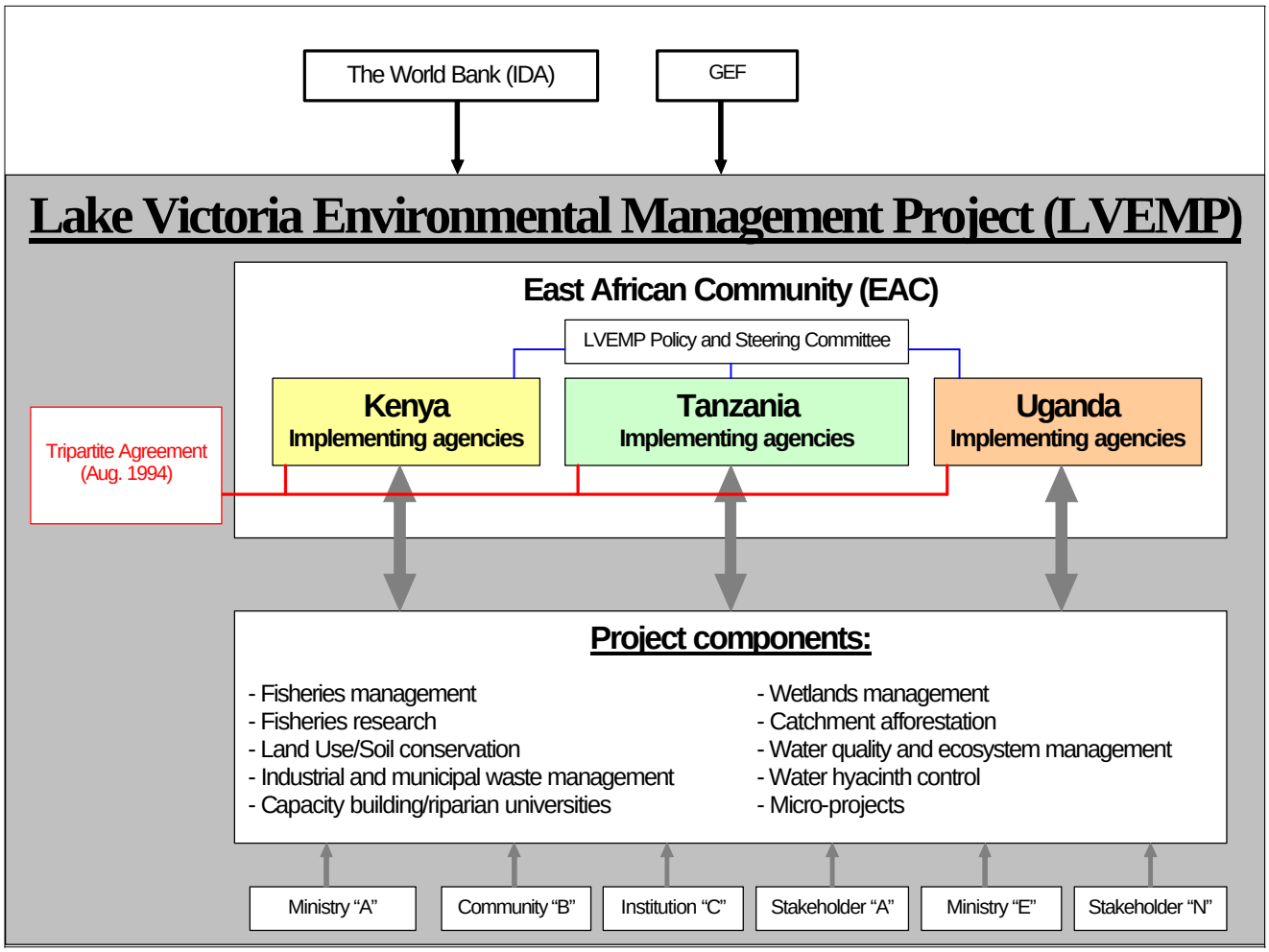
Additional Annex 9. Project Timeline and Structure - Figures

Figure 1: Different Stages of LVEMP1



NOTES:
1): Activities continued for 8 months with counterpart funds only
2): Supplementary Credit issued in June 2004, but delayed due to bureaucratic procedures
3): LVEMP-2 preparations funded by Japan (Policy and Human Resources Development) and GEF (Transboundary Diagnosis Analysis, incl. Burundi and Rwanda).
4): In total, almost USD 85 million has been spent under the project, around 52% of this being grants from GEF, the rest being credits from IDA. The distribution of the total funds between the countries has been: Kenya-29%, Tanzania-35%, and Uganda 36%.

Figure 2: Overall Project Structure



Additional Annex 10. List of Persons Contacted

Name	Position/Title	Institution
In TANZANIA		
Raymond J. Mngodo	National Coordinator (for Bridging Phase)	LVEMP, Ministry of Water (MAJI), Ubungo, Dar
Stanley Matowo	National Focal Point Officer	Ministry of Water (MAJI), Ubungo, Dar
Hassan Mjengera	Director of Water Laboratories. Coordinator, Water quality and Ecosystem Management Components (LVEMP)	Ministry of Water (MAJI), Ubungo, Dar
Cecile Ramsay	Operations Advisor	The World Bank, Dar
Francisca F. Katagira	Coordinator Water Hyacinth Control and Soil and Water Conservation	Ministry of Agriculture and Food Security, Dar es Salaam
Peter Chisara	Coordinator, Wetlands	National Environment Management Council, NEMC
Saidi Mbwana	Senior Operations Officer	LVEMP, Mwanza
Filemon Merik	Shopkeeper (wetlands products), nursery caretaker	Bubinza Village, Magu District, Mwanza Region,
Juma Chalele	Field Team Leader, Kalamera Catchment	LVEMP, Magu District Authorities, Mwanza Region,
Henrik Brundin	Project Manager	VI Agroforestry Project, Musoma Town, Mara Region
John Nnko	District Forestry Officer, rural	Musoma District, Mara Region
Balige El	Team Leader, Mara, Soil and Water Conservation Musoma	Musoma District, Mara Region
John Kindia	Forest Assistant, rural	Musoma District, Mara Region
Jonathan A. Mmbaga	Municipal Forest Officer	Musoma Municipality, Mara Region
Various people	Kwibuse Village	Tarime District, Mara Region
Farmer with woodlot	Kuruya Village	Tarime District, Mara Region
Revocathy Luhemeja	Village Executive Officer	Nyatwali Village, Magu District, Mwanza Region
Women group and farmer	Kalamera Village	Magu District, Mwanza Region
Dedan Sombe	Caretaker/Coordinator	Kyaka and Kyakairabwe weevil rearing stations (Kagera river), Bukoba, Kagera Region
Marco Vita	Laboratory Officer	Maji water laboratory, Bukoba, Kagera Region
Monica Kishe	BMU Leader	Nyamkazi Village, Mugezi Primary School for disabled persons, Kahororo Dipensary Bukoba
Braison Meela	Ag. Task Leader, Fisheries	LVEMP, Ministry of Agriculture and Food

	Management Component	Security, Mwanza
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