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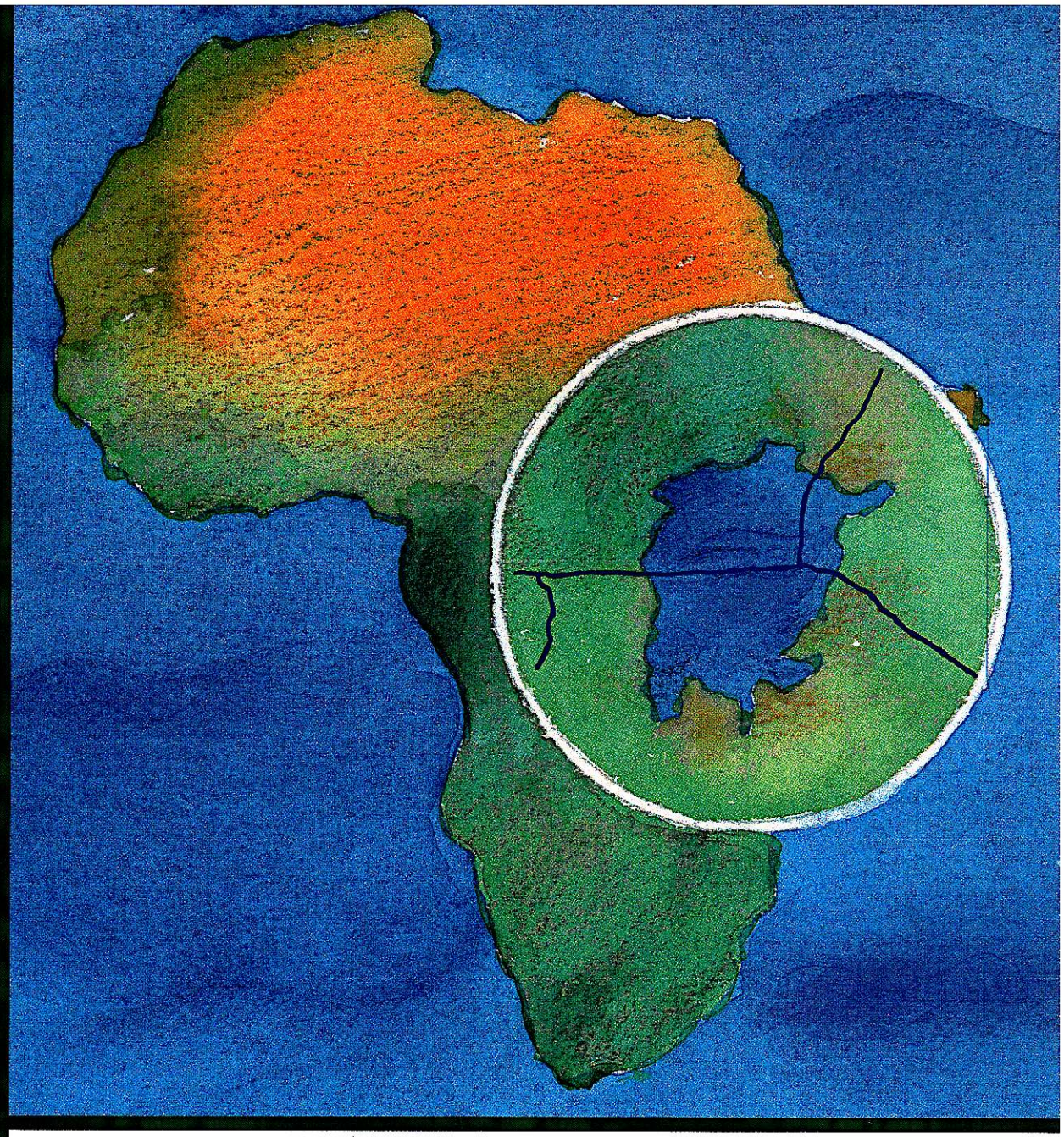

HIGH LEVEL SEMINAR ON
THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL CO-OPERATION ON LAKE VICTORIA

Convened and Hosted by the Secretariat of the Commission for East African Co-operation (EAC)

Supported by the Swedish International Development Co-operation Agency (Sida)

Assisted by the Stockholm International Water Institute (SIWI)

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High Level Seminar on the Assessment of Initiatives for Environmental Co-Operation on Lake Victoria

SIWI PAPER 1

High Level Seminar on the Assessment of Initiatives for Environmental Co-Operation on Lake Victoria

September 8-9, 1998
Arusha, Tanzania

Convened and Hosted by the Secretariat of the Commission for East African Co-operation

Supported by the Swedish International Development Co-operation Agency

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BACKGROUND, OBJECTIVES, AND EXPECTED OUTCOMES

High Level Seminar on the Assessment of Initiatives for Environmental Co-operation on Lake Victoria

September 8-9, 1998
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Background

The three countries of East Africa (Kenya, Tanzania and Uganda) are facing substantial ecological and environmental problems in the Lake Victoria Basin. Initiatives to solve these problems through co-ordinated actions by the riparian states are in place such as through the recent Tripartite Agreement on Lake Victoria Environmental Management Project and the Convention for the Establishment of Lake Victoria Fisheries Organisation. Similar problems are experienced elsewhere. For example, the countries surrounding the Baltic Sea have for decades faced substantial ecological and environmental problems due to emissions and discharges of polluting substances into the Baltic Sea and its drainage basin. Through a long-term co-operation among all concerned neighboring countries and a targeted action program, commendable improvements have been made in the situation. The experience gained by the Baltic Sea countries over the years could be used to build on the already initiated efforts by the riparian states of Lake Victoria to address the environmental and ecological problems in the lake basin.

Objectives

To discuss and share experiences at the technical, professional and administrative levels concerning the threats from human activities and the impacts on the water balance and the ecological conditions in Lake Victoria and Baltic Sea, respectively, and the consequences in the fields of economy, environment, health, food security, etc., if these threats are not abated.

Expected Outcome

- Increased knowledge of the Baltic Sea experiences which could be relevant to Lake Victoria;
- Strengthening the existing mechanism for continued regional co-operation in the Lake Basin; and
- Identification of areas where additional support may be needed to strengthen the existing initiatives in the three riparian states.

RECOMMENDATIONS OF THE HIGH LEVEL SEMINAR

RECOMMENDATIONS OF THE HIGH LEVEL SEMINAR ON THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL CO-OPERATION ON LAKE VICTORIA

September 8th – 9th, 1998
Arusha, Tanzania

The High Level Seminar on the Assessment of Initiatives for Environmental Co-operation on Lake Victoria was held on 8-9 September 1998 in Arusha, Tanzania. The Seminar, which was facilitated by the Secretariat for East African Co-operation, with support by the Swedish International Development Co-operation Agency and assistance of the Stockholm International Water Institute, was attended by representatives of the governments of Kenya, Tanzania, and Uganda, as well as representatives of intergovernmental organizations, non-governmental organizations, and international institutions. Representatives of the Government of Rwanda participated as Observers.

The objectives of the Seminar were to discuss and share experiences at technical, professional, and administrative levels concerning the threats from human activities and the impacts on the biodiversity, water balance, and ecological conditions in Lake Victoria and Baltic Sea, respectively, and the consequences in the fields of economy, environment, health, food security, etc., if these threats are not abated.

The Seminar noted the importance attached by the governments in environmental management and the ongoing reforms in legal and institutional sectors coupled with efforts to strengthen mechanisms for regional cooperation.

The Seminar:

Considered the environmental and socio-economic situation in the Lake Victoria basin, and the threats to the environment due to introduction of alien species such as the Nile Perch and the water hyacinth, pollution from municipal and industrial wastewater, poor land use practices, and wetland degradation;

Recognized the fact that poverty in the region is impacted by the environmental degradation and also that poverty in itself contributes to degradation;

Recognized the role of the public and, in particular the poor, should play in the process of decreasing poverty and environmental degradation;

Noted the ongoing environmental programs and initiatives in the Lake Victoria basins as the Lake Victoria Environmental Management Project, the FAO Project on Lake Victoria Water Resources Management, the Lake Victoria Fisheries Organization, the UNDP/UNEP program on environmental law and institutions in Africa, the Nile Basin Initiative, and other national, regional, and international actors involved;

Appreciated the need for a sustainable framework for the long-term as well as short-term environmental work related to the Lake Victoria;

Took note of the vast financial resources required to address the situation in the Lake Victoria basin;

Noted the successfully co-ordinated work taking place in the Baltic Sea region and its achievements, and recognizing its relevance to the Lake Victoria basin; and

The Seminar further noted Sweden's interest in the environmental management of Lake Victoria basin, and gaps in existing multilateral and bilateral assistance programs, and welcomed Sweden's participation in the process of strengthening the management of environment and development issues in the Lake Victoria basin.

Priority Areas for Intervention

The Seminar recommended the following five Priority Areas for Intervention.

1. Process for Enhanced Cooperation. Strengthening the ongoing process for improving regional cooperation, including the institutional, policy, and legal frameworks for the Lake Victoria basin. In that connection, the Seminar requested Sida to finance a study on the *Use and Management of Lake Victoria Resources and Environment*, to assess the adequacy and effectiveness of the existing institutions and recommend proposals for long-term intergovernmental cooperation on the Lake Victoria basin, in line with the terms of reference already approved by the Commission for East African Co-operation.

2. Point Source Pollution Control. Realizing that major pollution to Lake Victoria is from point sources – municipalities and industries – the most important action in order to save the Lake Victoria water quality is to reduce the pollution load from point sources. A project in this area should be to develop a comprehensive investment plan for reduction of the worst pollution sources.

3. Land, Soil, and Water Conservation. Bearing in mind the extent and severity of soil erosion and sedimentation and the comparative advantage and experience of Sida in addressing this particular problem in the Lake Region, the Seminar requested Sida's support to expand the existing programs of soil and water conservation, tree planting, and reclamation of degraded land.

4. Health Improvements. Additional efforts should be made to improve the health situation among the population through enhanced health service delivery as well as expanded rural water supply and sanitation.

5. Control and Management of Water Hyacinth. There is need to fill gaps in existing national and regional efforts to control water hyacinth. The current efforts to address the problems caused by water hyacinth are inadequate. In particular there is need to cut off excessive nutrient inputs from point and nonpoint source pollution, provide additional support for the ongoing efforts in manual and mechanical removal, and support the participation of Rwanda and Burundi in eradication of the weed. Furthermore, community based initiatives to use the weed for energy generation should be supported.

In undertaking the actions recommended above, special attention should be given to:

(A) Measures to Reduce Poverty

The Seminar noted the poverty issues coupled to opportunities for economic growth are of such a magnitude that they should be reflected in all actions taken to improve the situation in the Lake Victoria basin.

(B) **Measures to Build Capacity**

The Seminar noted that the national, district, and local capacity for economic growth and environmental management is limited, and realized the need to build and strengthen coordinated mechanisms and extension services for sustainable development at all levels. The program should cover training, awareness, and logistics at all levels and include actors from government, the private sector, and non-governmental organizations.

Action Plan

The Seminar urged the EAC Secretariat, in consultation with Sida, to work out a priority program for the implementation of the above recommendations.

In that connection, the Seminar requested Sida in consultation with the EAC Secretariat to propose a plan of activities making use of the Baltic Sea program experiences, and define the role the agency can play in facilitating financing and the implementation of the above priority program.

In the meantime, the Secretariat and Sida may agree upon proceeding with activities aimed at facilitating the process. This could i.a. include financing the study on regional institutional arrangements.

Arusha, Tanzania
9 September 1998

REPORT OF THE HIGH LEVEL SEMINAR

Secretariat of the Commission for East African Co-operation (EAC)

REPORT OF THE HIGH LEVEL SEMINAR ON THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL CO-OPERATION ON LAKE VICTORIA

Arusha, Tanzania, September 8-9, 1998

Supported by the Swedish International Development Co-operation Agency (Sida)

Assisted by the Stockholm International Water Institute (SIWI)

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REPORT OF THE HIGH LEVEL SEMINAR ON THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL CO-OPERATION ON LAKE VICTORIA

AICC, Arusha, Tanzania
September 8th – 9th, 1998

I INTRODUCTION

Organisation

1 The High Level Seminar On The Assessment of Initiatives For Environmental Co-operation On Lake Victoria, Co-sponsored by SIDA, Sweden and EAC Secretariat with the assistance of the Stockholm International Water Institute was held on 8th and 9th September, 1998 at AICC, Arusha, Tanzania.

2 The need for an international Seminar on the assessment of environment and development activities on Lake Victoria arose after it became apparent that there was lack of co-ordination of such initiatives at regional level.

3 After consultations, Sida and EAC agreed to co-sponsor the Seminar involving EAC Member States, local and international organisations as well as observers.

Attendance

4 The Seminar which was opened by the Vice President of the United Republic of Tanzania, who was represented by the Minister of State, in the Vice President's Office, was attended by the Chairman of the Permanent Tripartite Commission for East African Co-operation and Minister for Foreign Affairs and International Co-operation, United Republic of Tanzania and a High Level representative of the Government of Sweden.

5 It was also attended by participants from the Member States who included Permanent Secretaries from the Ministries responsible for Water, Land, Environment and Natural Resources. Representatives of intergovernmental organizations and international institutions also attended. Rwanda attended as observer. The full list of participants is attached to this report as Annex I.

II OFFICIAL OPENING

Opening Statements

6 Before the Vice President of the United Republic of Tanzania, H E Dr Omari Ali Juma officially opened the Seminar, there were introductory remarks by the East African Co-operation Secretariat, Executive Secretary, Amb Francis K Muthaura and the welcoming statement by the Chairman of the Tripartite Commission for East African Co-operation, Hon Jakaya Mrisho Kikwete.

7 In his introductory remarks Ambassador Francis K Muthaura, Executive Secretary, EAC Secretariat stated that under its partnership programme, the East African Co-operation seeks to establish its networks with a broad range of regional, international and inter-governmental organizations in order to generate resources to support its work. He thanked the Swedish International Development Agency (SIDA) for having been one of those organizations which has shown readiness to enter into development partnership with EAC, as is demonstrated by their co-sponsorship of the High Level Seminar.

8 The Chairman of the Permanent Tripartite Commission for East African Co-operation, Hon Jakaya Mrisho Kikwete, MP, Minister for Foreign Affairs and International Co-operation, United Republic of Tanzania before welcoming the Vice President to address the seminar, paid tribute to the Swedish International Development Agency (SIDA) who co-sponsored the Seminar and expressed his appreciation to all the delegates who attended the Seminar.

9 Minister Kikwete observed that Lake Victoria is a symbol of the natural and lasting unity of the three East African Co-operation Member States. He further observed that apart from the lack of existing effective co-ordinated regional arrangement for management and utilisation of the shared resources, the Lake Victoria Basin is also currently facing serious ecological and environmental problems. The most dramatic manifestation of these problems is, of course, the growth of the water hyacinth which threatens to choke the lake and render it into total environmental waste and disaster. The Chairman concluded by urging the Seminar, in its deliberations and in presenting its recommendations, to be guided by the sense of urgency as well as of commitment to action in addressing the issue of the management of the Lake Victoria resources.

10 The Chairman of the Commission welcomed Hon Bakari Mbonde, Minister of State, Vice President's Office, United Republic of Tanzania to deliver the Keynote address on behalf of the Vice President.

11 In his Keynote address, the Vice President stated said that the Lake Victoria environment embraces many aspects, including water quality, biodiversity, such as fishery and other organisms in the lake, and wetlands around it. The riparian countries have been in co-operation in various ways to preserve and conserve the lake and will continue to co-operate. However, for a successful environmental initiative, it is imperative to put in place effective co-ordination mechanism to avoid unnecessary duplication of efforts.

12 The Vice President told the Seminar that Lake Victoria initiatives should mainly be about changing peoples' behaviours regarding resource use and environmental protection, rather than changing nature which may prove difficult. People should, therefore, be made aware and sensitised about sustainable use of resources.

13 He further stressed that environmental problems facing the Lake are so related and intertwined to the extent that individual and sectoral approach and efforts cannot adequately address them. For this reason, it is important to approach them in a comprehensive manner.

14 Lastly the Vice President expressed his appreciation to the organisers for identifying Lake Victoria as an area requiring assistance and the Swedish International Co-operation Agency, SIDA, and the Stockholm International Water Institute for financial support.

15 Ambassador Lars-Göran Engfeldt from the Ministry of the Environment, Sweden, in his response, to the Vice President's address, stated that Sweden's relations with Africa have traditionally been at the center of the Swedish foreign policy. He lauded the increased regional co-operation in Africa in general and the revitalisation of East African Co-operation in particular.

16 Amb Engfeldt assured the seminar that Sweden is prepared to support regional initiatives if the commitment and ownership within the region is strong.

17 As regards Lake Victoria, he said that problems in the Lake and its catchment area are regional and affect the three countries as well as the neighbouring countries. He further observed that the experiences around the Baltic Sea have been similar to those experienced around Lake Victoria. He said that on their part, a strong commitment at the highest levels has been one of the pre-requisites for success. Another is the existence of effective instruments of action at the regional, national and local levels.

III OBJECTIVES OF THE SEMINAR

18 The objectives of the Seminar were to discuss and share experiences at technical, professional and administrative levels concerning the threats from human activities and the impacts on the bio-diversity, water balance and ecological conditions in Lake Victoria and Baltic Sea, respectively, and the consequences in the fields of economy, environment, health, food security, etc. if these threats are not abated.

IV SEMINAR PROCEEDINGS

19 Presentations made during the seminar covered the following main themes:

(i) Lake Victoria : A Shared Resource;

(ii) The Lake Victoria Basin: Natural Resources Under Environmental Stress;

(iii) Main Environmental Programmes in Lake Victoria: Activities Undertaken and Results Achieved; and

(iv) The Baltic Sea Environmental Co-operation: A Case Study.

20 Under each of these themes, specific topics were addressed, as follows:

Lake Victoria: A Shared Resource

- An Overview of the Lake Victoria Basin, its Environment and Natural Resources; and

- The Economic Values of Activities in the Lake Basin and How These Values Can be Affected by Mismanagement of the Environment and of Natural Resources.

The Lake Victoria Basin: Natural Resources Under Environmental Stress

- A Presentation of the Study Organised in 1997 by Sida: Overview and Proposals;
- Kenya: Land Use, Agriculture and Land Conservation Activities;
- Uganda: Water Quality and Minimising Pollution;
- Tanzania: Water Resources Demand and Management; and
- Kenya: Sida-Financed Lake Victoria Pollution Inventory.

Main Environmental Programmes in Lake Victoria: Activities Undertaken and Results Achieved

- Lake Victoria Environmental Management Project;
- Lake Victoria Water Resources Project;
- UNEP's Programmes Related to Lake Victoria;
- Need for a Permanent Mechanism to Address Environmental and Fisheries Issues of Lake Victoria;
- Lake Victoria Fisheries Research Project: Fisheries Research in the Light of the EU funded Project;
- New Initiatives for the Nile Basin; and
- The General Public's Involvement in Ongoing Activities and the Potential for the Future.

The Baltic Sea Environmental Co-operation: A Case Study

- The Baltic Sea and the Helsinki Convention;
- The Baltic Sea Joint Comprehensive Environmental Action Programme;

- The Role of NGOs; and
- Examples from Other Regional Areas including The North Sea, The Black Sea and the Great Lakes.

21 After each presentation, there was open discussion and summary of the conclusions.

22 The sessions were chaired by Permanent Secretaries from: Ministry of Water, Land and Environment, Uganda; Vice President's Office, Tanzania; and Ministry of Natural Resources, Kenya.

V OUTCOME OF THE SEMINAR

Conclusions

23 The ensuing discussions and sharing of experiences on the topics presented during the Seminar led to three main conclusions, that:

(i) there is need for strengthening the existing mechanism for continued regional co-operation in the Lake Basin;

(ii) additional support is needed to strengthen the existing initiatives in the three riparian states; and

(iii) Baltic Sea experiences could be relevant to Lake Victoria co-operation arrangement.

24 The Seminar further noted the importance attached by the governments in environmental management and the ongoing reforms in legal and institutional sectors coupled with efforts to strengthen mechanisms for regional cooperation.

25 In this regard, the Seminar:

(i) Considered the environmental and socio-economic situation in the Lake Victoria basin, and the threats to the environment due to the introduction of alien species such as the Nile Perch and the water hyacinth, pollution from municipal and industrial wastewater, poor land use practices, and wetland degradation;

(ii) Recognized the fact that poverty in the region is impacted by the environmental degradation and also that poverty in itself contributes to degradation;

(iii) Recognized the role of the public and, in particular the poor, should play in the process of decreasing poverty and environmental degradation;

(iv) Noted the ongoing environmental programs and initiatives in the Lake Victoria basins as the Lake Victoria Environmental Management Project, the FAO Project on Lake Victoria Water Resources Management, the Lake Victoria Fisheries Organization, the UNDP/UNEP program on environmental law and institutions in Africa, the Nile Basin Initiative, and other national, regional, and international actors involved;

(v) Appreciated the need for a sustainable framework for the long-term as well as short-term environmental work related to the Lake Victoria;

(v) Took note of the vast financial resources required to address the situation in the Lake Victoria basin;

(vii) Noted the successfully co-ordinated work taking place in the Baltic Sea region and its achievements, and recognized its relevance to the Lake Victoria basin; and

(viii) Furthermore, the Seminar noted Sweden's interest in the environmental management of Lake Victoria basin, and gaps in existing multilateral and bilateral assistance programs, and welcomed Sweden's participation in the process of strengthening the management of environment and development issues in the Lake Victoria basin.

Recommendations Arising from the Seminar

26 The Seminar identified priority areas for intervention and made respective recommendations for action as follows:

1. Process for Enhanced Cooperation.

Strengthening the ongoing process for improving regional cooperation, including the institutional, policy, and legal

frameworks for the Lake Victoria basin. In that connection, the Seminar requested Sida to finance a study on the *Use and Management of Lake Victoria Resources and Environment*, to assess the adequacy and effectiveness of the existing institutions and recommend proposals for long-term intergovernmental cooperation on the Lake Victoria basin, in line with the terms of reference already approved by the Commission for East African Co-operation.

2. Point Source Pollution Control.

Realizing that major pollution to Lake Victoria is from point sources – municipalities and industries – the most important action in order to save the Lake Victoria water quality is to reduce the pollution load from point sources. A project in this area should be to develop a comprehensive investment plan for reduction of the worst pollution sources.

3. Land, Soil, and Water Conservation.

Bearing in mind the extent and severity of soil erosion and sedimentation and the comparative advantage and experience of Sida in addressing this particular problem in the Lake Region, the Seminar requested Sida's support to expand the existing programs of soil and water conservation, tree planting, and reclamation of degraded land.

4. Health Improvements.

Additional efforts should be made to improve the health situation among the population through enhanced health service delivery as well as expanded rural water supply and sanitation.

5. Control and Management of Water Hyacinth.

There is need to fill gaps in existing national and regional efforts to control water hyacinth. The current efforts to address the problems caused by water hyacinth are inadequate. In particular there is need to cut off excessive nutrient inputs from point and nonpoint source pollution, provide additional support for the ongoing efforts in manual and mechanical removal, and support the participation of Rwanda and Burundi in eradication of the weed. Furthermore, community based initiatives to use the weed for energy generation should be supported.

In undertaking the actions recommended above, special attention should be given to:

Measures to Reduce Poverty

27 The Seminar noted the poverty issues coupled to opportunities for economic growth are of such a magnitude that they should be reflected in all actions taken to improve the situation in the Lake Victoria basin.

Measures to Build Capacity

28 The Seminar noted that the national, district, and local capacity for economic growth and environmental management is limited, and realized the need to build and strengthen coordinated mechanisms and extension services for sustainable development at all levels. The program should cover training, awareness, and logistics at all levels and include actors from government, the private sector, and non-governmental organizations.

VI ACTION PLAN

29 The Seminar urged the EAC Secretariat, in consultation with Sida, to work out a priority program for the implementation of the above recommendations.

30 In that connection, the Seminar requested Sida in consultation with the EAC Secretariat to propose a plan of activities making use of the Baltic Sea program experiences, and define the role the agency can play in facilitating financing and the implementation of the above priority program.

31 In the meantime, the Secretariat and Sida may agree upon proceeding with activities aimed at facilitating the process. This could i.a. include financing the study on regional institutional arrangements.

Arusha, Tanzania
9 September 1998

OPENING REMARKS

Welcoming Remarks: F.K. Muthaura, Executive Secretary, Secretariat of the Commission for East African Co-Operation

Welcoming remarks by the Executive Secretary of EAC, Amb. Francis K. Muthaura, at the Opening of the EAC High-Level Seminar on the Assessment of Institutions for Environmental Co-operation on Lake Victoria, AICC, Arusha 8 September, 1998

Chairman of the Permanent Tripartite Commission for East African Co-operation, Hon. Jakaya Kikwete

Hon. Minister of State in the Vice-President's Office, United Republic of Tanzania, Hon. Bakari Mbonde

Distinguished Representatives of the Swedish Government, Ambassador Lars-Göran Engfeldt

Distinguished Participants

Ladies and Gentlemen

On behalf of the Secretariat, it is my pleasure to welcome you to this High-Level Seminar on the Assessment of Institutions for Environmental Co-operation on Lake Victoria. Special appreciation goes to those participants who have

travelled a long distance from outside our region to be with us today. In particular, I wish to commend the Government of the United Republic of Tanzania for initiating, with the Swedish International Development Agency, the process for this important Seminar.

We are privileged to have the Chairman of the Permanent Tripartite Commission for East African Co-operation, Hon. Jakaya Kikwete, Minister for Foreign Affairs and International Co-operation, Tanzania, accept to chair the Opening Session of this Seminar. Furthermore, Hon. Bakari Mbonde, Minister of State in the Vice-President's Office of the United Republic of Tanzania will be delivering the key-note speech on behalf of the H.E. the Vice President who for unavoidable circumstances could not be with us this morning.

Under its partnership programme, the East African Co-operation seeks to establish its networks with a broad range of regional, international and inter-governmental organisations in order to generate resources in support of its work. I would like to thank the Swedish International Development Agency (SIDA) for having been one of those organizations which have readily entered into development partnership with us, as indeed demonstrated by their co-sponsorship of this High-Level Seminar.

As I have stated, this is the first High-level Seminar of its kind in the context of the East African Co-operation. We intend, in due course, to hold such seminars which are specifically targeted on various areas of co-operation, in particular, on the critical issues relevant to the promotion of regional trade and investment.

In prioritizing the programme for Lake Victoria, East African Co-operation recognizes that the Lake is one of the most important of the shared natural resources of our region which, if rationally utilized, could be the centre-piece of the regional integration being pursued. Indeed, the lake provides enormous potential for transportation, fisheries, tourism, agriculture, water, power, industries and support for the eco-systems in the lake basin.

It is gratifying that the Swedish International Agency for Development has facilitated this Seminar which will also discuss the regional co-operation on the Baltic Sea. Being one of the most successful regional co-operation arrangement on a heavily used sea by many industrial countries, it is a useful example from which the co-operation we are developing on the Lake Victoria could borrow experience. The Secretariat hopes that the East African Co-operation will benefit immensely from the discussion of this important presentation.

Moreover, the Lake presents multi-sectoral challenges and opportunities, requiring scientific and technical and financial inputs thus offering opportunities for investments, from both within and outside our region. It is to be appreciated that past initiatives to harness the resources of Lake Victoria have had limited success. This is, primarily because those initiatives have been largely of the stand-alone variety, from the point of view of the sectors involved and of the national boundaries to which they were confined.

With the re-establishment of the East African Co-operation, the consensus is finally emerging that this piece-meal approach to the utilization, development and protection of the resources of the Lake should give way to a comprehensive strategy involving the three partner States, all the socio-economic operators in the lake and within its basin, as well as the general population which is dependent on the lake and its catchment area.

In view of the credentials of the participants and the topics to be addressed, I am confident that this High-Level Seminar will make a starting point of a new action-oriented phase of sound environmental management and a maximization of the resources of the Lake.

With these few remarks I thank you, once again, and wish the Seminar success. It is now my pleasant duty to invite the Chairman of the Permanent Tripartite Commission to address the Seminar.

Thank you.

EAC Secretariat
Arusha

8 September, 1998

Opening Statement and Chair: Honorable Jakaya M. Kikwete, Minister for Foreign Affairs and International Co-operation, Tanzania, and Chairman of the Commission for East African Co-operation

Statement by Hon. Jakaya Kikwete, M.P., Minister for Foreign Affairs and International Co-operation, Tanzania & Chairman, Permanent Tripartite Commission for East African Co-operation to the EAC High-level Seminar on the Assessment of Initiatives for Environmental Co-operation on Lake Victoria AICC, Arusha, Tanzania, 8 September, 1998

Hon. Bakari Mbonde, Minister of State, Vice President's Office, United Republic of Tanzania

Distinguished Representative of the Swedish Government, Ambassador Lars-Göran Engfeldt

Distinguished Participants

Ladies and Gentlemen

On behalf of the Commission for East African Co-operation, it is my great pleasure to welcome you to this important High-level Seminar on Assessment of Initiatives for Environmental Co-operation on Lake Victoria. To those of you who come from outside Tanzania, welcome to Tanzania and Arusha in particular. I extend a warm welcome to Hon. Bakari Mbonde, Minister of State, Vice President's Office, who is representing H.E. the Vice-President of the United Republic of Tanzania.

I should also like to pay tribute to the Swedish International Development Agency (SIDA) who have co-sponsored the Seminar. Sweden has a longstanding and wide experience in the management of the Baltic Sea which is one of the busiest integrated water bodies in the world. As we in the East African region embark on a thoroughgoing co-operation in the environmental management of the world's second largest fresh water lake, we stand to benefit a lot from Sweden's experience in the elaborate regional arrangement for the management of the Baltic Sea.

Let me also express my appreciation to all the delegates, Permanent Secretaries and other senior officials and experts from our region, and the representatives of international, inter-governmental and non-governmental organisations, who by their attendance, have demonstrated their faith in this Seminar convened to address one of the most critical concerns of our evolving regional co-operation.

Hon. Minister,

Bestriding the countries of our region is the vast Lake Victoria. This Lake is a symbol of the natural and lasting unity of the three East African Co-operation countries. Perhaps, besides the airspace, there is nothing most East African than this lake. Beyond its symbolic significance, the lake is a resource of inestimatable potential in, among others, fisheries and tourism development; transport and communication; water and energy; agriculture and industry; and in trade and investments.

Apart from the lack of existing effective co-ordinated regional arrangement for management and utilization of the shared resource, the Lake Victoria Basin is currently also facing serious ecological and environmental problems. The most dramatic manifestation of these problems is, of course, the rise of the water hyacinth which threatens to choke the lake and render it into a total environmental waste and disaster.

Evidently, the problems, challenges and opportunities posed by the lake are today of such magnitude that they cannot be faced by the riparian states acting separately.

Our challenge, of course, the challenge of this High-level Seminar, is to contribute to the development of a collective approach to roll back the environmental threat that hangs over the Lake and unlock the vast potential of the lake for the benefit of the people of the region.

Underpinning the East African Co-operation Development Strategy (1997-2000) and the upcoming Treaty for the Establishment of the East African Community is the commitment of the Member States to the rational utilization and maximization of shared resources for mutual benefit. Specifically, the East African Co-operation Development Strategy designates Lake victoria as a regional economic growth zone which should be developed as such. Further, the Strategy emphasizes a co-ordinated process in the exploitation of the resources of the lake; management of its resources and development of adequate and reliable infrastructure, including safe navigation on the lake.

This Seminar which has involved the participation of a high calibre of experts representing a wide range of disciplines, professions and other capabilities in the management of the Lake and its Basin is indeed an indication of the seriousness with which the region intends to marshall the effort for Lake Victoria.

At this seminar, the perspective of East Africans will be presented and the experience of the Baltic Sea will be shared with us by our Swedish friends and partners. At the end, this Seminar will have to come up with concrete proposals on the way forward. I pray that this seminar will be the beginning of practical measures being taken to make Lake Victoria the real jewel of Africa.

The Commission for East African Co-operation has high hopes on the outcome of this High-Level Seminar. We urge the Seminar, in its deliberations and in presenting its recommendations, to be guided by the sense of urgency as well as of commitment to action in addressing the issue of the management of the Lake Victoria resources.

With these few remarks, it is now my honour and pleasure to invite the Minister to give his keynote address and officially open our Seminar.

Thank you.

8 September, 1998

Keynote Address: Vice President His Excellency Dr. Omar Juma, United Republic of Tanzania, Delivered by Honorable Bakari Mbonde, M.P., Minister of State, Vice President's Office

ADDRESS BY H.E. THE VICE PRESIDENT, DR. OMAR ALI JUMA, AT THE OPENING OF HIGH LEVEL SEMNAR ON THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL COOPERATON ON LAKE VICTORIA ARUSHA, SEPTEMBER, 8,1998

Chairman of the Tripartite Commission,
Permanent Secretaries,
Distinguished Participants
Ladies and Gentlemen,

I must first of all thank the organisers of this seminar for the invitation to participate at the opening ceremony. I am indeed delighted to be associated with this high level international seminar on the assessment of initiatives for environmental cooperation on Lake Victoria.

I commend the Secretariat of the East African Cooperation for giving emphasis to environmental management in this early phase of the restoration of cooperation among our three states. Sound environmental management is pivotal to sustained development in the sub-region and it must be admitted that

there are numerous problems to be tackled including pollution and land degradation leading to desertification.

I also commend the organisers of the Seminar which is bound to strengthen the existing mechanism for continued regional co-operation in the Lake Basin, including identification of areas where additional support may be needed to consolidate current initiatives in the three riparian states. This seminar has therefore come at the right time when the three countries bordering the Lake are making serious effort to reverse the escalating environmental deterioration in and around the Lake.

Chairman,

This seminar is very important because it will discuss and assess initiatives for environmental cooperation on Lake Victoria through sharing of experiences at technical, professional and administrative levels concerning the threats from human activities and impacts on the water balance and ecological conditions. In this context the Baltic Sea experience could be relevant to lake Victoria, which is of great regional and international importance. It is the second largest fresh water body after Lake Superior. The gross economic product of the lake catchment is in the order of UD $3-4 billion annually and supports an estimated population of 25 million

people. Its fishery is one of the most important inland fishery in Africa with an annual catch estimated at between 400,000 to 500,000 metric tonnes, generating US $300 – 400 million. The lake is major source of water for domestic, industrial, agricultural usage as well as hydropower generation. It is a renowned world heritage site of tremendous biological importance harbouring over 500 endemic fish species. Besides providing employment, it also facilitates communication in the area.

Over the last three or so decades, however, the lake has undergone drastic changes in its trophic state. Some of the clear signs of these changes include frequent loss of indigenous fish species, and prolification of water hyacinth weed to mention just a few. Hidden behind these signs of lake sickness are casual factors namely growing rates of human population at rates among the highest in the world, poverty and unregulated development in the catchment all resulting in imprudent patterns of human use and the subsequent pollution of the Lake. Another serious problem is illegal fishing, including the use of nets with small eyes, dynamite and even poisons, like thiodine.

Mr. Chairman,

Since the United Nations Conference on Environment and Development in 1994, the three riparian countries have taken various initiatives to improve the management of the Lake Victoria environment. These initiatives include, inter alia, the formulation of National Environment Action Plans in all riparian countries which recognise the serious environmental problems facing Lake Victoria and Development of National Policies on Environment including strengthening of national institutions dealing with environment. Other initiatives whose details will be provided by experts include the following regional efforts:

(a) The Tripartite agreement on the development and implementation of the Lake Victoria Environment Management Programme.
(b) Lake Victoria Water Resources
(c) Lake Victoria Fisheries Organisation
(d) Lake Victoria Fisheries Research Project

These initiatives are at an infant stage and need continuous regional and international support.

Mr. Chairman,

I hope your deliberations will touch on the following areas, among other things:-

Need for Cooperation and Coordination

The Lake Victoria environment embraces many aspects, including water quality, biodiversity, such as fishery, and other organisms in the lake, and wetlands around it. Our riparian countries have been in cooperation in various ways to preserve and conserve the lake and we will continue to cooperate. But for a successful environmental initiative it is imperative to put in place effective coordination mechanism to avoid unnecessary duplication of efforts. This mechanism is already there in the form of Lake Victoria Environment Management Program, with the assistance of the World Bank and the Global Environment Facility. We thank them for this assistance. What is now needed is to strengthen this mechanism and I hope you will explore ways of doing that.

Addressing causes of problems

I am sure you will agree with me that many projects pay far more attention on fighting symptoms rather than addressing the real causes of the problem. This is fighting a loosing war. For example for Lake Victoria, it is likely to get positive results if combined efforts are made to address poverty and rising population together with proper resource utilisation rather than emphasizing on resources only. Likewise if we do not cut

off the input of nutrients into the lake, the growth of weeds will continue and beat all efforts to control it.

Change peoples' attitudes

Lake Victoria initiatives should primarily be about changing peoples' behaviour regarding resource use and environmental protection rather than changing nature which may prove difficult. People should therefore be made aware and sensitised about sustainable use of resources.

Need for Comprehensive Approach

Environmental problems facing Lake Victoria are so related and intertwined to the extent that individual and sectoral approach and efforts cannot adequately address them. For this, it is important to approach them in a comprehensive manner.

Mr. Chairman,
Ladies and Gentlemen,

Before I conclude my remarks, I wish to once again sincerely thank the organisers of this seminar for inviting me to launch the seminar, the organising committee for choosing Lake Victoria as a place to assist, and last but not least the Swedish

International Development Cooperation Agency, SIDA, and the Stockholm International Water Institute for their financial support.

I wish you a successful deliberation and declare the seminar on the assessment of initiatives for environmental cooperation on Lake Victoria officially opened.

Thank you for your attention.

Response: Ambassador Lars-Göran Engfeldt, Ministry of Environment, Sweden

HIGH LEVEL SEMINAR ON THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL CO-OPERATION ON LAKE VICTORIA

Opening statement by Ambassador Lars-Göran Engfeldt, Ministry of the Environment, Sweden

Arusha, Tanzania, September 8, 1998

Ambassador Muthaura, Honorable Jakaya Kikwete, Honorable Bakari Mbonde, Excellencies, Ladies and Gentlemen,

Sweden's relations with Africa have traditionally been at the center of the Swedish foreign policy. This has manifested itself in ambitious development cooperation programmes and many other links between the continent and Sweden. This year our Government adopted a **new Africa policy,** preceded by close consultations with our African partners. One central feature is to welcome the focus on each country's responsibility for its own development that many African leaders now emphasize. Another is to redefine the nature of relations between ourselves and our African friends. This is in line with ideas developed in the international discussion of recent years and can be summarized in the notion of **partnership**. The central focus of this concept is not on donors and recipients, but on two parties collaborating to attain jointly formulated goals. This important seminar is a concrete outflow of these inspiring developments.

It is a great honour for me and my colleagues on the Swedish side to be present at this prestigious gathering. We will listen attentively to the presentations on the environmental and natural resource problems in the Lake Victoria basin and the efforts undertaken to deal with them so far. We will contribute with some experiences of our own, not least dealing with the Baltic sea. To-morrow, we will have a meeting of minds on possible avenues of co-operation. Our possibilities to move forward together will depend on the existence of a political and technical platform that is firmly anchored and supported here in the region. In such a situation, I can see promising opportunities with a very active involvement by my Government. I can assure you that the problems we are going to deliberate on are perceived by the Swedish Government to be of the highest significance.

This brings me to the importance of increased **regional co-operation** in Africa. The motives are many. With increased collaboration and integration between African countries regional imbalances can be reduced, conflicts can be managed and prevented, shared resources can be sustainably managed and the national economies can develop. In a region fraught with very difficult problems, marked by the upheavals in the Great Lakes area in recent years, the revitalization of East African co-

operation is a heartening development. We have noted the impressive work that has already been achieved in strengthening practical co-operation in East Africa and also the vision for full integration in the future. Indeed, the fact that the East African Secretariat is hosting this meeting has considerable symbolic significance.

I wish to underline again that Sweden is prepared to support regional initiatives if the commitment and ownership within the region is strong.

The overall **aim of Swedish support to Africa** is to reduce poverty among the people by creating conditions which will permit economically and ecologically sustainable development. Since the countries in East Africa became independent, Sida has worked in supporting development in the region through programmes in areas such as natural resources, health, water and sanitation, education and infrastructure. Many of these programmes are located around Lake Victoria. Taken together, these activities have accumulated a lot of experiences and generated insights, which could be of value in further deliberations on remedial actions in the Lake Victoria Basin.

The **environmental situation** in the Lake Victoria Basin has led to growing alarm. The situation which affects both land-based and lake-based sources of livelihood, requires in many cases long-term projects at regional, national and local level as well as projects of an emergency character. Lake Victoria is indeed a prime example of a comlex of issues that require regional co-operation for their solution.

It is positive and important that the countries in the region are moving rapidly in assuming responsibility to attempt to break the trend of increasing discharges of effluents and pollution as well as the deterioration in the aquatic situation in the Lake Victoria. Some serious problems, like the water hyacinth, are of an urgent character and require immediate measures. A lasting solution must, however, be seen in long-term and sustainable improvements of the environmental situation around the lake.

Several long-term programmes have been started by the countries bordering Lake Victoria in co-operation with various multilateral organisations, development banks and bilateral donors. One of the most significant of these is the Lake Victoria Environment Management Programme (LVEMP). It is important that these programmes can be completed speedily to reduce the need for emergency measures/projects in the future.

The problems in Lake Victoria and its catchment area are regional and affect the three countries bordering Lake Victoria as well as Rwanda and Burundi. Regional agreements or conventions have proved elsewhere to be a prerequisite for the effective and efficient implementation of complex

projects, as for example in the programme of Baltic Sea Co-operation (HELCOM) in Europe, co-operation between countries in the Mekong river in Asia, and co-operation in respect of water resources in southern Africa. It is our hypothesis that the **experience gained and lessons learned from the Baltic Sea co-operation** could be an interesting input in a deepening regional co-operation in the Lake Victoria basin in future. This meeting will give us guidance on whether this is valid or not.

Our experiences around the Baltic Sea have been similar to those experienced around Lake Victoria. We have together with our neighbours found that sustainable solutions are possible to attain. A strong commitment at the highest levels has been one prerequisite for success. Another is the existence of effective instruments of action at the regional, national and local levels.

The general background which I have just outlined has prompted the Swedish Government to initiate contacts in the region in order to ascertain whether there are areas where Sweden could contribute constructively, without duplicating other efforts. This seminar is a first result of this process. We have a high interest and commitment and hope that it will be possible to reach a stage where formal decisions can be taken on Swedish support.

We look forward very much to our common deliberations to-day and to-morrow

LAKE VICTORIA: A SHARED RESOURCE

An Overview of the Lake Victoria Basin, Its Environment and Natural Resources

THE LAKE VICTORIA BASIN:

PERSPECTIVES OF ITS ENVIRONMENT AND NATURAL RESOURCES

BY PROF. J. OKEDI

EXECUTIVE DIRECTOR
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
(NEMA)
UGANDA

September 1998

The lake shoreline is divided into the three countries as follows:

Uganda	50%
Tanzania	33%
Kenya	15%

The lake is shallow, maximum depth 80m and mean depth at 40m with a long convoluted shoreline of approximately 35,000km convoluted. Hence the lake is fringed by an extensive system of swamps and wetlands. The main sources of water is direct precipitation (about 85%). Rivers and tributaries contribute only about 15%. Most of the rivers enter the lake through extensive wetlands which tend to increase evapotranspiration but play a major role as sinks for land based pollutants. The main inflow is the Kagera (44% of inflows) from the Western highlands of Burundi, Rwanda through Uganda and Tanzania, the Katonga from Western Uganda and numerous smaller rivers draining Mt. Elgon through Kenya like the Nzoia, Sio, Nyando and Sondu. Other smaller rivers drain into LakeVictoria from the central plateau in Tanzania e.g. the Mara, Mbalageti, Simiyu, Magogo etc. (Fig. I). Water loss is mainly through evaporation and the rest through the Nile.

1.3 CLIMATE

The Lake Victoria Basin lies across the Equator with two main rainy seasons (March - May) and (August - October). Annual rainfall is between 1250 - 2020mm. Two dry seasons occur in December - February and June - July. Temperatures on average are favourable with small fluctuations between 21 - 25°C. The South East Trade winds play a large influence in the region.

1.4 POPULATION

The Lake Victoria catchment is reckoned to have a population about 30 million with a high growth rate of around 3%. The Gross Economic Product of the lake catchment is US$3-4 billion annually with an income per capita of between US$90-270. There is a high rate of rural urban migration in the region giving an annual growth rate of 3.5% in many towns.

1.5 AGRICULTURE

Suitable soils, amiable climate and adequate rainfall combine to make the Lake Victoria basin principally an agricultural area. The region has some of the most productive lands generating high value cash crops like coffee, cotton, tobacco and now flowers, vanilla, fruits and vegetables. The medium elevation areas have sustained the keeping of large herds of livestock by traditional pastoralists. The famous cattle corridor of East Africa lies largely in the Lake Victoria catchment.

1.9 WATER RESOURCES

The Lake Victoria Basin is very important as a source of water for domestic, industrial and animal consumption, transport, sport and recreation, hydropower production, fisheries as well as regulation of climate and weather. Whereas the rivers have been used to carry away industrial and domestic effluent, the lake itself has acted a sink for most of the catchment pollutants. For tourism, the lake and its rivers is becoming increasingly important for water sports, rafting, sailing and sport fishing.

1.10 BIODIVERSITY

Research conducted in the 1960's showed that Lake Victoria had a very rich fish species diversity of between 200 - 300 species composed mostly of the *cichlid genera* particularly the *Haplochromine* species flock. The speed of speciatiom in Lake Victoria was truly staggering in that this large species composition thought to have arisen in the last 10,000 - 15,000 years only. Most of the species are endemic. Hence this lake is a very important genetic pool which could be exploited for man's benefit.

Besides fish species, the lake is known to contain unique plants, algae, zooplankton and other benthic invertebrates. The massive quantities of lake flies which swarm regularly according to lunar phases is a resource that is yet to be exploited by man.

Further, research under EAFFRO in the late 1960s indicated that animal and plant material in the muds of Lake Victoria did not undergo complete decomposition on death. It was discovered that this was due to the presence of a possible strong antibiotic produced by an unidentified algae. This discovery has tremendous medical and economic significance but is yet to be taken to its logical end for man's benefit.

1.11 POSSIBLE GAS DEPOSITS

Huge balloon like deposits of methane gas were discovered by EAFFRO scientists carrying out research in Lake Victoria in the 1960s. These deposits were extremely large covering large areas of the bottom of Lake Victoria. It is now necessary to quantify these deposits and find ways of exploiting the gas commercially in a region that imports all its oil and gas energy resources.

1.12 WETLAND RESOURCES

Most of the fringing areas of Lake Victoria are covered by large expanses of wetlands which are either permanent or seasonal. Similarly many of the rivers and streams are fringed by swamps and often empty into the lake through vast swamp ecosystems. These vast wetland ecosystems contain important resources like the *Clarias*, *Protoptanus* and other migratory fish species. Other resources include valued hardwoods for timber, grasses for roofing, reeds

the chemical and physical features of its water medium. Most of the recent observed changes in the Lake Victoria Basin have been associated with human activity.

2.2.1 There has been rapid population growth in the basin from less than 5 million to now 25million people in less than a century.

2.2.2 There has been rapid rural to urban migration in the basin often creating inadequately planned towns like Kampala, Jinja, Masaka, Tororo, Mukono in Uganda, Kisumu, Eldoret, Houna Bay, Bungoma, Kakamega, Kisii and Kericho in Kenya and Mwanza, Bukoba and Musoma in Tanzania. Most of these urban centers have inadequate solid waste and effluent management systems in place. Good examples are provided by Kampala City where 2800m^3 of solid waste is generated daily and only 50 percent is collected. In Mwanza 200 metric tons of solid waste is generated daily but only about 40 percent is collected.

2.2.3 Recent introduction of alien fish species into Lake Victoria has caused rapid decline in species composition. The appearance of *Lates niloticus,* the Nile Perch, in the 1960s has seen the decimation of the 200 plus species of the Haplochromis cichlid group to a few representatives. The other foreign cichlids of *Oreochromis niloticus* may have outcompeted the endemic Tilapiines of *Oreochromis esculenta* and *Oreochromis varabilis*

2.2.4 There has been rapid expansion of agricultural activity in the basin for the growth of monoculture commercial crops like Tea, Sugarcane, Cotton and flowers where fertilizers and pesticides are heavily used.

Current estimates of nutrient input into Lake Victoria from Agriculture and rainfall runoff are as follows in metric tons

	Total Nitrogen	**Total Phosphorus**
Kenya	26,000	11,374
Uganda	16,860	5,564
Tanzania	11,480	665
Total	**54,340**	**17,603**

2.2.5 After the devastating tsetse fly invasion at the turn of the century, there has been rapid growth in cattle population in the basin resulting in soil degradation and soil compaction on a large scale e.g. along the cattle corridor.

2.2.6 Large scale deforestation has taken place in the catchment including on the hills, river banks and lakeshores. This has largely been due to increased demand for building timber, fuel wood

3.1 The increased demand for fish both for local consumption and more so for export has led to over fishing, using illegal destructive nets and even using pesticides for catching fish.

3.2 Frequent occurrence of algal blooms.

3.3 A two fold increase in algal productivity and biomass.

3.4 A turbid lake with reduced transparency.

3.5 Prolonged anoxia now covering 50 per cent of the lake bottom.

3.6 Double increase in phosphate level

3.7 Prolonged periods of thermal and oxygen stratification.

3.8 Current estimates put waste water input into Lake Victoria at 2300m^3 per day.

3.9 Also a pollution load of 2000kg. BOD is being imputed into Lake Victoria daily.

3.10 It is estimated that between 2500 - 3500 kg. of suspended solids enter the lake daily.

3.11 The lake is now experiencing rapid eutrophication i.e.

* Rise in nutrient levels
* Increased shading
* Reduced transparency
* Emergence of aquatic weeds (Water Hyacinth)
* Greater deoxygeneration
* Increase in onoxia
* Greater stratification
* Changes in water colour
* Foul smell of water
* Occurrence and prerelance of algal blooms

3.12 Recent changes in the water quality, pollution and alien introductions has led to an apparent huge decline in the stocks of fish in Lake Victoria. The species composition has also reduced drastically with apparent disappearance of delicacies like the Ningu, *(Labeo)*, the Ngenge *(Oreochronis niloticus)*, the *Schilae*, the Kisinja *(Barbus altianalis)* and the Elephant Snout fishes *(Mormyridae)*.

3.13 The sum total of all these changes is scenesence of this young shallow lake. Hence it will die and be replaced by a succession of wetland/terrestrial plants. When will it die? Not within our life time but within a fairly short geological time scale. Human polluting and degradation

The Economic Values of Activities in the Lake Basin and How These Values Can be Affected by Mismanagement of the Environment and of Natural Resources

ECONOMIC VALUES OF THE NATURAL RESOURCES IN THE LAKE VICTORIA BASIN AND RELATED ENVIRONMENTAL ISSUES[1]

By
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1.0 INTRODUCTION

Lake Victoria is the second largest freshwater lake in the world with a surface area of about 68,800 Square Kilometres. It has a catchment of 184,000 Square Kilometres and a 3,500 kilometres long shoreline. It is shared commonly by the three East African countries with 6 percent being in Kenya, 49 percent in Tanzania and 45 percent in Uganda. The lake's resources and its catchment presently support an estimated population of about 30 million people with about 10 million being in Kenya. Given that the Lake Victoria region is presently experiencing a high rate of population growth, the region's natural resources will continue to play a pivotal role in improving the living standards of the region's inhabitants. In particular, the said resources will be instrumental in providing for the region's populace more food, higher incomes, employment opportunities and raw materials as part of a broader development strategy aimed at poverty alleviation and improving living standards. With the adoption of a liberalised economic regime and increased efforts being made by the East African countries to expand exports to earn the much needed foreign exchange, the region's role has become even more critical. This is not entirely unexpected. The abundant and diverse natural and human resources with which the region is endowed coupled with the suitable climate indeed constitute an essential pillar for several economic activities. A look at the economic activities being currently undertaken in the region is a testament to this reality.

These include agricultural production with diverse enterprises such as maize, sugarcane, coffee, tea, dairy, horticulture, fishing and forestry. The scope for developing the region's potential further is considerable due to the abundance of both surface and groundwater resources, suitable climate and availability of land whose physical and chemical characteristic make it suitable for irrigation. To various degrees, these options have been pursued in the development strategies of the East African countries whose economic mainstay is agriculture.

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[1] A paper presented at the High Level Seminar on the Assessment of Initiatives for Environmental Cooperation on Lake Victoria Held in Arusha, Tanzania from 8-9 September 1998.

As initiatives continue to be made to diversify the economic base of these countries through industrialization and the promotion of service sectors, it has become yet the more apparent that the success or failure of these initiatives will depend on the full and efficient utilization of the available natural resources. These are the issues explored in this paper. First, the values of the region's natural resources are set out by outlining the roles they have played and will continue to play in the region's social and economic development. Thereafter we examine some of the problems which have emerged or are likely to emerge if the said natural resources are not put to wise use. This is then followed by a brief discourse on the policy issues which pertain to the proper management of the lake's resources and its catchment. In particular we emphasise the transnational character of the lake and its catchment as the justification for a joint approach to its management.

2.0 ECONOMIC VALUES OF LAKE VICTORIA REGIONS' NATURAL RESOURCES

Lake Victoria region has abundant and diverse resources which are valuable and capable of supporting a variety of economic activities. These resources include land, water, fish, forests, wetlands, rocks, wildlife and rivers. The values of these resources to a considerable extent derives from the various uses to which they can be put in the creation of wealth and improvement of the living conditions of the region's inhabitants. These are the use values which are reflected in the market prices of the resources and which are indicators of people's valuation of the same. But the resources also have values which cannot be captured in market prices because of the incompleteness or non-existence of certain commodity and service markets.

The value of the region's land which is estimated to be 184,000 Square Kilometres emanates largely from its use for agricultural production which is the backbone of the region's economy. This in turn is due to its suitable physical and chemical characteristics and the favourable climate. The heterogeneity in the region's agroecological conditions underlies the diversity of agricultural enterprises which are feasible in the region. They include enterprises such as maize, sugarcane, coffee, tea, horticulture, dairy, ranching, fishing and forestry. So important are the agricultural undertakings in the region that they employ upto 75 percent of the regions labour force, provide food for the populace, raw materials for the agro industries and generate the large part of the foreign exchange earnings.

Given the widespread poverty which has characterised the region, agricultural improvement is critical if living standards are to be improved. The shortage of land and the high rate of population growth are however factors which have underlined the extension of agriculture into

marginal lands. The scope of such expansion is however limited and efforts will increasingly have to be directed towards intensification. This calls for the increased use of modern agricultural techniques to improve yields.

Water resources of good quality are the other important endowment which have suited the region for agriculture. The major sources of this vital resource in the Lake Victoria Basin are the lake itself, the rivers which drain into it, springs, precipitation and groundwater. But the availability of this resource has also been the key in the growth of industries which rely heavily on it. Presently the exploitation of groundwater is being undertaken on a limited scale but there are indications that this will intensify in the future. This contention is based on the fact that this water source is regarded by many as safe and reliable and also due to the many initiatives which are presently underway to develop this resource.

Based on consideration of utility, water resources are extremely valuable. This is particularly the case in the urban centres which have sprung up in the basin and where water is scarce and extremely costly. But even in cases where water resources are plentiful their high value can be vindicated. From an economic standpoint perhaps the greatest value of the lake derives from the fact that it supports a fishery on which a substantial segment of the population relies for food, employment and income. The fishery's importance is evident from the fact over 500,000 people are directly or indirectly employed in the sector and the fact that it is today the source of the raw material on which more than 20 factories depend. Available figures indicate that the factories in Kenya alone process about 20 tons of fish per day. That the fish is mainly destined for export markets implies that substantial foreign exchange earnings are derived the fish export sector. From the amount of catch and processed fish, it is estimated that exports of fish annually are about 60,000 tons. Working with a mean price of US$ 3.0 per kg, the annual fish exports are estimated to have a value of about US$ 180 million. These figures apply to the nile perch fishery and exclude the other species. If these, too, are taken into consideration then the economic value of the fishery becomes even greater. For instance in 1995 about 77,000 tons of dagaa was landed on the Kenyan part of Lake Victoria. At an average price of KShs. 30.00 per kg, the value of dagaa landed works out to be about KShs. 2.2 billion. Given an average wage rate of KShs. 50.00 per day the value of the fishery in terms of the income it generate to those employed in the sector can be estimated to be about Kshs. 7.5 billion per year. As new uses of the fish are invented and as the demand for fish and fish products continue to grow, it can be expected that the value of the resource will continue to rise.This may in turn, culminate in fish harvesting practices that are unsustainable.

The value of the lake's catchment can also be seen from the fact that it has considerable potential for irrigation and hydropower generation. On the Kenyan side the basin covers an area of about 47,709 square kilometres and is mostly made up of the catchments of seven rivers, namely Sio, Nzoia, Nyando, Sondu (Miriu), Kuja, Mara and Yala. On basis of feasibility studies the potential for hydropower generation from these rivers have been estimated to be 60 MW for Nzoia, 50 MW for Yala, 84 MW for Sondu, 148 MW for Miriu and 18 MW for Kuja River. These figures imply that on the basis of technical considerations alone the Kenyan part of the Lake Victoria basin has a combined hydropower potential of at least 360MW. This is substantial and if fully harnessed can contribute to the region's social and economic development. The development of the region's vast hydropower potential has however been constrained by the high costs involved and the unfavourable benefit cost ratios which suggest that most of them lack economic viability.

Closely related to the region's hydropower potential are the forests which make up about 40 percent of the Lake Victoria basin. The forest cover is of great importance both ecologically and economically. It protects and stabilizes soils and local climates as well as soil hydrology and the efficiency of the nutrient cycle between soil and vegetation. They are the habitat of numerous plant and animal species as well as an irreplaceable repository of biodiversity. From the economic point of view, forests provide not only timber and firewood but also medicinal plants and other plants of use to man. In Kenya the forestry sector has also been an important source of income and employment. Though a renewable resource, considerable care needs to be exercised in the way the wood stocks contained in forests are consumed because the resource base will eventually be depleted if more than the annual increment from it is consumed.

This is likely to be the case given the high demand which exists for wood and wood products, the fact that it constitutes the main source of energy for most household and rural industry needs and the open access character of the resource.

Since the region's economy is predominantly agricultural, this has an effect on the demand for land. The shortage of land and the high rate of population growth are factors which have necessitated the clearing of the regions forests to create more land for agriculture, industrial developments and human settlements. But also affected have been the regions wetlands which have tended to be regarded as a nuisance, as wastelands and habitats for pests and threats to public health which can best be utilized by their reclamation and conversion to uses deemed more valuable. The wetlands however are in reality a valuable natural capital asset which provide to local communities important products and perform critical ecosystem functions. They help to regulate water flows and provide essential breeding habitats for many species of flora and fauna - like forests they too are an important repository of biodiversity. Due to the

many products derived from them and the crucial ecological roles which they perform, wetlands are no doubt an extremely valuable resource. This has however been obscured by the fact that the markets for these products and services are in many cases either incomplete or non-existent for which reason they have tended to be ignored in economic analyses of their various uses. They have also in many cases tended to be an open access common property resource. For this reason, the products and services which they provide have tended to be regarded as "free". Free in this context should not be equated with little value. As methodologies for valuing environmental resources are developed and refined these substantial values will be demonstrated and reflected in not only in benefit cost analyses but also in the market price.

In the marginal areas of the Lake Victoria region, Wildlife resources are abundant and constitute a major land use option.There is scope for practising agriculture in such areas though this will require considerable investments in water management technologies which may render the agricultural enterprises economically unviable. That these regions are ecologically fragile is a strong case for their utilization for wildlife development which can then yield to local communities income and important products such as meats and skins. Such wildlife resources also underpin the tourism industry on which the country relies heavily for foreign exchange earnings and employment opportunities.

The above discussion illuminates the fact that the Lake Victoria basin is abundantly endowed with natural resources whose harnessing is central in advancing the region socially and economically. Indeed the last 15-30 years have witnessed an intensification in the utilization of these natural resources. This has been prompted by factors such as the high incidence of poverty and the consequent over-reliance of large segments of the region's inhabitants on the natural resources and government policies which have aimed at promoting exports and foreign investments and industrialisation. Indeed this trend can be expected to continue into the forseeable future. The problem however is that several adverse consequences have accompanied the use of the region's natural resources. If unmitigated, these side effects have the potential to undermine economic development and lower the living standards of the region's inhabitants. On this issue it needs to be noted that the various land use practices are likely to have crossborder impacts due to the transnationality of the lake and its catchment.

3.0 EMERGING ENVIRONMENTAL ISSUES

There are legitimate reasons for exploitation of natural resources. These include the creation of wealth and the production of goods and services for human use. It is therefore a key ingredient in the economic wellbeing of societies. Indeed without the use and consumption of natural resources human welfare cannot be improved. The manner of unitizing resources

is however one which is now featuring prominently in development concerns largely because of the adverse consequences associated with certain patterns of resource use. This fact is amply demonstrated in the Lake Victoria region where human economic activities have resulted in environmental degradation and threaten to undermine the welfare of the inhabitants and the prospects for economic development. We highlight some of these risks herebelow.

- Deforestation: Deforestation and forest degradation have many negative consequences. The fact that the region under consideration is situated in the tropics indicates that its forests are a rich biotic environment in terms of the numbers of plant and animal species. The loss of forests is therefore directly linked to the extinction of increasing numbers of these species while forest degradation leads to serious reductions in the genetic diversity of others. The accelerated loss of forests being witnessed in the region already affects thousands of people through increased flooding, soil erosion and silting of waterways, drought and shortages of fuelwood and timber.

  The destruction of forests also undermines the basic operations of the ecosystem and may cause irreversible changes. The most serious of these appear to be due to the large scale exposure of natural soil systems leading to increased erosion and, in turn, indirectly affecting water resource development. In extreme cases deforestation can eliminate plants and animals and degrade water supplies and soil fertility to an extent that families become unable to support themselves. It also has an important influence on regional and global climate by altering sensible and latent heat flux, precipitation, albedo and by its net positive effect on the amount of carbondioxide and greenhouse gases released into the atmosphere.

  To a large extent the high rate of deforestation witnessed in the Lake Victoria basin is a product of inappropriate agricultural practices which have been adopted subsequent to the cutting of trees to clear the catchment for arable agriculture and to obtain wood both for sale and domestic use. Soil erosion has therefore become a grave problem with empirical studies showing that it has in the recent past gone from moderately light to extremely severe. The poor management has also culminated in soil compaction and a necessary increase in the use of chemical fertilizers and pesticides. Thus deforestation and inadequate soil management have combined to transform soil erosion into a major ecological problem in the region and has important consequences for the principal watersheds of the region and their potential for energy production which has been largely underutilised.

- Pollution :Increased levels of pollution are a feature which today characterise many areas in the Lake Victoria basin. This is particularly the case in the many urban centres which have sprung up around the Lake. The said pollution can be attributed to the growth of industry which utilize substantial energy resources and emit many contaminants into the air and the local authorities which dispose of untreated or inadequately treated municipal wastes into waterbodies. This is a serious problem because the substances so emitted have several adverse ramifications on the lake itself. These include the lowering of water quality, the poisioning of aquatic life and the subjection of human health to increased risks. The latter is the case when the domestic sewage discharged into the Lake and river waters contain pathogenic organisms. As epidemiological studies unequivocally demonstrate, bathing in water receiving such sewage and the consumption of contaminated fish are the causes of a variety of infections. More specifically the users of sewage polluted waters have an above-normal incidence of gastric disorders and also non-gastric disorders such as ear, respiratory and skin infections. The consumption of contaminated fish is linked with serious illness including viral hepatitis and cholera. This explains, at least partly, the public health considerations that recently led to the rejection by the European Union of fish products from East Africa. It reveals quite clearly the dangers the East African Countries are likely to face in their fish export sectors if the public health status of the Lake and its environs is allowed to deteriorate further. Not only do these countries stand to lose considerable foreign exchange earnings but also likely to be threatened are the thousands of jobs and the livelihoods of large segments of the population who depend for their income on the fishery.

  A recent development which further warrants that such matters be given serious attention is the replacement of easily degradable materials with synthetic ones which are more resistant and thus can travel long distances. If excessively concentrated, the end products of these substance may lead to serious disturbances of ecosystems e.g. eutrophication due to excess nutrients. This is likely to occur when large quantities of nitrogen and phosphorus are introduced into the lake waters from sources such as detergents, fertilisers and human and animal wastes. These compounds nourish algae and can cause an explosive growth which can deplete the water of oxygen and suffocate other species.

- Overfishing: Overfishing has resulted from the commercialisation of the Lake's fishery. Though the purpose of intensifying the exploitation of the fisheries has been to create more jobs, improve the incomes of the local communities and generate foreign exchange, these very objectives are endangered by the present unsustainable fishing methods. Though precise data on the fish stocks are still being generated the

predominance of juvenile fish in the catches and the transformation of a previously multispecies fishery into a three species fishery constitutes strong and compelling proof that there is overfishing in the lake. If left unmitigated, the collapse of the fishery can result in the not too distant future. But more disturbing is the fact that in the exploitation of this vital resource technologies and production methods have been adopted which have to a large extent marginalised local lakeside communities and disfavoured them in the sharing of the benefits, financial or otherwise that accrue from this resource. The substitution of artisanal fishing technologies with expensive, capital intensive mechanised technologies has indeed transformed fishing into an enterprise which is a preserve of the rich.

- Alteration of Ecosystems: Alteration of valuable ecosystems such as wetlands and indigenous forests and their conversion to uses deemed more valuable such as agriculture and human settlements has unfortunately not been preceded with a thorough and comprehensive analysis of their values in their pristine states. Where such assessments have been attempted, they have been incomplete with the main focus being on their use values. The valuable ecological functions performed by these ecosystems such purification of water and air, their contribution to ecosystem resilience and their role as repositories of biodiversity have in many cases tended to be slighted. This must not be construed to mean that these functions and ecological services have minimal economic values. Indeed the contrary is the case . Part of the reason for this omission is the fact that markets for these valuable ecosystems and functions are in many cases either incomplete or non existent and the fact that decision makers often have limited understanding of ecological issues and their link to the macroeconomy. Loss of biodiversity for instance is a serious problem because it is the source of potentially valuable individual species, is an input to such ecological processes as nutrient and water recycling, soil generation, erosion control, pest control and climate regulation - all essential to human survival. With respect to individual species, wild relatives of economically important crops, trees, and livestock often carry unique genes that can be used to improve the characteristics of the domesticated stocks or just help them survive changes in the environment. Plants, animals, and microorganisms found in the wild are also major sources of medicines and other useful industrial substances.

4.0 POLICY RESPONSES AND CONCLUSION

The thrust of this paper has been to show that the Lake Victoria Basin is endowed with abundant natural resources which can be harnessed for the regions's social and economic development and that substantial risks are entailed in the unwise use of these resources. Given that under the present circumstances there are financial incentives to overutilize the resources,

intervention is warranted to stem the environmentally harmful use of the resources as step towards making the region's development sustainable and to safeguard the future livelihoods of communities. In the pursuit of these goals the following two issues need to be borne in mind.

First, it is in the best interest of the region's inhabitants that the resources be utilized in a sustainable manner. Why the resources are being used in ways that are unsustainable and environmentally harmful is therefore an issue which needs to be examined. It seems to be the case that poverty is prevalent among the concerned communities who therefore lack adequate options as can be demonstrated in situations where the poor overfish, cultivate steep lands and cut trees for firewood and other domestic uses. It is also the case when the poor overgraze the arid and semi-arid ecosystems which are ecologically fragile. If the threats to these valuable resources are to be minimized, these dilemmas will need to be confronted and addressed so that suitable and viable options may be devised. It is definitely not an easy task but serious attempts must be made in this direction if long-term sustainability is the goal being aimed at.

Second, to realize a meaningful degree of success, a joint management approach is needed because of the transnational character of the lake and its catchment. Indeed one of the most outstanding characteristics of sustainable development is interdependency since it is no longer possible to conceive of neighbouring countries as isolated entities independent from one another. This is clear from the fact that the actions of one country will have both direct and indirect impacts on others with which she shares a common resource. Such a joint management approach implicitly recognises the interlinkages between the various ecosystems. It is also necessary to create an increased awareness among the region's inhabitants and all stakeholders about the values of the resources and the adverse consequences entailed in their unwise utilization. Economic development needs to be promoted as a way of not only improving people's incomes and living standards but also of providing communities with more options and thus reduce their overdependence on the endangered natural resources. To succeed in these endeavours community-based organizations and mechanisms need to be identified and strengthened so that the resources are managed by those whose livelihoods most directly depend on them. This holds the promise of being cost effective besides winning the support of those in closest contact with the resources.

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Land Use, Agriculture and Land Conservation Activities

LAND USE, AGRICULTURE AND LAND CONSERVATION

(Summary of A Eriksson's input at Arusha Lake Vic. Meeting 8-9 Sept. 1998)

Land Use and limitations to agricultural production.

The lake basin covers a wide range of ecological zones, from the forests on the slopes of Mt. Elgon, through intensively cultivated areas to rangelands and irrigated lowlands around the lake. The area is dominated by small-scale farmers mainly producing food crops for subsistence and for the local market.
Population pressure has resulted in intensified land use in fragile areas causing land degradation mainly through lack of soil conservation measures on cultivated land, overgrazing and deforestation.
A main problem is for land users to adjust their production system to current needs. When land holdings are reduced to levels where sustaining the household population has become impossible, a farmer need to move from food security (subsistence farming) towards economic security through the use of higher value inputs with added value for higher economic outputs.
Access to agricultural extension services, credit, infrastructure, marketing, agro-industries, availability of water for irrigation etc. are all factors that limits agricultural development in the Lake Basin.

Effects of land degradation

Apart from the problem of sediments and dissolved nutrients being discharged into the lake as a result of soil erosion, declining soil fertility is a common problem in the Lake Basin. Decreasing land productivity and low household income has serious implications on the overall economical development, which is directly dependent on performance of the agricultural sector.

Efforts to improve land management

In all three countries, there is high level of awareness of the problems of land degradation with government agencies and NGOs implementing soil and water conservation programmes. As compared to needs, these programmes have limited area coverage and in most cases do not respond fully to needed improvements in agricultural production and people's welfare.
From project emphasis on land rehabilitation and soil conservation, there is now a move towards broader land management programmes with a focus on sustainable agricultural production and improved household income.
Government funding and donor support is normally channelled through the traditional sectors (e.g. Agriculture, water, forestry etc.). Mechanisms to fund and implement multidisciplinary programmes within the government set up are often not in place. Many if not most NGOs have specific mandates that do not accommodate all aspects of a comprehensive land management programme. This is partly the reason why there

are still very few extension programmes that have adopted the most recent strategies for promotion of improved land management
Current decentralisation strategies for development activities are expected to facilitate the needed close collaboration between stakeholders in land management. Financial constraints have however forced local administration to give low priority to these issues. Drastic reductions of numbers of civil servants put high demands on programme designs that these efficiently can hand over responsibilities for management of natural resources to the local communities with limited involvement by the government.

Preparedness to promote improved land management in Lake Victoria Basin

Indeed, land management aspects are among the most important components of watershed management efforts.
Although practical implementation has to be brought down to grass root levels and adjusted to local conditions, technologies and strategies for land management programmes can be similar for the Lake Basin Countries.
Sweden has provided long term support to government- and NGO-implemented soil conservation programmes in the East African Region.
In an effort to promote sharing of experiences in the Region, Sida's Regional Soil Conservation Unit (RSCU) was established in 1982 with a main mandate of development of technologies and strategies and support to soil conservation training. In recognising the need for a broader scope of land management aiming at improved food security and generally improved household economy, RSCU was transformed into the Regional Land Management Unit (RELMA) in 1998. RELMA has already established a network in the region, facilitating interaction between professionals working in the field of land management. The countries are having similar strategies and there are regional training programmes. RELMA has identified a number of local professionals/consultants from the region who are often engaged in studies related to development of the land husbandry concept. This locally available pool of experienced professionals should be seen as one very important asset for eventual future work on land management in the Lake Basin.

Conclusions

Land management issues are fundamental for maintaining a sound environment and for the overall economical development in the Lake Victoria Basin.
Sweden has over the years contributed to several successful land management programmes in the Region, building local capacity in this field.
This involvement could form a base for future extended Sida support to intensified efforts in promoting improved land management in the Lake Victoria Basin.

Uganda: Water Quality and Minimizing Pollution

HIGH LEVEL SEMINAR ON THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL COOPERATION OF LAKE VICTORIA.
8 – 9 September, 1998, Arusha, Tanzania.

Water Quality and Minimizing Pollution.

E. M. Dribidu, Ministry of Water, Lands and Environment, Uganda.

Summary

There is concern that the water quality and rich biodiversity of Lake Victoria may already be threatened by the introduction of alien species including the water hyacinth; discharge of industrial and municipal waste water; and changes in land use including draining and cultivation of wetland and soil erosion due to poor agricultural practices.

Use of pesticides and dumping of solid waste, which contains toxic substances, and accidental spill of chemicals during transportation, create a another potential risk of polluting the Lake by hazardous substances. Toxic substances that will accumulate in the environment, such as pesticides and other organic substances resistant to bio-degradation, require particularly cautious regulation since their effect may be irreversible or present hazards to consumers of the water i.e. for drinking or for aquatic organisms. For example, the former use of biologically persistent organochlorines (e.g. DDT) may have caused accumulation of these compounds locally.

The major source of pollution into the lake is from municipal and industrial waste water. The most important action in order to save the Lake Victoria water quality is therefore to cut the pollution load from these point sources. There is equally urgent need to control water hyacinth and stop non-point source pollution such as soil erosion and sedimentation arising from poor agricultural practices and deforestation. However no comprehensive plan concerning the deletion of the worst pollution sources exists. As a first step, a prioritized investment (action) program for deletion of the worst pollution sources should be jointly elaborated. Such an action program would facilitate raising of funds for investment.

Uncoordinated sectoral approaches and weak legal and institutional framework at national and regional level have also weakened regulatory measures for control of pollution into the lake. National efforts to establish comprehensive and coordinated legal and institutional frameworks need to be supported. As well as the need to establish a sub-regional collaborative mechanism for holistic and integrated management of Lake Victoria.

This paper presents the findings and recommended actions (in relation to water quality and minimizing pollution) of a Sida Fact Finding Mission which visited the region in April 1997. The emphasis in the paper are the authors.

1 Changes in water quality and ecology of Lake Victoria

The available data on Lake Victoria is limited for comprehensive assessment of the water quality of the Lake. However, there are indications of changes in the water quality and ecology of the lake. The most apparent change is the introduction of non-indigenous fish species, specifically the

predatory Nile Perch, introduced in the late fifties and early sixties, which has increased the catch from the lake, but at the same time their dominance has resulted in an exclusion of a large number of indigenous species on which they feed.

Secondly there are indications that the nutrient chemistry and phytoplankton biomass and composition have changed. Lastly, there are strong indications that oxygen depletion are more pronounced, resulting in anaerobic conditions in the deeper parts of the lake.

The above trends towards eutrophied conditions may seriously threaten the important exploitation of the lake fishery and water supply. The increase in oxygen demand in the deeper parts will decrease the volume habitable for fish and anaerobic conditions will kill the bottom fauna which is the food source for a number of fish species.

2 Underlying causes

The introduction of the Nile Perch and water hyacinth, increased nutrient loading from industrial and municipal pollution and from rainwater uptake of nitrogen from bush fire smoke are responsible for the changes in water quality and ecology of the lake. Moreover the buffering capacity of the wetlands is being reduced by its degradation.

2.1 Introduction of alien species.

The most striking threat to biodiversity in Lake Victoria is the decline in fish species, during the last 2-3 decades, from about 20 fish species to 2-3 species, mainly the Nile Perch and Tilapia. These changes are connected with the introduction of the carnivorous Nile Perch. The possible environmental cost of this measure could be the total extinction of a number of endemic fish species in the lake. The lake ecosystem is also threatened with the introduction of the water hyacinth. The enormous growth potential of this weed (facilitated further by increased loads of organic and inorganic nutrients) has resulted in a prolific creation of biomass leading to serious effects - ecological as well as economical. These two examples illustrate clearly the environmental danger connected with the introduction of exotic species.

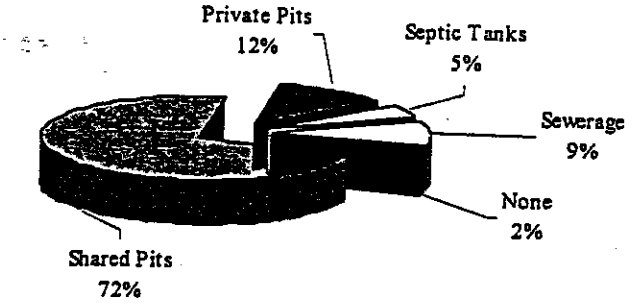
2.2 Municipal and industrial wastes

The major source of pollution into Lake Victoria is municipal and industrial wastewater from the major urban centers around the lake (Kampala, Jinja, Entebbe, Kisumu, Musoma, Bukoba, Homa Bay and Mwanza), from other towns in the catchment (such as Mbarara, Masaka, Kitale, Eldoret, Bugoma, Webuye, Kakamega, Kericho, Kissii, Migori, Biharamulo, Tarime and Shinyanga), and from settlements along the shores of the lake such as fishing villages and rural growth centers.

Sewage systems. In most of the towns, the sewage system (where they exist) is limited to the central business areas and the general state of the sewerage treatment facilities is very poor. Raw or partially treated sewage is often discharged directly or indirectly into Lake Victoria. Moreover, the treatment facilities do not have capacity to remove toxic substances such as heavy metals and organic micro-pollutants from industries connected to sewers.

Sanitation in peri-urban areas. The peri-urban areas are either served by septic tanks, private pit latrines, shared pit latrines with very poor hygienic conditions or have no sanitation facilities. The majority of the population use the later categories - extremely unhygienic communal facilities - or defecate where ever they might find some privy.. The problem is particularly acute in unplanned squatter settlements either on rocky hills (like in Mwanza) or in low lying seasonally flooded areas, like in Kampala. The problem will only get worse with the rapid urbanization – growing at a rate of 7% on average.

Sanitation coverage in Kampala (KCC, 1994)



Industrial pollution. Most of the industries are not connected to the municipal sewerage systems. They are supposed to treat their own effluent before discharging into the water bodies, but enforcement of the regulation is weak. Therefore most of the industries discharge untreated or partially treated waste water into receiving water bodies which end up in the Lake. The main pollution is organic waste (with very high concentration of BOD) from sugar, foods, soft drinks, breweries, dairy products, meat and fish processing factories. Some of the industries such as textile, paper and tanning industries also produce hazardous chemical wastes.

There are also a number of semi-industrial activities which affect the water quality such as battery manufacturing and repair, garages, gas stations and petroleum storage facilities. Presently, the significance of these pollution sources may be low but with continued economic growth, water quality impacts from these activities will be an issue for action.

Solid waste. Less than 50 % of the domestic solid waste in the towns is effectively collected and disposed at dump sites. The dump sites also receive solid wastes from the industries. The domestic solid waste contains all types of waste from the households: organic debris as well as plastic, glass, metal, batteries and medicine. The impacts of the solid waste on the surface water quality derive mainly from rain induced washout of bacteria, organic matter, and hazardous chemicals.

Assessment of impacts from industrial and municipal waste. The discharge of domestic and industrial sewage into the lake and the possible impact of pit latrines on the groundwater threatens the water quality of the lake. The amount of effluent from the industries and their characteristics are not known but there is indication that, the organic substances and chemical wastes together with the high load of sewage area are a severe threat to the water quality of the lake. Although in a

few cases the fringing swamps may retain part of the organic substances, there is no evidence of the fate of many industrial chemicals, and the retaining capacity of the swamp is unknown. These quality changes are already seriously affecting the fishery in the lake as well as its use for water supply. These threats will increase with the rapid growth in population and industrial activities. Regulatory measures and investment in waste water treatment are required in the basin to control the quality of effluents being discharged into the lake.

The rapid economic development in the basin will similarly increase the amounts of dumped wastes, and attention should be paid to the design and location of future landfills to avoid serious water pollution problems. Another consideration is the content of hazardous compounds in solid wastes, which tends to increase with increasing living standard of the population due to higher consumption of sophisticated products. This would ultimately result in an increase in the hazardous effects of this pollution if appropriate treatment measures were not implemented

2.3 Agriculture.

Agriculture is the most important economic sector in the basin – employing more than 80% of the population. However, agriculture in the basin is basically subsistence with the small scale farmers holding less than 2 hectares of land. Only tea and sugar are grown on large estates.

The potential impacts from agricultural activities on water quality involve issues such as increased sediment loads due to clearance of natural vegetation for cultivation, land degradation due to overgrazing, poor agricultural practices, and road construction; increased nutrient runoff due to application of fertilisers, and contamination by toxic chemicals used for control of weeds and insects; and drainage of wetland.

Soil erosion and sediment transport. The extent of soil erosion as well as its relation to land-use practices in the basin cannot be assessed in detail due to lack of quantitative data. However qualitative evidence point to severe erosion problems in the mountainous areas, pastoral areas and highlands with high population pressure. Relevant impacts on water quality and ecology are: excessive turbidity which affects drinking water supplies and fish; destruction of the substrate for bottom-living fish; destruction or alteration of the benthos that forms the source of food for many fish species and exposing of anoxic sediment layers.

Fertilisers - High concentrations of nutrients from excess fertiliser run-off (from cropped areas) into the lake and rivers would result in dense growth of algae and weeds, which are considered a component of eutrophication. However, use of fertiliser is mainly confined to the estate crops such as tea and sugar, which presently counts for a very small proportion of the cultivated area. The application of fertilisers for food crops is virtually non-existent. Consequently, leaching of fertiliser nutrients cannot be considered a significant threat to the general water quality <u>at present</u>.

Crop protection. Organochlorines were formerly used for insect control. Due to their persistence, Organochlorines may be effective even 10 years after application and they tend to have a bioconcentration trend in the food chain. DDT is the most well known of all organochlorine biocides. Due to its effectiveness and low price, DDT was also applied in agriculture particularly

against seedling and foliage pests in cotton and boll worm. This chemical's ecological effect, however, has resulted a ban of its use in many countries.

Against the banana weevil and the banana nematode *Radopholus similis*, Dieldrin and Furadan have been used, and in the coffee plantations Fenitrothion is used against foliage pests while "Round Up" (a glyphosate) is used against weeds.

Livestock protection against ticks. In the past Organochlorines (toxaphene and lindane) was used but these has given way to organophosphate and synthetic pyrethroids such as deltamethrin (Decatix) and cypermethrin (Fendona). These chemicals are mainly used in cattle dips, and are generally disposed of directly into the river/stream systems or into soak pits.

Vector control - biocides are used in the control of vectors, such as mosquitoes, tsetse flies, black flies and snails. Before 1960 DDT was the main pesticide used against these vectors. However, DDT has been largely replaced by Dieldrin, which is has itself been replaced (for aerial spraying) by thiodan.

Assessment of threats from pesticides. Considering the current agricultural structure in the basin, with the majority of land being used for traditional food crop farming as well as a general shift towards use of more biodegradable and less harmful chemicals, the present use of pesticides for crop protection and vector control is not likely to be a major quality issue for the lake. However, the former use of biologically persistent organochlorines (e.g. DDT) may have caused accumulation of these compounds locally. More importantly, there is need to guard against dumping of biologically persistent organochlorines (pesticides) in the region - since their effect may be irreversible or present hazards to consumers of the water i.e. for drinking or for aquatic organisms. For example

2.4 Degradation of wetland

Large parts of the lake basin are wetland - predominately located along the shore of the lake, at the lower reaches of the major rivers basin (Kagera, Bukora, Katonga, Mara, Masirori and Yala) and as swampy lakes within the catchment (Koki lakes and Lake Wamala).

The wetlands play a major role in determining the quality of the Lake by retaining sediment, nutrients and several toxic compounds. For example, it has been believed that the Nakivubu swamp has had a purification effect on a major part of the wastewater discharges from Kampala. The purification capacity of the wetland are limited if overloaded. The continuous deposition of peat and sediments, as well as the availability of chemical binding of compounds, obviously sets a limits for the retention capacity of the swamp. High loading of waste water will in the end surpass the retention capacity and even affect the wetland itself to a degree where the purification effect decreases or stops. The result is increased discharge of pollutants to the receiving water.

The greatest threat to the wetland, however, is increased conversion or use for cultivation, brick-making, mining of sand, construction and settlement, and industrial establishments all of which threaten to reduce their buffering capacity.

2.5 Water hyacinth

Since the time of its discovery in 1989 , the water hyacinth has rapidly spread to cover most of the shoreline of Lake Victoria - due to its high growth rate and continuous inflows from River Kagera. The water hyacinth is characterized by the ability to grow and multiply increasingly fast with increasing nutrient availability. The plants exploit steady supplies of nutrients from sewage discharges and from runoff of fertilizers and leaching of soils from agricultural areas. Consequently the plants are often found spreading from areas near such nutrient sources. The worst affected areas are the closed bays receiving effluent from the major urban centers around the lake i.e. Murchison bay in Kampala, Jinja, Kisumu and Mwanza.

The proliferation of the weed has created very serious problems such as hampered navigation affecting transport on the lake, blocking intake of water supplies, access of fisher men, and blocking the Owen Falls power plant intake. Moreover, dense mats of the weed deplete the oxygen content of the waters due to shading of the oxygen producing phytoplankton, resulting in fish migrations or even killing of fish and bottom fauna.

In spite of many scientific and practical efforts, the riparian States have not yet succeeded in effective control of the weed. The present control efforts are concentrated on mechanical, manual and biological means. In addition to intensifying the current efforts, management of the influencing factors i.e. pollution and direct measures against the weed at the source would improve the success of its control. It is well known that nutrient availability predominantly determines the growth rate of the water hyacinth.

2.6 Navigation

The three countries rely in part on transport routes on Lake Victoria between Kisumu, Mwanza, Kampala, Jinja and Bukoba for transport of goods and passengers. The lake transport facilities include ferry terminals on Lake Victoria. Navigation affects the quality of water through discharge of untreated sewerage, blast water and accidental spill of oil etc.

3 Minimising Pollution

The major pollution load into Lake Victoria is from point sources - municipalities and industries. The most important action in order to save the Lake Victoria water quality is therefore to cut the pollution load from point sources - municipalities and industries. There is also need to cut off pollution from non-point sources (agriculture, livestock husbandry and to stop soil erosion). No comprehensive plan concerning the deletion of the worst pollution sources exists.

Table 1 gives recommended actions to cut pollution load from point sources and non-point sources. The non-point sources pollution is mainly connected to soil erosion arising from poor agricultural practices, livestock husbandry, overgrazing and deforestation. Actions to fill existing gaps in control of water hyacinth and protection of wetland are included.

As a first step, a prioritized action program for deletion of the worst pollution sources in the Lake Victoria Basin should jointly be elaborated by the three Governments and in co-operation with the appropriate financial institutions, aid agencies and NGOs. As the other two states in the Basin, Rwanda and Burundi, are contributing to the pollution of Lake Victoria, they should be invited to participate. Such an action program would facilitate raising of funds for investments, making the best use of available resources and speed up the process for curbing pollution discharges from the worst point and non-point sources.

A strategy for peri-urban settlements and their need for water supply and sanitation should be formulated and implemented.

4 Co-operation and co-ordination at the sub-regional level

Uncoordinated sectoral approaches to environmental management of Lake Victoria, weaknesses in legal and institutional frameworks, lack of incentives, and weak penal and enforcement mechanisms all contribute to effective control of pollution into Lake Victoria. There is therefore need to establish comprehensive legal and institutional mechanism for holistic and integrated management of Lake Victoria at national and sub-regional level. All the three countries have taken steps to establish such a mechanism. These national initiatives need to be supported. Parallel to the national initiatives, there is need to establish a sub-regional collaborative mechanism for holistic and integrated management of Lake Victoria.

The mandate and function of such a sub-regional collaborative mechanism may include the following:-

- exchange of data and information on the state of the environment of Lake Victoria and consultations on planned or on-going activities.
- protection and preservation of the lake environment including harmonization of water quality/waste water effluent standards and environmental impact assessment regulations.
- planning and coordinated implementation of joint development activities such as hydropower, transportation, regulation of lake levels and water hyacinth control.
- lake transport including navigation safety measures and standards and regulation of waste water discharge from vessels.
- disaster management
- harmonization of national laws, policies, regulation, standards, enforcement and penalty mechanism.
- research
- conflict avoidance and dispute settlement.

The design of the sub-regional body should be guided by the principle *subsidiary and sustainability.*

Table 1 - Proposed Actions to Minimise Pollution of Lake Victoria

ISSUES	POTENTIALS (REGIONAL)	PROPOSED REGIONAL ACTIONS.
Point Source Pollution: (Municipal and Industrial)	• National Programmes for Water Supply and Sanitation (Additional Funding). • Lake Victoria Environment Management Programme (Providing information base, management measures and pilot actions).	• Investment (Action) Plan to delete the worst pollution sources. • Strategy for peri-urban settlements including water supply and sanitation. • Promote environmental awareness among industrialists and other users.
Water hyacinth	• LVEMP component on water hyacinth control (mechanical, biological and manual control) • National efforts.	• Additional funding for current efforts • Harmonise eradication policy, strategy and control program at regional level • Support participation of Rwanda • Investment in industrial and municipal waste water treatment and rural sanitation. (Elaborate concrete regional action plan).
Poor agricultural practices, agrochemical and deforestation	• Sida supported programmes on soil and water conservation (NSWCP, SCAPA, USCAPP) • LVEMP component on soil and water conservation (pilot	• Raising awareness on soil and water conservation, sound agriculture practices and sustainable forest plantation and application of agro-chameicals.

ISSUES	POTENTIALS (REGIONAL)	PROPOSED REGIONAL ACTIONS.
	projects) and afforestation. • Sida supported Vi TPP Tree Planting and land reclamation in all the three countries	• Strengthen Cross-sectoral co-ordination and extension between water, agriculture, livestock and forestry at district and local level. • Guidelines / regulations for soil and water conservation, grazing of cattle and protection of special catchments, application of pesticides etc. • Expand on going programmes.
Wetland degradation	• LVEMP component on wetlands • IUCN proposal for Regional Wetland Programme.	• Support development of national wetland policies. • Identify wetland of ecological importance and gazette. • Support IUCN proposal for regional wetland programme.
Uncoordinated sectoral approaches at national and regional level.	• The three countries are at various stages of putting in place a comprehensive policy, legal and institutional framework. • East African Co-operation • Lake Victoria Fisheries Organisation • Kagera Basin Organisation • _____- • Lake Victoria Environment Management Programme • FAO Projects • UNEP/ UNDP Project on Environmental Institutions and	• Adopt regional convention or protocol for co-ordinated and integrated management of Lake Victoria. • Harmonise Policy, legal and institutional framework (standards, environmental impact assessment, auditing, enforcement, economic incentives, penalties

Tanzania: Water Resources Demand and Management

HIGH LEVEL SEMINAR ON ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL COOPERATION ON LAKE VICTORIA: 8-9 SEPTEMBER, 1998, ARUSHA

THE LAKE VICTORI BASIN; NATURALRESOURCES UNDER ENVIRONMENTALSTRESS

- Water Resources Demand and Management.

By Meraji Msuya, Tanzania

1. THE LAKEVICTORIA BASIN

Lake Victoria is the second largest fresh water body in the world with a surface area of 68,800 km^2. It is a shallow lake with a mean depth of only 40 m and a maximum depth of about 80 m. The lake has about 3,500 km of shoreline and holds about 2,760 km^3 of water.

The riparian states of Lake Victoria are Kenya, Tanzania and Uganda, and they control 6%, 51% and 43% respectively of the lake's surface area. The drainage area is approximately 194,200 km^2 or 2.5 times the lake area and extends up to Rwanda and Burundi. It contains areas with agriculture land, forests and wetlands.

2. AVAILABLE WATER RESOURCES

The available Water Resources can be determined by looking at the water balance over the Lake.

The lake level rises during the main rains in April and generally reaches a maximum in May-June. The lake level declines through the rest of the year, usually between 20 and 40 cm to a minimum water level in October.

Results of water balance studies of the Lake conducted during the last 30 years shows that the estimation of the net contribution of rainfall and evaporation on the lake surface, and impacts of land-use changes on inflows is still uncertain. Detailed studies on the hydrology of the Lake are essential for a responsible planning of future developments such as port facilities, irrigation, drinking water supply, and hydropower.

Inflow

The two dominating factors in the water balance of Lake Victoria are direct rainfall and evaporation from the lake surface. Rainfall on the lake surface contributes 85% of water entering into the lake, while 15% is due to river flow. The Kagera, contributes about half of the river flow or 7 % of the total inflow.

Outflow

Outflow from the lake is dominated by evaporation, which is about 85% of the water leaving the lake. The remaining 15% is discharged via the Owen Falls into the White Nile. The average outflow of the lake is 914 m^3/s (1948-1970).
The historical minimum and maximum outflows have varied from 347 m^3/s to 1721 m^3/s. A historic sequence of lake levels from 1948 to 1996 is produced using end of month water levels recorded in Entebbe.

3. WATER RESOURCES UTILISATION

The Lake Basin Water Resources are essential for life and a wide spectrum of human activities and livelihoods. Among these are agriculture, fisheries, transport and trade routes, municipal and industry, power generation, livestock and environment.

Towns around the lake are growing very fast resulting in increase in population as well as human activities. This growth is not, however, in parallel with needed services such as wastewater treatments, solid waste collection and disposal facilities. The lake automatically becomes a dumping areas!

The general situation around the Lake Victoria is as follows:

Rural water supply

The general situation of rural water supply in the lake basin is characterised by a very low level of access to safe water within reasonable walking distance. Coverage ranges from 30% - 50% in all areas around the Lake. All the three countries have rural water supply programs or projects which emphasises a decentralised community-based approach, in which the communities are fully involved in the implementation of low cost facilities for water supply, and take full responsibility for operation and maintenance. The strategies also emphasise integrated approach to water and sanitation, community mobilisation, health and hygiene education - to improve the impact of safe water provision. However, the coverage levels are still below the respective national objectives which aim at providing safe water to all the people.

Urban water supply - this include Industrial use

The piped urban water supply coverage in major towns on the shores of Lake Victoria (Kampala, Jinja, Entebbe, Kisumu, Homa Bay, Musoma, Mwanza and Bukoba) and other towns in the catchment (such as Masaka, Mbarara, Kitale, Eldoret, Bungoma, Webuye, Kakamega, Kericho, Kisii, Migori, Biharamulo, Tarime, Shinyanga) is very low, estimated at below 50 %.

Sewerage and sanitation

The situation in the basin is characterised by extensive use of simple sanitation techniques. The vast majority of the population in towns rely on pit latrines. All the major towns have public sewerage systems but these only cover the core areas of the towns, thus serving a minor part of the urban population. It is estimated that only 15% of the population in these towns are served. The general state of the sewage treatment facilities is very poor. This implies that raw sewage is discharged into small rivers or streams or directly into Lake Victoria.

Less than 50% of solid waste, including household wastes, in the bigger towns and cities is collected by the city council and disposed of.

Within the rural areas the coverage of sanitation is estimated to be 50%.

Livestock water supply

Livestock water demand is a significant water use, especially in the semi-arid pastoral areas of the lake basin, where surface water sources are seasonal and where long dry seasons are experienced. The population of livestock (mainly cattle) is about 4 million in Tanzanian side of the basin. Provision of adequate livestock water supply in the pastoral areas is an important requisite for livestock development.

Hydropower generation

The demand for electric energy in the basin countries far exceeds total installed capacity of about 1500MW. The demand is rapidly growing and is expected to increase to over 6000 MW by the year 2020. Growth in many sectors (especially the industrial sector) of the economy in the three countries is already being constrained by the availability of electricity.

Some of the industries have either shifted to the expensive thermal power and/or plan to install mini-hydropower stations to meet their demands. Yet great potential for hydropower production in the basin has basically not been exploited. All the three countries aim to achieve self sufficiency in energy supply but none of them is self sufficient and all have unreliable supplies.

The hydropower generated at the Owen Falls dam is being extended but the combined capacity of the existing plant and the extension will need outflows well in excess of the present run-of-river operating rule (the Agree Curve). The wide fluctuations in the lake out-flows also raises key issue of the reliability of the outflows for hydropower production. There is thus a need to develop an optima Lake Victoria regulation plan in order to optimise hydropower production-talking into account the environmental and socio-economic impacts on the riparian states.

Besides the Owen Falls dam there is identified potential of over 2700 MW on the rivers Kagera, Mara, and Sundo-Migiu and on the Nile downstream of Lake Victoria.

As a first step toward a regional co-operation in the hydropower sector the Team proposes development of a hydropower master plan for the region. Such a plan may include proposals for further inter-grid connections, detailed an assessment of the hydropower potential in the basin, development and updating of respective Nation Power Supply Master Plans, proposals for integrated projects on hydropower development in the lake basin and an assessment of the effects of a developed hydropower production on the lake water balance and ecology.

Irrigated agriculture

The present irrigation use of water from Lake Victoria is not widespread, with exception of the sugar plantations, horticultural and floricultural farmers practising small scale irrigation, and smallholder and few large scale rice schemes. The unreliable rain-fed agriculture in the lake basin has often highlighted the need to achieve higher agricultural production per unit area and improved food security through a more efficient use of land and water resources.

The technical irrigation potential in the Lake basin is over 170,000 ha. There is need to assess irrigation potential in the basin including socio-economic assessments and actual water use and requirements.

Food security in the region has become a major issue, as the area often experiences food shortages during recurrent droughts.
To cover food demand from the growing population, there is an acute need for increased agricultural production and irrigation is bound to increase.

4.0 LAKE VICTORIA BASIN WATER RESOURCES MANAGEMENT

The Lake Victoria Basin Water Resources are heavily being threatened by pollution which results from human activities. At the same time, the population of the people living around the lake is ever increasing, which in turn raises agricultural, industrial, domestic and environmental demands of the available fresh water resources.

It is therefore the responsibility of the riparian governments and civil society to mange this resource in a sustainable manner for economic and social well-being. For this purpose there is a need to jointly and comprehensively plan for this resources and to have in place an appropriate regulating mechanism on the use of the Lake Victoria Water Resources.

WATER RESOURCES INFORMATION SYSTEM

The use of water for different purposes influence the water balance of the Lake Victoria Basin while increasing the evaporation. This results in a decrease of the water flow to the lake, a lowering of the water surface and a subsequent reduced outflow to the Nile River. Downstream the Lake Victoria on the Nile River the riparian countries might feel their interest threatened and a conflict can possibly develop. Therefore, it is important that the Lake Victoria countries plan the use of their water resources extremely well and assess the consequences of their water activities. To be able to do so they need reliable information on the status and variations of the water resources in short and long term.

Reliable water resources information systems, both at national and regional levels, which is the basis of water resources assessment, monitoring and management is inadequate in all the three countries.

Currently, there are two basic projects i.e the Lake Victoria Environmental Management Programme (LVEMP) and the Lake Victoria Water Resources Project (LVWRP), which in part address some of the numerous water resources and environmental issues of the Lake Victoria Basin. LVEMP only focuses on the lake ecosystem and water quality, while LVWRP, although having a vision on comprehensive strengthening of water resources monitoring capacity in the Lake Victoria basin, does not have adequate resources.

It is obvious that there is a gap with respect to the establishment in the Lake Victoria Basin of a water resources information and decision support system. Such a system containing data, information and tools on water resources availability, water use and water demand is of vital importance for a sustainable development of the Lake Victoria Basin.

The Team recommends a water resources and information system to be built up through national activities and with co-ordination through the East-Africa Co-operation Secretariat, and that a feasibility study be fielded to determine an appropriate mechanism.

Such a study should i.a. include assessment of the needs for water resources information, evaluation of the existing water resources monitoring and assessment tools, and identifying the relationship of the proposal with other ongoing or planned projects including transboundary water issues.

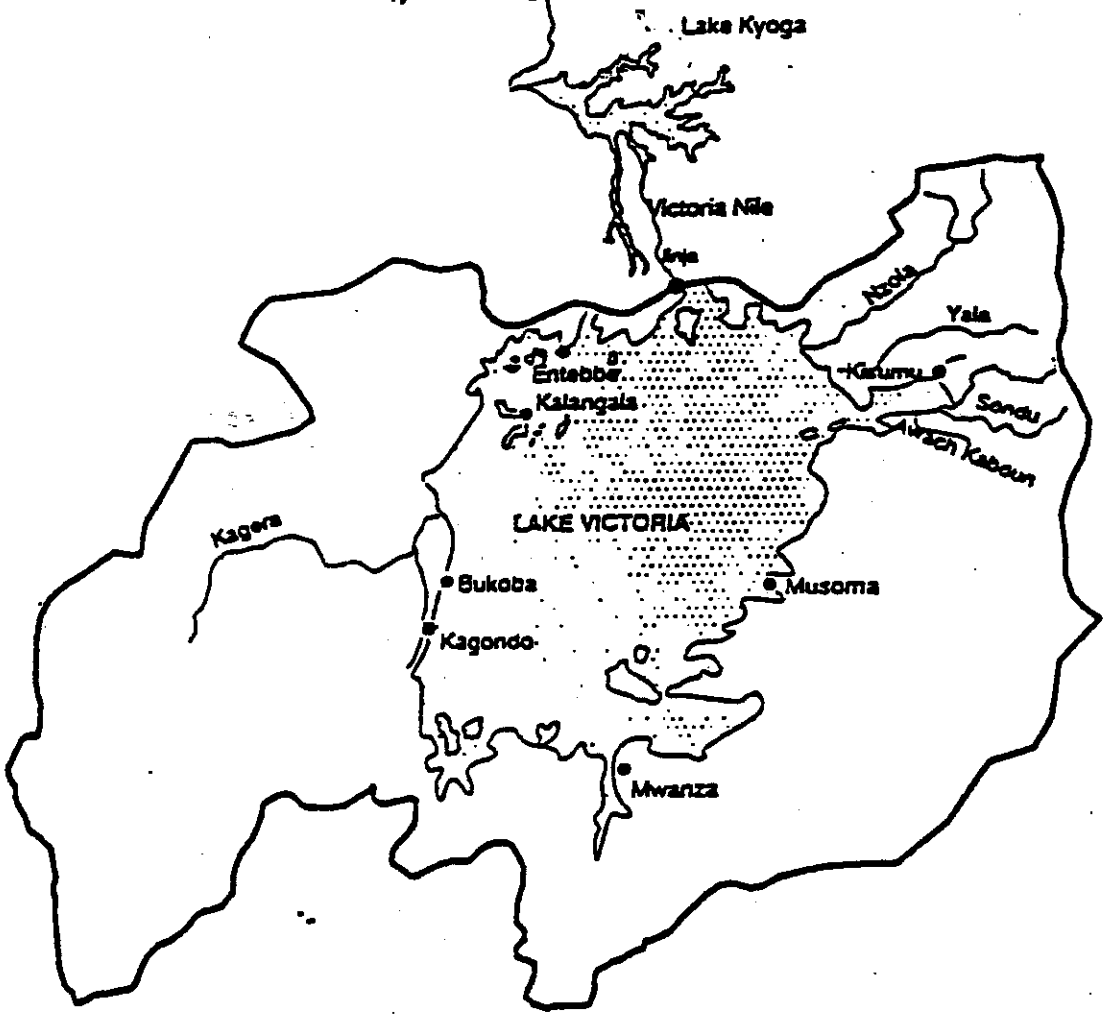

Lake Kyoga
Victoria Nile
Jinja
Nzoia
Yala
Entebbe
Kalangala
Kisumu
Sondu
Miriu
Kaboun
LAKE VICTORIA
Kagera
Bukoba
Musoma
Kagondo
Mwanza

Table 1 Water Balance of Lake Victoria (Averages over 1948-70)

Parameter	Contribution km^3 /year	Total Inflow %
Rainfall on Lake	114	86
Runoff from Catchments (rivers)	19	14
Evaporation from Lake Surface	100	
Change in Storage	5	
Outflow	29	

Source: HYDROMET, 1974

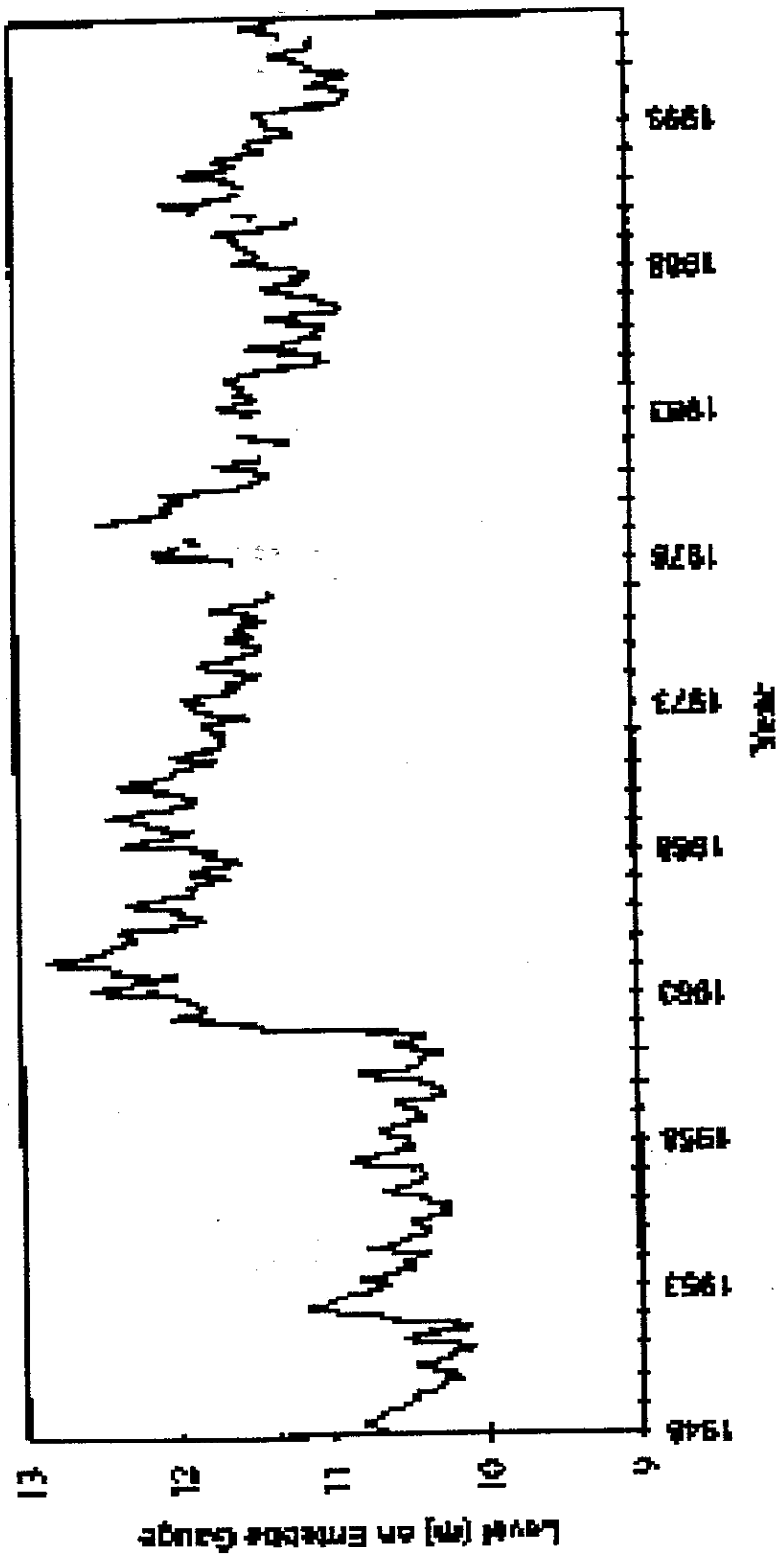


Fig. 2 End of month Lake Victoria Level Variations (1948-1996)

Kenya: Sida-Financed Lake Victoria Pollution Inventory

EXECUTIVE SUMMARY

An Inventory of Water Pollution Sources in Lake Victoria Basin

Points highlighted at the High-Level Seminar on the Assessment of Initiatives for Environmental Co-operation on Lake Victoria

By

M.M. Ndege

Arusha, Tanzania

8 September, 1998

EXECUTIVE SUMMARY

Lake Victoria is the world's second largest freshwater lake. It has an open surface area of 68,800 km^2, a volume of 2760 km^3 and average depth of 40 m but a maximum of 80 m. The lake is a shared resource between Kenya (6%), Uganda (45%) and Tanzania (49%).

The Lake Victoria basin is used by the riparian communities of Kenya, Tanzania, Uganda, Rwanda and Burundi as a resource of food, energy, drinking and irrigation water, building materials, transport and as repository for human, agricultural and industrial waste. Almost 26 million people leave in the lake basin, 11 million in the Kenya part of the basin, 5 million in Tanzania part, 5 million in Uganda part, and additional 5 million in Burundi and Rwanda parts.

Development pressures in the basin are increasing because of natural population growth (about 3%) and due to immigration from poorer rural areas to the municipal, town and urban centres in the basin for better socio-economic status. The towns around the lake are, therefore, growing very fast but not in line with the needed improved services of water supply, wastewater treatment works, solid waste collection and disposal facilities, roads, power and other communication structures.

The developmental activities in the lake basin are, on one side, creating employment and better livelihood while, on the other side, are also the contributing sources of pollution. Pollution, on one side, is due to human

settlements where uncontrolled disposal of wastes, poor or lack of solid management practices and non-functioning treatment facilities are conspicuous. They are also brought by agricultural activities where poor agricultural practices (deforestation), application of wrong and unlicensed fertilisers, pesticides herbicides and/or over-usage of the said, uncontrolled storm water and agricultural runoffs go on unabated. Then there are the industrial activities which discharge untreated or partially treated effluents directly or indirectly into the lake.

These sources of pollution can be divided into two main groups, the point source where the pollutants enter the aquatic environment at identifiable point(s) from factories and municipal waste water treatment facilities. There are also the non-point source where activities that generate pollutants enter the aquatic environment at diffuse points. In this latter case the human settlements and agricultural activities, small scale mining (gold mining) off-load pollutants into the lake waters and wetland degradation are envisaged.

The water hyacinth infestation in the lake basin started from the mid eighties. The weed apparently originated from South America and has been in Africa for as early as 1846 (Egypt). It is only recently that its infestation has taken tall in the Lake Victoria region, where conducive environmental conditions have greatly encouraged large surface area coverage of the lake. The plant is now blocking fishing villages, water intakes to municipal water supply system, hydropower stations, etc. The high nutrient loading which finally finds its way into the lake is the real course of infestation.

The team agreed that to abate pollution and water hyacinth infestation, control strategies involving manual removal, mechanical removal, biological and chemical control will have to be employed. The riparian states' environmental policies, legal and institutional frameworks will need harmonisation and strengthening. It was noted that enforcement of the existing environmental laws that should have some impact on pollution abatement are extremely wanting. There is also urgent need to rehabilitate the waste water treatment plants and/or construct new ones where necessary. Cases of more comprehensive waster treatment works, capable of removing heavy metals and organic micro-pollutants, should be addressed. While looking into ways of cleaning industrial wastes before emptying the effluents into any body of water, the industrialists should be made aware of environmental gains of such efforts and be assisted technically and through tax rebates to co-operates in these efforts. Farmers should be taught and encouraged in efficient use of fertilizers, herbicides, pesticides, etc.

The way forward should be addressed in three levels. The first being areas needing immediate address like updating the current scanty information on pollution loading (by type and concentration) into the lake to give the gravity of the problem. The second are areas which need concrete frameworks and the third are those needing immediate investments. All these measures are taken to address the underlying aim of improving the lifestyle of the basin inhabitants and, therefore, of the riparian countries citizens. In this way those who live in the basin will have a better understanding and therefore appreciate the measures suggested that will definitely lead to better environmental management for sustainable development.

MAIN ENVIRONMENTAL PROGRAMS IN LAKE VICTORIA: ACTIVITIES AND RESULTS ACHIEVED

Lake Victoria Environmental Management Project

IMPLEMENTATION AND MANAGEMENT

THE LAKE VICTORIA ENVIRONMENTAL MANAGEMENT PROJECT

PAPER PRESENTED AT A HIGH LEVEL SEMINAR ON THE INITIATIVES FOR ENVIRONMENTAL CO-OPERATION ON LAKE VICTORIA, HELD AT ARUSHA INTERNATIONAL CONFERENCE CENTRE TANZANIA - 8 - 9 SEPTEMBER, 1998

By

Christopher M. Nyirabu
Regional Executive Secretary
Dar es Salaam

SEPTEMBER, 1998

1. BACKGROUND

Lake Victoria, with a surface area of 68800km^2 and an adjoining catchment of 184,000 km^2 is the world's second largest fresh water body after lake Superior. Kenya, Tanzania and Uganda control 6, 49, and 45 percent of the lake surface respectively. The gross economic product of the lake catchment is in the order of US$3-4 billion annually, and supports an estimated population of 25 million people.

The fishery of Lake Victoria is one of the most important inland fisheries in Africa. Annual fish catch from the lake is between 400,000 to 500,000 metric tones generating some US$300-400 million. The fishery directly employs about 100,000 people but more than 2 million people are involved in other activities. The lake is a major source of water for domestic, industrial and agriculture. It is also a major transport corridor between the three riparian countries. The lake is also of biological and environmental importance. It used to support about 500 endemic species of fish mainly haplochromis. The lake is therefore of great value to the people of the three riparian countries to their economy and social development. It is also of global interest to scientists due to its outstanding biodiversity.

2. MAJOR THREATS TO THE LAKE

With the populations of the communities in the catchment growing at rates among the highest in the world, localised urbanisation and industrialisation, poverty, poorly regulated development and lack of enforcement of existing legislations, pressure on natural resources and the environment has greatly increased. This has resulted into imprudent patterns of human use including landuse practices that cause erosion and eutrophication, exploitative and non-sustainable use of fishery resources, deforestation, discharge of untreated industrial and municipal solid and liquid wastes. These continuing trends are upsetting the ecological balance of the lake ecosystem as the following examples indicate:

2.1 Eutrophication

The water quality of Lake Victoria has drastically deteriorated mainly due to eutrophication resulting from increased flow of nutrients from cultivated lands and municipalities. Nutrient inputs - phosphorus and nitrogen have increased threefold since 1950. These nutrients have given rise to five-fold increase in algae growth since 1960 causing deoxygenation of the water and increased sickness for humans and animals using water from the lake, clogging water intake filters and increase chemical treatment costs. Deoxygenation also threatens the survival of deep water fish species and other organisms.

2.2 Water Pollution

The shoreline of the lake and certain parts of rivers flowing into Lake Victoria are heavily polluted by municipal and industrial discharges. All most all municipalities and towns in the Lake catchment have inadequate or non-functioning waste treatment facilities. Level of industrial pollution control among the common industries namely : tanning, fish processing, sugar coffee and abattoirs is low.

2.3 Huge decline in biodiversity

Lake Victoria has one of the richest fish species diversity and has become a renown world heritage site of tremendous biological importance. The lake used to harbour over 300 haplochromine species. However, recent studies have estimated that over 200 of these species have disappeared and only pockets of the remaining species may be seen in protected bays and inlets. Besides the haplochromine, two endemic fish species oreochromis esculents and o.variabilis have almost disappeared too.

Reasons for this huge loss are many including introductions of exotic fish species which pray on the endemic species for example: Lates niloticus introduced during the 1960's and exotic tilapiines introduced in 1950's. Other causes include irrational fishing methods, over fishing and eutrophication

2.4 Water hyacinth

Water hyacinth is a fast growing fresh water aquatic weed whose origin is South America. It was first noted in Lake Victoria in 1988 on the Uganda side believed to have originated from the Rwanda and Burundi catchment areas. Since then, it has spread to many parts of the lake with high concentration on the Ugandan side mainly due to prevailing Southerly winds. The total area covered by the weed in lake Victoria is more than 4,000 hectares.

The weed causes problems to fisheries by obstructing light, air and destroying fishing nets, big mats obstructing water transport, blockage of water intakes and endangering hydro electric installations.

2.5 Changes in fish biomass

Lake Victoria used to support a multi species fishery. A comprehensive stock assessment survey conducted between 1967-1974 gave an estimated biomass of 67900 metric tonnes. Of this the haplochromis constituted 83% while Nile perch accounted for less than 1%. To day, the picture is different. Nile perch accounts for more than 80% of the catch and about 20% being the rest. This change and decline in species composition has caused a number of social and economic problems to fishing communities e.g. loss of some of the locally favoured fish species renown for their medicinal and cultural values and the marginalisation of small scale fisherman in the fishery business due to the emerging fish processing industry based on Nile perch.

2.6 Land Use Systems

Rapid population growth has put pressure on the environment and natural resources resulting into cultivation in areas not suitable for agriculture i.e. steep slopes, river banks and reserved areas. Deforestation caused by increased demand for forest products is high through out the catchment. Overgrazing is common particularly on the Tanzania side of the lake catchment. These activities have caused soil erosion, siltation and eutrophication of the lake.

3. STRATEGIC INTERVENTION

3.1 The Tripartite Agreement (1994)

The three riparian countries of Lake Victoria (Kenya, Uganda and Tanzania) recognizing the need to cooperate in the sustainable management of Lake Victoria signed an agreement on the preparation of an Environmental Management Program for Lake Victoria (LVEMP) on 5th August, 1994 in Dar es Salaam.

The agreement requires the riparian countries to address two broad areas of concern namely:

- Fisheries management and Control of Water hyacinth
- Management of water quality, landuse, Wetlands and catchment afforestation

With funding from the Global Environment Facility and as agreed under the Tripartite agreement, the three riparian countries set up a planning mechanism to prepare a comprehensive programme aimed at the rehabilitation of the lake ecosystem: The mechanism was as follow:

- Regional Steering Committee comprising of nine (9) Permanent Secretaries in-charge of natural resources, water and environment.
- Two Regional Task Forces on fisheries management and water hyacinth Control and management of water quality, land use, Wetlands and catchment afforestation.

- Two National working groups per each country for each of the two programme areas above
- Regional Secretariat to coordinate and supervise preparation of the programme

The programme document was prepared within one year between November, 1994 to December, 1995 and submitted to World Bank and GEF for funding. The two financing institutions have greed to support the first phase of the programme for the period of 1997 - 2001 at a total cost of 70 million US$.

3.2 Programme Objectives and Component

3.2.1 Objectives

The LVEMP's major aim is to reverse the deterioration of the resources and environmental conditions of the Lake Victoria ecosystem for the benefit of the people who live in the catchment, the national economies and the global community. Main objectives of the programme are:

(a) maximize the sustainable benefits to riparian communities from using resources within the basin to generate food, employment an income supply of safe water and sustain a disease free environment and

(b) Conserve biodiversity and genetic resources for the benefit of the global community.

(c) Harmonize national management programs in order to achieve, to the maximum extent possible, the reversal of increasing environmental degradation.

3.2.2 Project components

Following a successful preparation of the LVEMP the following areas were identified for rehabilitation and improvement:

3.2.2.1 **Fisheries Management**

- Formulation of self financing funding mechanism for Fisheries Extension, monitoring and enforcement.
- Harmonization of National Legislation and strengthening Fisheries Extension, monitoring and enforcement of the three riparian countries.
- Community participation and funding of incentives in pilot zones.

3.2.2.2 **Fisheries Research**

- Stock assessment;
- Biodiversity and Fisheries biology;
- Aquaculture;
- Socio economics and
- Information and Data base;

3.2.2.3 **Capacity Building in Riparian Universities**

- Provision of additional scientific equipment, repair of existing equipment, supply of chemicals, books, transport and office equipment to ~~allow~~ enable them offer postgraduate courses related to the project locally.

3.2.2.4 **Water Hyacinth Control and monitoring**

- Application of a integrated water hyacinth control program consisting of mechanical, bio-agents, manual and chemical methods
- Monitoring the spread of water hyacinth, effect of control methods and impact of the weed to the environment.

3.2.2.5 **Water Quality Management**

- Water quality monitoring;

- Capacity building in water quality management;
- Development of a water quality model;
- Sediment characteristics;
- Estimation of pollution loading to lake Victoria;
- Assessment of Agrochemicals and
- Hydraulic conditions of Lake Victoria.

3.2.2.6 **Pollution Abatement and Management**

- Management of Industrial and Municipal Effluent;
- Integrated Tertiary Municipal Effluent treatment;
- Integrated tertiary industrial Effluent treatment;
- Pollution Disaster Management;
- Priority Waste Management Investment.

3.2.2.7 **Land use and Wetland Management**

- Integrated Soil and Water Conservation;
- Wetland Buffering Capacity;
- Sustainable utilization of wetland;
- Catchment Afforestation;
- Assessment of the Role of Agro-chemicals in pollution of lake Victoria.

4. JUSTIFICATION

Successful implementation of the LVEMP will provide the following benefits to local and international community:

4.1 Avoidance of the predicted collapse in the fisheries estimated to have a present value to the lake community of US$325-600million;

4.2 Reduction in the annual cost attributable to water hyacinth which is in the order of US$6 - 10 million per annum;

4.3 Avoidanance of additional water supply costs arising from treatment in the order of US$3.5 million per annum;

4.4 Decreasing incidence of diseases among riparian communities as a result of improved water quality and sanitary conditions;

4.5 Increased production from wetlands; and

4.6 Improved biodiversity conservation.

5. RESULTS

One of the outstanding achievement of the Lake Victoria Environmental Management Project is first and foremost the recognition by the three Governments of Tanzania, Kenya, and Uganda of the need for Regional Cooperation and Coordination of efforts towards the environmental management of Lake Victoria ecosystem. The signing of Tripartite Agreement on the preparation and implementation of the LVEMP is an important foundation for continued cooperation in future. More specific achieved results are as presented below:

5.1 Water Hyacinth Control

The prolification of water hyacinth is one of the greatest challenges facing Lake Victoria. It is the most appreciated problem by the majority of people familiar with Lake Victoria. Infestation of the weed in Lake Victoria is estimated to be approximately 4000 hectares at end of 1996. The water hyacinth control strategy has so far involved an integrated approach involving manual, mechanical and biocontrol.

5.1.1 Manual removal

This option is being practised by local people and NGO to control the weed in strategic areas including water supply intakes, landing beaches, ferry crossings, dams and ports etc. Support to active communities and NGOs has been made for example one active NGO in Tanzania has been assisted with hand tools worth 13.4 mill TAS. The Uganda Government

has been spending about 2.7 million Ush. to remove one hectare of the weed from the Owen Falls Dam at Jinja. In spite of the difficulties and costs involved under this option, local communities will continue to be sensitised to remove the weed at strategic locations particularly water supply areas and beaches.

5.1.2 Mechanical

This option is so far being applied in Uganda at Port Bell and Owen Falls Dam. The strategy involves use of aquatic weed harvesters, conveyors, draglines and push boats. The Uganda Government has been spending approximately US $2,500 per hectare at Port Bell and Owen Falls Dam.

5.1.3 Bio Control

The three countries have imported two weevil species from Benin for use in the control of the weed. The two weevil species are ***Neochetina bruchi*** and ***Neochetina eichhornia***. Prior to their release the weevils have undergone host specificity test which proved that they only feed on the weed.

In Uganda, the weevils have been released into lake Kyoga and Lake Victoria at Kitosi Masese and Masaka. On the Kenyan side mass rearing of the weevils is taking place at Kibos Fibre Research Centre and released into the lake at about 40 sites in Homa bay, Siaya, Kisumu and Busia districts. In Tanzania three rearing units have been established at Nyegezi, Musoma town and Buyagu. A fourth unit is under construction at Bukoba. Additional weevils are transferred from Hale dam in Tanga and Kibaha bio control centre. Releases have been made at more than ten sites along the lake shore.

Although it takes about 3 years or so for the weevil colonies to get fully established, already in areas of release, signs of plant damage can be

noted including browning of leaves, stunting plant growth, lack of flowering, reduction in the leaf laminar area and length, and feeding scars.

5.1.4 We have not used a fourth method of herbicides because it is still undergoing some tests particularly in Uganda.

5.2 Fisheries Management and Research

5.2.1 Fisheries Management

Work has focused on sensitisation of communities on the importance of conserving the lake, extension including establishment of closed fishing areas, gazettement of fish landing sites to facilitate quality control, data collection and enforcement of fisheries regulations. Quality control and hygiene have also been given great attention in both countries resulting into lifting of the export ban to the European Union.

5.2.2 Fisheries Research

5.2.2.1 Biodiversity Conservation

The three countries have each made one frame survey and several beach surveys to collect information on biodiversity status, species composition and food preference. These research surveys are coming up with interesting information on the biodiversity status of the lake i.e. some of the fish species feared extinct or seriously threatened have been identified in several locations. These species include endemic cichlids such as o. variabilis, o. esculents and other haplochromis species.

- Construction of a hatchery has been completed at the Tanzania Fisheries Research Institute - Nyegezi - Tanzania and breeding of several threatened species for re-stocking the lake has commenced. Ten ponds have also been constructed at the same place for the same purpose. Preparation for establishing a hatchery in Kenya are at an advanced stage.

5.2.2.2 Aquaculture potential

The three countries have completed a survey of the potential for aquaculture development in the lake basin. A book on this subject is currently under preparation by experts from the three countries.

5.3 Water quality monitoring and ecosystem management

The three countries have worked out and agreed on standards for measuring and monitoring water quality and that routine sampling of water quality along the shores of Lake Victoria has started. Off shore sampling will commence soon when repair of large vessels is completed. The main laboratories in all the countries are under major renovations to be able to handle additional task arising from the Project. Necessary equipment and chemicals have been identified and orders placed.

5.4 Land Use, Wetlands and Afforestation

Needs assessment for soil and water conservation including agro-forestry has been carried out in the pilot catchments namely Simiyu (Tanzania); Nyando (Kenya) and Kagera river in Uganda. Consultative meeting with local communities is continuing to agree on the appropriate measures for soil conservation, location for nurseries and people to be trained.

Key catchment forest areas for water catchment functions have been identified and surveying to establish conservation requirements is going on. Tree nurseries at priority sites are being established in the catchment to provide seedlings for gap planting, boundary planting and agro forestry. In Kenya work on rehabilitation of degraded hill through soil conservation and tree planting has started in the lake basin.

Wetland surveys have been accomplished in the first pilot areas in each country. The surveys give information on size and location of an individual wetland, type of use and threats. Work will continue into the remaining pilot areas.

5.5 Support to Riparian Universities

The LVEMP provides financial support to strengthen the Department of Marine Biology and Zoology of the riparian universities i.e. Makerere, Dar es Salaam and Moi support is in form of training and office equipment, transport, field tours for students and Ph.D training for lecturers.

5.6 Microproject

The LVEMP provides funding for community based social and economic projects each costing up to 15,000 US $. Of this sum, the Project meets 90% and the local people meet the remaining 10% in cash, labour or materials. All three countries have completed preparation of micro project implementation manuals, and have put in place the necessary implementation mechanisms at the district and local level.

In Tanzania, five micro projects are currently under implementation in Mwanza gulf namely Kamanga Shallow Water Scheme, Mihama - Kitangiri road 7.8 km, Igombe sanitation project, Bukokwa dispensary and completion of Mbarika piped water scheme.

5.7 Project Coordination

The three LVEMPs have continued to coordinate and supervise project implementation in all the three countries. Some of the tasks carried out include preparation of 1998/99 work plan and financial plan, procurement of land and water transport, processing of bid documents for renovation works and international consultants. Several harmonisation meetings involving individual project component staff were held.

The Regional Secretariat coordinated the preparation of the following important documents. Project Implementation Plan (PIP), Project Administrative Manual and Review of the possible use of chemical pesticides in the control of water hyacinth in Lake Victoria.

6. PROBLEMS ENCOUNTERED

6.1 Water and Land transport

There has been a big delay in the procurement of water and land transport for the project as a whole. Implementation is now in its second year and yet no component has acquired the required transport. Long and bureaucratic tender procedures demanded by the government and the World Bank are both to blame.

6.2 Shortage of Staff

Some components are badly affected by lack of staff i.e. fisheries management, water quality management, wetlands and water hyacinth control, caused by our Governments Civil Service Reforms.

6.3 Operational Funds

Some components are seriously under funded including soil and water conservation, water hyacinth control particularly the weed harvesters option catchment afforestation, and pollution abatement from industries and residential areas.

7. WAY FORWARD

7.1 Water Hyacinth

The plorification of water hyacinth still remains a big environmental challenge. Current control efforts are not matching with the weed growth and entrance of the weed from outside the lake particularly through the Kagera river. As a way forward we propose that a mini-donors meeting be convened to solicit additional funding for the component.

7.2 Tender Procedures

As for the other problems i.e. cumbersome procedures in the tendering procedures, we request our governments and the World Bank to discuss the issue and simplify some of the routines.

7.3 Staffing

The respective Secretariats are currently negotiating with the governments on the need to increase the number of staff either through transfers or new recruitment. In some components, the governments have responded positively. These efforts will continue until we arrive at the right manning levels.

7.4 Sustainability

The Project is receiving Credit and Grant and local funding to run her operations. These funds will not continue forever. It is for this reason that the Project pays great attention on community awareness and participation so that environmental management activities can be sustained in future.

In addition the creation of the Fish Levy Trust is crucial for the sustainance of the Project activities. The three countries are in the process of recruiting consultants to define such a system for each country.

7.5 Sensitization/awareness

The Lake Victoria Environment Management Project should principally aim at changing peoples' behaviour as far as resource use and environmental protection is concerned. Continuous sensitisation, awareness participation in resource management and utilisation is therefore of crucial. Local and national awareness/sensitisation workshops to relevant stakeholders to enlist their appreciation and full involvement in all Project components will continue to be emphasised.

8. CONCLUSION

The LVEMP is one year into implementation. During this period, we have witnessed continuing deterioration of the lake ecosystem mainly increasing plorification of water hyacinth land degradation, water pollution from municipal and industrial waste and inadequate staff capacity. For this we wish once again to request the national governments and international community to continue support the LVEMP through additional operational funds, institutional capacity building as well as special support to communities.

Lake Victoria Water Resources Project

EAC SECRETARIAT - SIDA HIGH LEVEL SEMINAR ON THE ASSESSMENT OF INITIATIVES FOR ENVIRONMENTAL CO-OPERATION ON THE LAKE VICTORIA

ARUSHA, 8 - 9 SEPTEMBER 1998

FAO REGIONAL LAKE VICTORIA WATER RESOURCES PROJECT: ACHIEVEMENTS AND CHALLENGES

by
Mihailo M. Andjelic
FAO Chief Technical Adviser

SEPTEMBER 1998, ENTEBBE, UGANDA

FAO REGIONAL LAKE VICTORIA WATER RESOURCES PROJECT: ACHIEVEMENTS AND CHALLENGES

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1. Introduction

1.1 Background

From the Global Environmental Conference in Stockholm in 1972 to the UN Global Summit on Environment and Development in Rio in 1992 and many other international fora, there has been an increasing awareness of the need to manage water resources in a holistic and integrated manner in order to avoid escalating water related constrains to development, or worse, conflicts.

The Lake Victoria region is not an exception in this respect. Apart from being one of the sources of the Nile river, Lake Victoria is also one of the world's largest fresh water bodies which is shared by Kenya, Tanzania and Uganda. The gross economic product in the lake catchment is about US$ 3 to 4 million annually and supports an estimated population of 25 million people at average incomes in the range of US$ 90 to US$ 270 per annum. Population density in the Lake basin is above the national average in all countries and the populations of the riparian communities grow at rates that are among the highest in the world. The environmental challenges are also besetting the Lake: the introduction of an exotic fish, the Nile perch, is upsetting the ecological balance with harm for biodiversity, the inputs of nutrients stemming from the Lake catchment are resulting in considerable eutrophication and a water hyacinth invasion has caused a host of problems.

Land and water resources of the Lake Victoria basin constitute one of the main development potentials in Kenya, Tanzania and Uganda. There is a pressing need for irrigation in dry areas of Kenya and Tanzania and for urban, rural and industrial water supplies in all three countries. Uganda needs an undiminished flow of water from the Lake Victoria basin for power generation. Major natural and anthropogenic disturbances of the Lake basin water balance can change the water level and flow regime with serious effects the scope of which is unknown or not completely understood and is yet to be properly investigated and quantified. Lake Victoria is also the source of the Victoria Nile and thus the subject of a keen interest by downstream countries, a fact which further accentuates the inherent complexities and uncertainties involved in water resources management in the Lake basin.

The solution to these problems requires regionally co-ordinated action. Taking such action in the past was often complicated by various factors, which include unequal benefits drawn by riparian countries from the Lake catchment and the Lake body, national interests that are not necessarily convergent, and inadequate data, information and water resources planning and management

tools available to decision-makers. The situation is further exacerbated by the fact that the Lake Victoria countries are upstream riparians in the Nile Basin; hence any arrangement for a sustainable use and management of the Lake Victoria water resources needs also to be negotiated and agreed upon with downstream riparians of the Nile. The prospects for reaching such an agreement can greatly be enhanced if the East-African Countries have a shared vision and common policies on water use and management in the Lake Victoria region, and then act as a group, rather than individually, in negotiating a final settlement with the downstream riparians.

1.2 Current Situation and Ongoing Initiatives

When it comes to co-operation, it can be argued that the situation has radically changed in the past few years. The three Lake countries are becoming increasingly aware of the importance of a regionally coordinated common approach in integrated planning and management of the Lake basin resources with particular emphasis on land, water and environment protection, fisheries and transport. Poverty alleviation is seen as a key to achieve a sustainable balance between people and their environment.

A number of regional coordinative bodies or organizations has been created in recent years, such as the Permanent Tripartite Commission for the East African Cooperation and its EAC Secretariat, the Lake Victoria Fisheries Organization, and the Tripartite Agreement on the Lake Victoria Environmental Management Programme to mention but a few. In the same spirit, the Steering Committee of the FAO/Japan Lake Victoria Water Resources project GCP/RAR/304/JPN has been mandated to act as a transitional body for coordinating water resources development and management activities in the Lake Victoria region pending the formation of a Lake Victoria Management Institution. There are also several other either regional or national projects and initiatives currently active in the Lake Victoria region, notably the EU Fish Stock Assessment project, the FAO/Italy Nile Basin Water Resources project, the latest Nile Basin Initiative which was launched by the Council of Ministers (COM) of Water Affairs of the ten riparian states of the Nile basin, including the East - African states, and so on.

It can be concluded that currently there are a number of parties, interests and programmes operating or concerned with the use and management of the Lake basin resources. Nonetheless, the activities of these parties are coordinated by different ad hoc established bodies and mechanisms while interaction and cooperation among the programmes and the respective coordinative bodies is in general poor, sporadic or non-existent.

In the East African Co-operation Strategy (1997 - 2000) the Lake Victoria basin has been designated as a regional economic growth zone reflecting the desire of the Member States to have in the Lake basin an integrated development approach which will insure sustainable exploitation of the Lake's resources. Moreover, the Statement from the EAC Secretariat on the Arrangements for Tripartite Co-operation in Water Resources Management in the Lake Victoria Basin under the aegis of the East African Cooperation, emphasize that, as a first step towards establishment of a regional mechanism for co-ordination in the Lake basin, a study be undertaken with the objective of determining the most appropriate institutional framework that would insure a harmonized regionally coordinated development, management and

environmental protection of water resources in the Lake Victoria region. A similar requirement has been echoed elsewhere, notably in the SIDA Report from a fact finding mission to Kenya, Tanzania and Uganda in April 1997, entitled Lake Victoria Basin - Natural Resources under Environmental Stress and in several documents of the ongoing FAO Lake Victoria Water Resources project.

1.3 Physical Background

Lake Victoria (see Figure 1) has a surface area of about 69,000 km^2 shared by three countries, with a land drainage area of slightly over 181,000 km^2 in 5 countries (Table 1). The mean depth is of about 40 m with a recorded maximum depth of 84 m and the volume of water stored is estimated at about 2,760 km^3.

Table 1: Lake Victoria surface area, shoreline and basin area per country

Country	Lake surface area		Shoreline		Tributary basin	
	[km^2]	[%]	[km]	[%]	km^2]	[%]
Kenya	4,113	6.0	550	17.0	38,913	21.5
Tanzania	33,756	49.0	1,150	33.0	79,570	44.0
Uganda	31,001	45.0	1,750	50.0	28,857	15.9
Rwanda	0	0	0	0	20,550	11.4
Burundi	0	0	0	0	13,060	7.2
Total	**68,870**	**100.0**	**3,450**	**100.0**	**180,950**	**100.0**

Lake Victoria moved into the focus of attention in the 19th century, when it was for the first time identified as one of the sources of the Nile. Because it has a control structure for a large hydropower plant at its Oven Falls outlet, the Lake is classified as a very large reservoir. Hydrologically, however, the Lake behaves like a closed system, as can be seen from the estimated water balance components in Table 2.

Table 2: Lake Victoria water balance components 1965 - 1990

Water balance component	Volume	Lake level equivalent
	[km^3]	[m]
Lake rainfall	125	1.81
Lake evaporation	110	-1.60
Lake net rainfall	14.5	0.21
Catchment rainfall	293	n. a.
Catchment evaporation	270	n. a.
Inflow from catchment	23	0.34
Net basin supply	37.5	0.55
Outflow at Owen Falls	38	-0.57

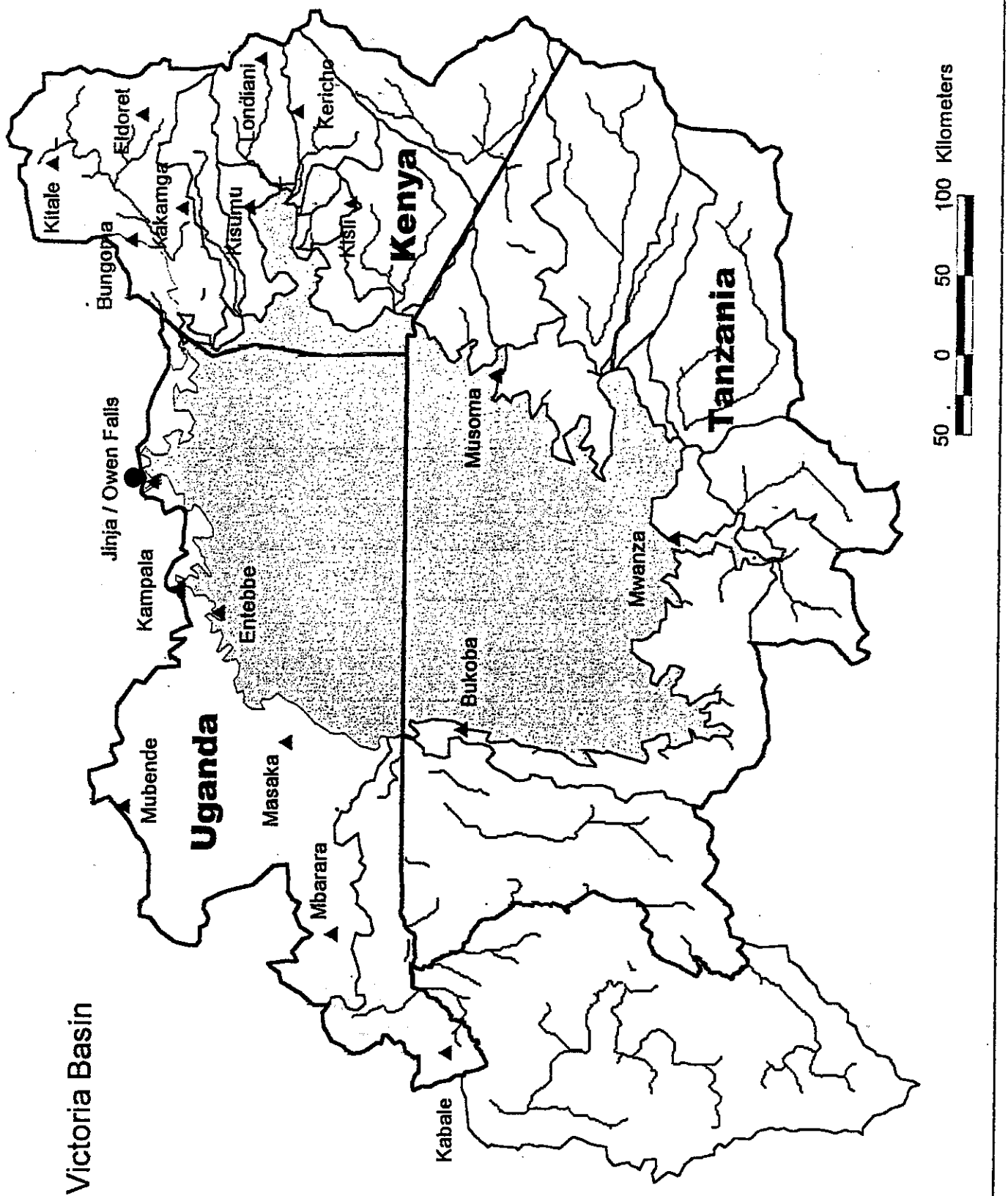


Figure 1: Lake Victoria Basin

It takes about 73 years for a volume of water equivalent to the Lake to flow out of it. Historically, somewhat above average rainfall in the early 1960s resulted in a sudden rise in water level of 2 m and extensive shore flooding. Since then, the lake level have receded to historic averages but rose again, quite significantly, in the first half of this year as a result of El Nino. Limnologically, the Lake is monomictic and primary productivity is high.

The water balance of the Lake Victoria has been the subject of substantial scientific scrutiny, largely in an attempt to explain the significant and sudden rise in water levels in the early 1960s. Yet, the results of a number of water balance studies and the early 1960s phenomena can't be still considered conclusive; this is mainly due to a rather poor insight into the rainfall and, partly, evaporation regime over the Lake surface which are by far the largest components of the Lake water balance as demonstrated in Table 2. An adequate explanation of the perennial 'Lake rainfall puzzle' could radically change current conventional wisdom about the major causes of the Lake's water level fluctuations and, thus, significantly influence all current and future plans for water resources management in the Lake Victoria basin.

2. Lake Victoria Water Resources Project (LVWRP)

2.1 Objectives and Implementation Mechanisms

Following the agreement between FAO and the Governments of Kenya, Tanzania and Uganda, a project GCP/RAF/304/JPN "Information System for Water Resources Monitoring and Planning in the Lake Victoria Region" or shorter- Lake Victoria Water Resources Project has been implemented with Japanese funding and FAO technical assistance. The purpose of the project is to support regionally coordinated national efforts to, in the first place, clarify complementarity and interfacing of interests and identify the goals of future cooperation of the East African States concerned with a harmonized and sustainable water resources development and management in the Lake Victoria Region, and in the second place, establish a basic monitoring and information system infrastructure covering water and related parameters, for use in water management and development planning in region.

In a nutshell, the Lake Victoria Water Resources Project (LVWRP) is about development of water resources information systems, mathematical models and tools in support of a harmonized, regionally coordinated water resources management in the Lake Victoria basin. The LVWRP has been implemented since January '96 in the Lake Victoria region and is scheduled to complete all major activities and phase out by June '99.

In addressing some of the many gaps in water sector and requirements expressed by the countries of the region, the LVWRP is focusing its efforts on delivery of the following key outputs for the Lake Victoria basin:

- water resources monitoring network;
- a geo-referenced database system containing both point and spatial data layers;
- a water resources management decision support system;
- capacity building on technology and know-how for a harmonized, regionally coordinated water resources management.

All major activities of the project are implemented at national level in Kenya, Tanzania and Uganda - through Focal Point Institutions and National Coordinators of the project designated by the Governments of the three partner counties. The activities are initiated and coordinated by FAO Chief Technical Adviser and his technical staff, presently consisting of two Associate Professional Officers and supporting personnel all stationed at the Project Office in Entebbe, Uganda. FAO provides technical and administrative backstopping while overall guidance and supervision of the project implementation rests on the Project Steering Committee.

2.2 Key Project Outputs

2.2.1 Monitoring Network

The project is establishing a limited water resources monitoring network in the Lake Victoria basin, consisting of 14 automatic water level recording stations and 3 automatic weather stations.

The network selected for implementation (see Figure 2) is the result of a series of activities executed by the project, including (a) preparation of national reports on water demand, development priorities, and needs for water resources data and information; (b) a series of national workshops with major stakeholders in the Lake Victoria basin in each country;(c) preparation of a proposal for implementation of a regionally coordinated water resources monitoring network in the Lake Basin; and (d) final adoption of the monitoring network at a regional harmonization workshop of the project, held May 97 in Kisumu, Kenya. In the process, a thorough review has been made of:

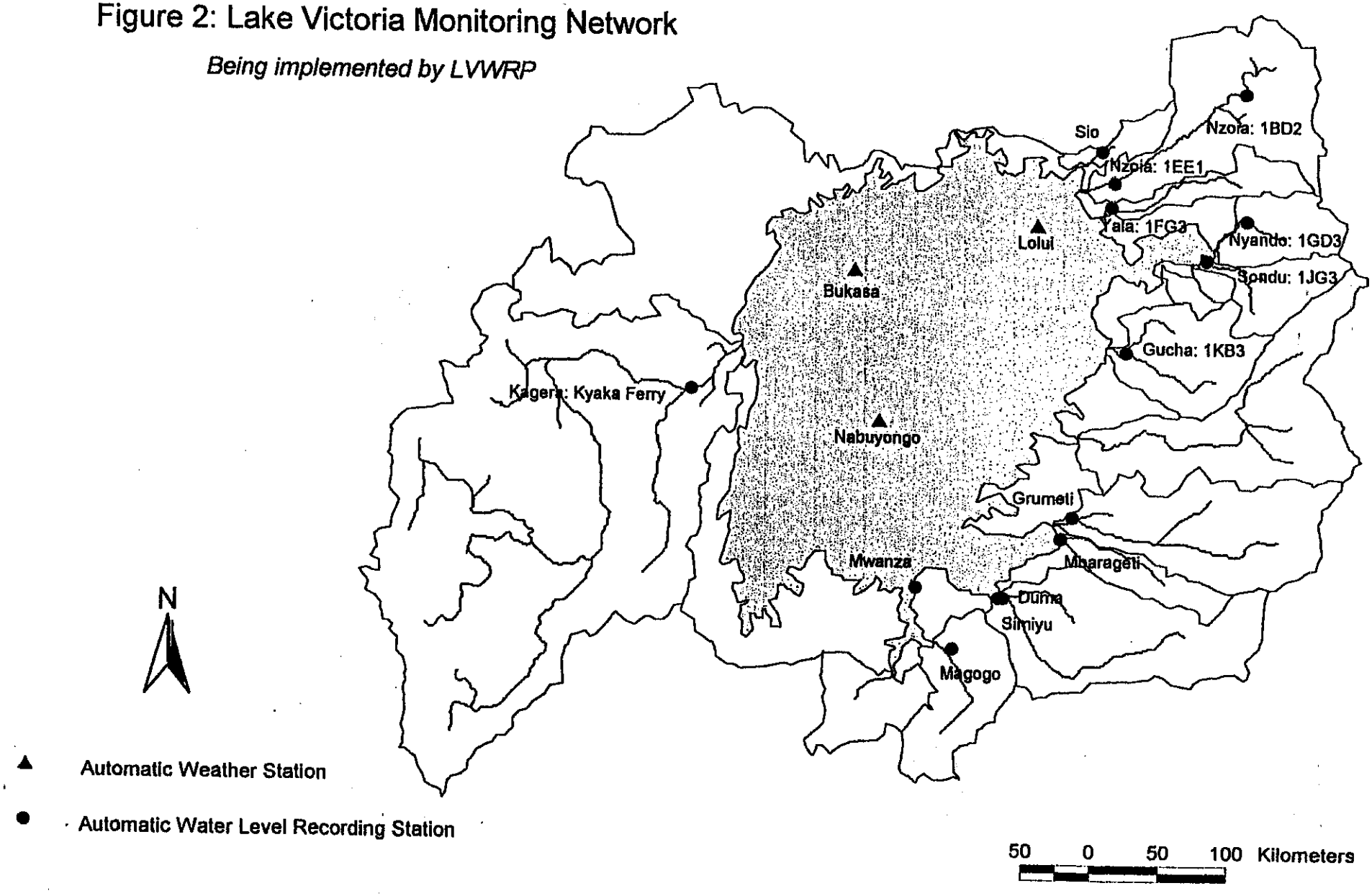
- the national priorities in water resources development in the Lake Basin;
- the existing and projected future water use and demand in the Lake Basin;
- the current status of the water resources monitoring network in the Lake Basin;
- the existing gaps in water resources data and information of crucial significance to decision makers in the water sector.

The outcome of the review demonstrated that each country of the region has placed, with slight variations in the emphasis and scope, very high priority on, and has concrete plans for water resources development in the Lake Victoria region in order to satisfy rapidly increasing demand for irrigation to increase food production, domestic and industrial water supply and hydropower production.

Not surprisingly, the identified gaps in the monitoring network proved to be significant, and this calls for an immediate follow up action. Thus, for instance, to satisfy high priority development requirements in its part of the Lake basin, Tanzania, whose observing network can by all measures hardly be considered operational, is in need for at least 21 hydrometric, 13 meteorological, 87 rain gauging and 10 automatic stations in remote areas; Kenya identified over 60 stations for measuring stream flow, suspended sediment and water quality parameters which are in need to be completely rehabilitated, 10 main meteorological stations and a number of rain gauges; while Uganda requires rehabilitation of 20 hydrological and meteorological stations and establishment of 8 water quality profiles.

Figure 2: Lake Victoria Monitoring Network

Being implemented by LVWRP



In contrast with the above identified gaps and requirements, the project has sufficient resources to establish only 17 stations in the whole Lake Victoria basin (refer to Figure 2) and even these stations will not be equipped with rather expensive cable ways for stream flow, sediment and water quality measurements in the periods of flood and high flow.

The adopted Monitoring Network includes stations on the 10 largest rivers in the lake basin and monitors approximately 88% - 90% of the total inflow into the Lake. It can be expected that a similar percentage of the total inflow of pollutant and/or suspended sediments is covered. Hence, the network also plays an important role in water quality management of Lake Victoria.

All stations, except Sio in Uganda, are located on sites of former stations which are either abandoned or no longer operational. Thus, the newly obtained information will complement historic record sets, mainly created in the 60s and 70s under the UNDP/WMO Hydrometeorological Survey project (Hydromet) in the Lake basin.

The water level recording stations are equipped with state-of-the-art pressure transducers and electronic dataloggers, ensuring a smooth transfer of data from the monitoring network to the Lake Victoria Basin Database.

The project has been looking into various possibilities, including a cooperation with the Lake Victoria Environmental Management Project (LVEMP) to establish permanent cable way installation with mechanical double drum winches at each control profile. This would facilitate the establishment of accurate rating curves and the assessment of actual inflows.

The network includes three Automatic Weather Stations on Lolui, Bukasa and Nabuyongo islands in the Lake Victoria. These stations are equipped with electronic dataloggers and sensors for monitoring rainfall, temperature, relative humidity, short wave solar radiation, wind speed and wind direction. These parameters will facilitate the estimation of open water evaporation using either the Priestley-Taylor or Penman-Monteith approach. Both evaporation estimates and rainfall data will serve as basis for unlocking a perennial rainfall regime over the Lake as well as for better assessment of the Lake evaporation.

To complement the monitoring network, the project has also joined efforts with the Nile Basin Water Resources project in upgrading the remote sensing PDUS and Meteosat image data archiving and processing facilities at the Meteorological Services in Kenya, Tanzania and Uganda. The facilities put in place have enabled the countries of the region to receive the Meteosat thermal infrared, visible and water vapor images in real time and archive/process the images as necessary. Once the development of Decision Support System is completed the images will be used for areal rainfall and evaporation estimation in the Lake region.

2.2.2 Geo-referenced Database

A geo-referenced database system for the Lake Victoria basin being developed by the project is a collection of: (a) daily hydrometeorological time series data; (b) spatial layers and attribute data describing some of the physical land properties of the Lake basin; (c) information on water demand and use; and (d) a set of software utilities for data ingest,

processing, analysis and management such as MS Access for relational database operations, ArcView for all georeferenced data, and MS Excel for additional data processing and analysis. For brevity, this collection of data, information and software utilities is referred to as LVBDS (Lake Victoria Data Base System).

The project completed the LVDBS version 1.0 and distributed it in November '97 on CD-ROM to the Focal Point Institutions of the project in Kenya, Tanzania, Uganda for further development and use. The CD contains over 55 Mb of data for the Lake Victoria basin; these data are also being used within the project for development of a water resources management Decision Support System of the Lake Victoria basin; Upon completion of the Decision Support System modeling effort, the LVBDS is designed to serve as backbone system for:

- ingesting new spatial and non-spatial data from either the monitoring network or any other source;
- feeding the necessary data and information into the Lake Victoria and water resources management Decision Support System;
- storage, retrieval and display of all data for interpretation of information and the modeling results; and, last but not least, for
- various additional sorts of analysis, presentation of results, map production and report preparation by using its own analytical tools and software utilities.

Data and information collected, processed and stored so far in the LVDBS come from a variety of sources, including (a) Focal Point Institutions and Meteorological Services in Kenya, Tanzania and Uganda; (b) Completed or ongoing projects in the region, including data from the WMO/UNDP project Hydrometeorological Survey of Lake Victoria, Kyoga and Albert, also known as the Hydromet project, which was implemented in the period from 1967 to 1982; (c) FAO database in Rome; and (d) International sources of data available on Internet. All time series and even data sets collected, extracted, checked and processed by the project, are stored in the LVDBS in a Dbase compatible format and in the ArcInfo/ArcView format for geo-referenced data layers thus making the LVDBS compatible with almost all present-day available database management software packages.

Further efforts in upgrading the LVDBS within the project will be focused on adding additional water resources time series, and climatological data, water demand and water use information and relevant digital maps available for the region.

For more detailed information on the LVDBS, its content and conditions for use, readers may refer to the Project Office, and Focal Point Institutions in Kenya, Tanzania and Uganda.

2.2.3 Decision Support System

One of the key outputs of the project is a water resources management decision support system (DSS) of the Lake Victoria basin; It is a user friendly modeling system which integrates all other components and outputs and provides a powerful tool to managers and decision makers in the Lake Victoria region. The development of the Lake Victoria decision support system is a collaborative effort of the Food and Agriculture Organization of the

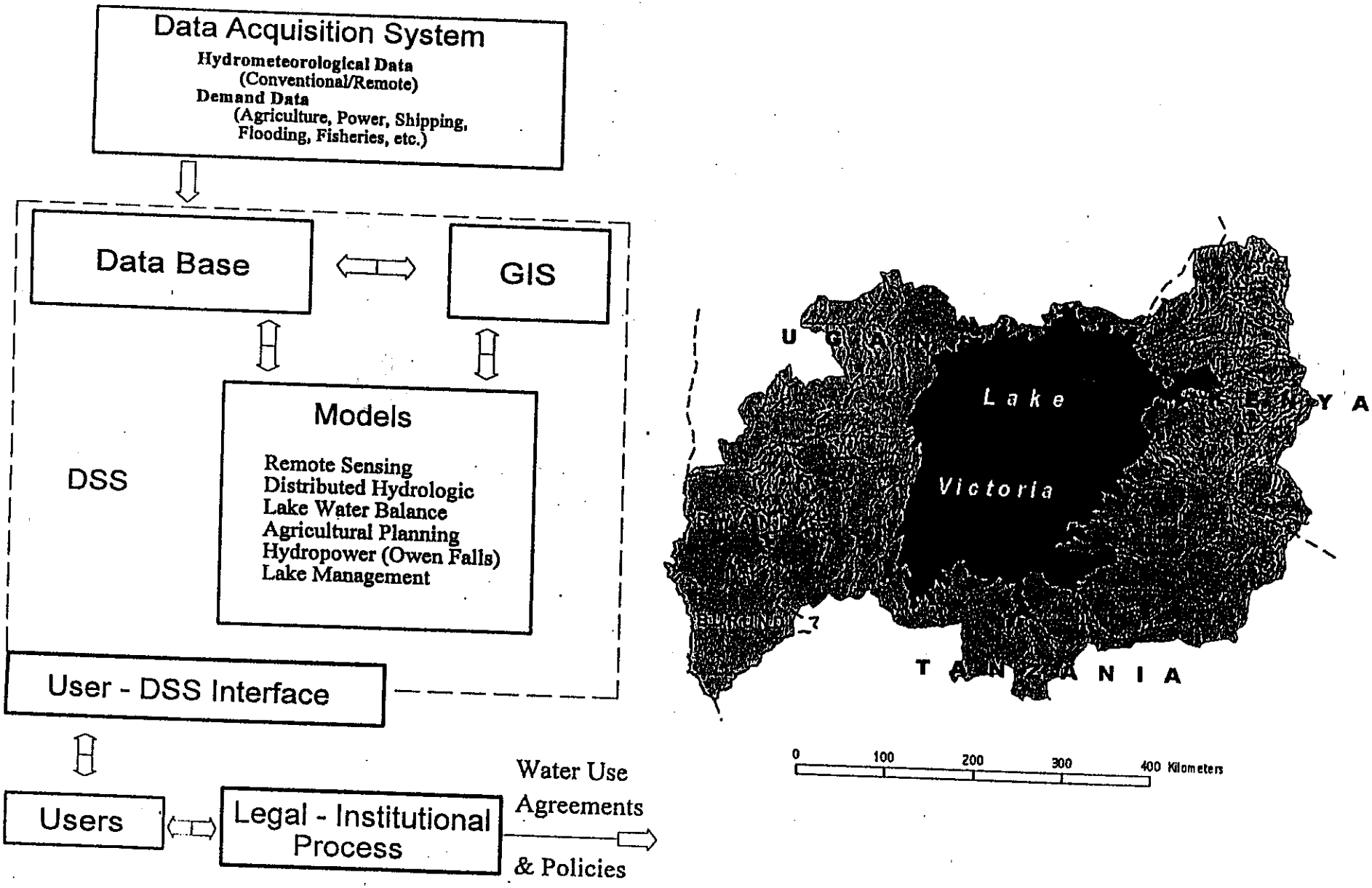


Figure 3: Lake Victoria Decision Support System

United Nations and its Lake Victoria Water Resources Project and the Georgia Water Resources Institute (GWRI) at the Georgia Institute of Technology, in Atlanta, Georgia.

The decision support system is being developed in accordance with the following guiding principles:

- It is intended to be a "shared-vision" Decision Support System, able to capture all relevant information pertaining to the management decisions, and represent it in a form that the users can intuitively appreciate;
- The role of the DSS will be to assist the Lake Victoria Partners in their efforts to formulate mutually-agreed upon management strategies. As such, it should have the ability to generate tradeoffs among the various water uses, and assess the gains and costs of various development and management scenarios.
- The Lake Victoria Partners should be able to continue to utilize and develop the DSS technology under a changing environment.

The decision support system components being developed (see Figure 3) can be grouped in five general categories: (1) water resources monitoring network: (2) geo-referenced database system; (3) water availability component; (4) water demand component; and (5) integrated water management component.

The Water Availability Component is modelling the processes that control the water fluxes into and out of Lake Victoria such as watershed runoff, rainfall, and evaporation and consists of the following four modules:

- Distributed Hydrologic Modeling of the Lake Victoria Drainage Basin
- Rainfall Estimation by Remote Sensing Methods
- Estimation of Lake Evaporation by Remote Sensing Methods
- Lake Victoria Water Balance Model
- Agricultural Planning
- Hydropower (Owen Falls)

The purpose of Water Demand Component is to make an assessment of water resources demands which relate directly to Lake Victoria and its watersheds in Kenya, Tanzania, and Uganda. Due to limited resources the water demand components will be assessed on the basis of the existing documentation, publications, reports and available data in the three participating countries. Much more exhaustive assessment and analysis of water demand in the region will have to be conducted in the future.

The Integrated Water Management component aims at (a) integrating the water availability and water demand products into a comprehensive, "shared-vision," decision support system, and (b) establish a framework within which the Lake Victoria Partners can assess the impacts of various development and operational scenarios and formulate mutually agreed upon management strategies. It consists of a Decision Model based on the Georgia Tech state-of-the-art reservoir control model and Water Management Scenario Analysis which will enable the analysis of water management scenarios in the Lake Victoria region as follows:

- Develop a baseline scenario that corresponds to present demands and operational conditions.
- Develop a common understanding (with Lake Victoria Partners and stakeholders) about how the physical system responds to given sets of conditions, and then use this knowledge to formulate management alternatives for evaluation.
- Assess the overall impacts of strategies and water development scenarios that favor exclusively each country's interest over all other water users. Specifically, each country will formulate an "ideal" scenario to be compared with the baseline. The gains and costs will be assessed for each water use as the performance difference between the baseline and ideal scenarios.
- Determine mutually agreed upon Lake Victoria management strategies that can be used to address the present and future water demands of Kenya, Tanzania, and Uganda.

2.2.4 Capacity Building

Capacity building in the participating countries of the Lake Victoria region represents an essential component of the project. It aims at providing a comprehensive theoretical and practical training of national water resources and other professionals in each country of the region and build the institutional capacity at the Focal Point Institutions to be able to deal with:

- installation of field equipment in water resources Monitoring Network;
- operation and maintenance of the network;
- data collection, quality control, and data entry into the LVDBS;
- use of computers for water resources data processing and analysis;
- geo-referenced databases and GIS software tools;
- management and maintenance of the LVDBS;
- methods and procedures for water resources data processing, analysis and report preparation as needed for water managers and decision makers by using the LVDBS and its utilities;
- methods for analysis of water use and demand information;
- modeling of each component of water resources management and Decision Support System;
- maintenance and further development of DSS developed within the project;
- use of the developed DSS for regionally coordinated water management scenario analysis in the Lake Victoria basin at the Focal Point Institutions in Kenya, Tanzania and Uganda.

A number of training activities have been accomplished so far in support of the capacity building component within the project. These consisted of regional and national training workshops, and a series of in-service training seminars at each FPI or Meteorological Service (in conjunction with commissioning of PDUS facilities in each country) dealing with a number of, above specialized, topics for sustainable use, operation and maintenance of facilities and technology being provided by the project.

Training activities are considered an integral part of all project activities and will go on till the end of the project. Thus, the capacity building activities in the remaining project implementation period will in particular be focused on components related to:

- installation of water resources monitoring network, its operation and maintenance, including procedures for data collection, quality control and ingest into the LVDBS;
- further advanced training on georeferenced databases, spatial analysis, GIS and its components;
- methods of analysis of water use and demand data and information;
- all components of water resources management decision support systems and their use.

To reinforce the capacity building on the most complex component concerned with the development and use of water resources management Decision Support System for the Lake Victoria basin, three National Modellers from the region will also undergo a three-month intensive training at the Georgia Institute of Technology in Atlanta, USA.

3. Challenges

3.1 Overview

As evident from the above considerations, the LVWRP project plans and has sufficient resources to: (a) establish a limited network of 17 key water recourses monitoring stations in the Lake basin; (b) upgrade remote sensing facilities and processing hardware/software for reception of Meteosat image data, storage, image processing and satellite-based rainfall estimation over the whole Lake region; (c) establish a geographically referenced data base system loaded with a limited number of spatial data layers and historical hydrological and climatological time series; (d) develop a distributed, GIS-based modelling and decision support system of the Lake Victoria region which will rely on limited data and coarser resolution than desirable and to be restricted to larger priority areas in the region; and (e) estimate present and future projections of water use and water demand in the region on the basis of a rough analysis and compilation of data from the existing documentation and planning documents without possibility to embark on a detailed and more reliable studies of water use and demand in various sectors in the three countries of the region.

In addition, by virtue of the conclusions of a high level Regional Meeting on the Formation of a Lake Victoria Water Management Institution, held in Arusha in July 1995, the Steering Committee of the LVWRP is mandated to serve as a transitional arrangement for co-ordinating water management activities among the three East African countries pending the formulation of more complete proposals for a Lake Victoria Management Institution. To this effect, the LVWRP and its PSC have carried out several tasks related to coordination of water management activities in the region; in the process, the project established close working relations with the Secretariat for the East African Co-operation in Arusha which resulted inter alia in an agreement between the EAC Secretariat and the PSC to closely cooperate and coordinate their actions concerned with any arrangement for tripartite cooperation in the water resources management in the Lake Victoria basin under the aegis of the EAC. Thus, the fifth PSC held in June '98 in Arusha, also attended by a representative of the EAC Secretariat, considered a draft Treaty for the East African Co-operation, tabled for public discussion in the East African countries, and adopted the text of recommendations for two amendments aimed specifically to reinforce and institutionalize cooperation of the Partner States in sustainable

management of the Lake Victoria basin water resources. The adopted recommendations were forwarded to the EAC Secretariat for further action.

3.2 Why is a Follow up Necessary?

In the implementation process, and in particular after the completion of the national reports and a series of national and regional workshops on water resources monitoring, planning and management in the Lake Victoria under the auspices of the LVWRP, it has inter alia become apparent that:

- the requirements and water development priorities in the Lake region set by Kenya, Tanzania and Uganda are by far exceeding the project's resources whilst the countries of the region have expressed urgent need for further technical assistance in this vital sector;
- the much needed arrangements for Tripartite Co-operation in Water Resources Management in the Lake Victoria Basin under the aegis of the East African Co-operation are not still in place and the region is in need for further assistance aimed at institutionalizing the cooperation and securing sustainable management of the Lake Victoria basin water resources.
- the other projects and programmes at the regional or national level are either not concerned with, or are only sporadically touching on, the harmonized use and sustainable management of the Lake Victoria water - the resource shared by the three countries;
- the Lake Victoria Environmental Management Project, currently the strongest programme in the region, has no component which is specifically addressing water resources information systems, water use, development and management problems.

In spite of its wide acceptance in the region, the ongoing LVWRP with its scanty resources is unable to address in an adequate manner all the identified priority issues in water sector of the region. The participating governments have identified and are in need for a follow up technical assistance project which would aim at (a) building on the infrastructure and achievements planned to be accomplished within the LVWRP and (b) addressing those identified gaps which require further attention and call for immediate action.

A follow up project would act as a vital component in the Lake Victoria region to attain the objectives of: (i) promoting the rational use, conservation and protection of water resources in the region through an optimal monitoring system of water resources; (ii) improving capabilities and provide tools for assessment of water availability, water demand and planning at local, national and regional level; (iii) strengthening national policy, legislation and institutional resource capacity for the environmentally sustainable, regionally harmonized management and use of water resources; and (iv) supporting development of an institutional framework for coordinated water resources management in the Lake Victoria region under the aegis of the East African Co-operation, including national and regional policy development, lakewide harmonization of legislation and rules, and enforcement of these.

To address the above challenges and based on request of the three riparian countries, the LVWRP prepared a project profile proposal for a follow up technical assistance programme; Potential donors are welcome for further discussions with the Partner States and the ongoing LVWRP with a view of exploring avenues in providing the necessary support.

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UNEP's Programs Related to Lake Victoria

1. KEY ENVIRONMENTAL, ECONOMIC AND SOCIAL ISSUES REQUIRING SUB-REGIONAL AND INTERNATIONAL COOPERATION ON THE MANAGEMENT OF LAKE VICTORIA:

Assessing Environmental Management Challenges in the Lake Victoria:

A World Bank/UNEP mission visited Kenya, Tanzania and Uganda October 21 to November 7, 1992 to review the nature and extent of environmental degradation of the Lake Victoria Basin and to discuss with Government officials and scientists the prospects and modalities for regional cooperation in addressing such degradation. The outputs of that assessment were subsequently built into the GEF funded Lake Victoria Environmental Management Programme (LVEMP).

Five (5) years later reportes prepared on the Lake Victoria Environment compiled within the framework of the UNEP/UNDP Joint Project (on Environmental Law and Institutions) made similar findings. In both cases, the findings show that the issues of concern still include the following:

- eutrophication phenomena of Lake Victoria;
- organic and chemical pollution;
- proliferation of water hyacinth in the Lake;
- Pollution by toxic metals and other hazardous chemicals;
- pesticide contamination from crop protection;.
- Changes in the Lake's biodiversity;
- Degradation of the Lake's ecosystem;
- multiple pressures on the lake as a source of drinking water supplies;
- Environmental impacts of fishing activities;
- Environmental impacts arising from the introudction of alien species;
- Sensitivity of the lake to natural variations in rainfall;
- Impacts of land use;
- Impacts of the rapid increase in the already dense population in the lake basin;
- Impacts of climate change;
- Impacts of the fluctuations in the level (and outflow) of the lake which have consequences for riparian infrastructure, settlements, fisheries, ecology and poses health problems.

The reports also call for action in a number of areas, including:

- Identifing the causes of the rapid development in eutrophication;
- Identifing and and quantifying the major pollution sources;
- Initiating environmental impact assessments of sector activities;
- Monitoring and regulating significant polluting discharges;
- Establishing water quality monitoring programming to detect long term trends; and
- Establishing databases and , disseminating water quality information.

The issues necessitate cooperative action throughout the entire Lake basin.

2. FRAMEWORK AND BASIS FOR UNEP ACTIONS IN SUPPORT OF THE ENVIRONMENTALLY SOUND MANAGEMENT OF LAKE VICTORIA, OTHER LAKE AND RIVER BASINS IN AFRICA

UNEP remains an active partner in the various initiatives aimed at the Environmentally Sound Management of Inland Waters. Over the years, the framework for UNEP's actions include:

(a) **Its Programme For the Environmentally Sound Management of Inland Waters** (EMINWA) through which UNEP facilitates the development of intergovernmental agreements for the sustainable management and use of transboundary rivers and lakes. Relevant activities include:

- Diagnostic analyses of the quantity and quality of freshwater resources at the level of drainage basins; factors affecting human water uses; and the causes and effects of water-related environmental problems;
- Developing and facilitating the implementation of action programmes to address water-related problems identified in the diagnostic phase.

(b) **The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities** through which, UNEP focuses on the assessment of the land-based activities and pollutant sources within freshwater basins draining to coastal waters.

(c) **The GEF of International Waters Portfolio**, through which, as implementing agencies, UNEP, the World Bank and UNDP facilitate the preparation of transboundary diagnostic analyses; regional reviews of threats to freshwater and associated coastal and marine waters; and the formulation of strategic responses such as in the LVEMP.

(d) **The United Nations System-wide Special Initiative on Africa**, in which UNEP is calling for a "Fair Share" water strategy, designed to ensure equity in regard to maximizing the benefits of the water resources within freshwater basins for all users, including the poor majority.

UNEP is also directing substantial attention to:

(a) **Intergovernmental Policy Dialogue on Freshwater Management and in particular on shared freshwater resources.**

(b) Facilitating **regional and sub-regional multilateral agreements** on internationally shared waters.

(c) Enhancing **public awareness** regarding the role of the natural environment in supporting human existence and well-being and the interlinkages between human life and the protection and sustainable use of water resources.

(d) Facilitating the development and application of practical **legal, economic and institutional tools** in integrated water-management action plans.

3. UNEP's CONTRIBUTIONS TO THE COLLECTIVE EFFORTS IN THE ENVIRONMENAL MANAGEMENT OF LAKE VICTORIA: SELECTED CASES

UNEP's collaboration with the Lake Victoria Basin countries and partner organizations covers a variety of environmental management issues, a snapshot of which is given below:

I. UNEP's Contributions to the efforts of the Lake Victoria Basin Countries (National level)

National Environmental Management Programmes/Strategies/Studies/Action Plans - UNEP supports advisory services in each of the riparian countries which have resulted in the strengthening of their environmental management capacities. Substantial assistance has been provided by UNEP in the areas of Environmental assessment, policy and management. The outputs of such collaboration with the riparian countries of Lake Victoria include, National Environmental legislation, institutional arrangements, guidelines, national strategies to deal with specific environmental problems etc.

II. UNEP-Supported Sub-Regional/Regional/Global Programmes of Relevance to the Environmental Management of Lake Victoria

1. UNEP/UNDP Joint Project (funded by the Dutch Government) on Environmental Law and Institutions

At the beginning of 1992 the Royal Netherlands Government offered an amount of five million U.S. dollars to UNEP and UNDP to support the development of environmental law and institutions in selected African countries. The FAO, IUCN and the World Bank are partners in the project . These five institutions constitute the Steering Committee of the project. The WHO also collaborates with the project's partners.

Kenya, Tanzania and Uganda were selected as part of the project's sub-regional component with the primary goal directed at the harmonization of laws and regulations in the respective subject areas. (Malawi, Mozambique, South Africa, Sao Tome and Principe, and Burkina Faso were selected as individual project countries.)

The umbrella project focuses on six specific objectives, namely:

- Development of **framework environmental law** for each of the project countries;
- Development of **priority sectoral statutes** as decided upon by the national committees;
- Development of priority **regulations** under the framework law or sectoral statutes, as may be determined by the respective national committees,
- Support for the establishment of a **legislative machinery for the implementation of environmental conventions,**
- **Harmonization of laws, within the sub-regional context** and for subjects identified by officials of the governments, and
- **Capacity building**, including introduction or strengthening of the teaching of environmental law at university level and the establishment and support of resource centres.

The highlights of the project implementation process include the following:

- The sub-regional component of the project commenced in February 1995 when the three East African countries (Kenya, Uganda and Tanzania) met to agree on areas and modalities of co-operation on transboundary or cross-border issues;

- This was followed by another meeting held in February 1996 where the three governments selected six priority topics for the development and harmonization of laws, namely, forest

resources, wildlife, transboundary movement of hazardous wastes, EIA regulations and guidelines, environmental standards, and the legal regime of Lake Victoria, utilizing reports of the GEF sponsored LVEMP. **Legal and institutional framework for the protection of the Environment of Lake Victoria was selected as one of those topics;**

- Generic or country-specific terms of reference were then worked out by each country. Two national consultants were selected from each country to undertake a review of legal and institutional aspects of the Lake Victoria Environmental Management Programme;

- National consultants worked on the six identified priority areas and in the course of their work, legal texts were exchanged among the three countries to assist the national consultants in the finalization of their reports and draft Bills.

- **The three groups of consultants presented their review reports at a Workshop organized for that purpose in Kisumu, Kenya in February 1998. The three review reports have since been made available;**

- With the finalization of the work, national consultants and co-ordinators of the sub-regional project and the consultants met at a workshop from 2-10 February 1998, to harmonize the draft reports and necessary draft Bills.

- The workshop adopted strategies for the harmonization of the draft Bills and reports and came up with various recommendations on the six topics.

- **Bearing in mind the absence of an over-arching sub-regional authority, the Workshop called for the development of appropriate legal and institutional machineries for the three countries to deal with sub-regional environmental problems;**

- **The recommendations and results of the Kisumu Workshop (February 1998) were presented to a meeting of Permanent Secretaries responsible for environmental matters in the three countries in Nairobi, Kenya on 15 April 1998;**

- The Permanent Secretaries reviewed the work of their national consultants and recommendations made to them for action. They endorsed the recommendations with minor adjustments;

- **To give effect to the recommendations made on the six topics, including Lake Victoria, the Permanent Secretaries requested UNEP to assist and support them in the preparation of a Memorandum of Understanding (MOU) on the Lake Victoria Environment;**

- The Draft MOU has since been prepared by a national consultant and was reviewed by the countries' legal experts in a meeting of East African Sub-regional Project Coordinators held in Nairobi, Kenya in July 1998; and

- **The draft MOU has been circulated to the three governments for consideration by their relevant authorities before its adoption at a meeting now scheduled for 23 and 24 October 1998.**

It is important to note that although the draft MOU generally covers environmental management issues in the three countries, several articles specifically relate to the management of the Lake Victoria. **The draft MOU on co-operation on Environmental Management accorded particular attention to the following areas:**

- Protocol on Environmental Management;
- Establishment of Interim Institutional Arrangements;

- General Matters on Cooperation and Harmonization;
- Development and Enforcement of Environmental Legislation;
- Management of Lake Victoria Basin;
- Management of Forest Resources;
- Management of Wildlife Resources;
- Management of the Marine and Coastal Environment;
- Management of Hazardours and Other Types of Waste;
- Pollution Control and Management;
- Development and Harmonization of Environmental Impact Assessment;
- Development and Harmonization of Environmental Standards;
- Capacity Building and Supporting Measures; and (xiv) Dispute Settlement.

It is noteworthy that Article 3 of the draft MOU calls upon UNEP, among others, to assist the Lake Victoria Basin Countries to initiate and facilitate consultations geared towards the development and implementation of a **legally binding protocol** on environmental management under the East African Treaty of Cooperation.

Phase I of the UNEP/UNDP Joint Project will end on 31 March 1999. It is hoped that before the end of Phase I, the draft MOU will have been adopted and, as the case may be, the responsibility for its implementation will be left to the three governments and the East African Cooperation Secretariat.

(2) The Lake Victoria Environmental Management Programme - World Bank, UNEP and UNDP have collaborated with the riparian countries in developing/implementing this project:

Other key activities, at the sub-regional level, include:

(3) Nairobi Convention - UNEP provides Secretariat to the Convention in which Tanzania, Kenya and other countries of the West Indian Ocean are Parties to;

(4) Transboundary Diagnostic Analysis and Strategic Action Programme for the Marine, Coastal and Associated Freshwater Environment in the Eastern African Region - This is a GEF funded project being coordinated within the framework of the Nairobi Convention. The SAP attempts to address those problems, that are particular to the East African Region.

Activities under the SAP relating to the Integrated management of major and international water basins and groundwater components include:

Assessment of transboundary water quality and quantity issues relating to major and international freshwater basins in Eastern and Souther Africa. The activities will focus on an assessment of contamination by sewage and agricultural chemicals and changes in sediment flux. The focus will be on an analysis of the root causes of the problems and identification of potential remedial actions;

(5) Overview of Land-based Sources and Activities Affecting the Marine, Coastal and Associated Freshwater Environment in the Eastern African Region - A Strategic Action Programme for Eastern Africa was prepared with funding from Sida and in cooperation with FAO and the Tanzanian Institute of Marine Sciences. This activity was carried out within the framework of the **Global Programme of Action to Protect the Marine Environment from Land Base Activities;**

(6) The Lusaka Agreement - This agreement was entered into by Kenya, Uganda, Tanzania and other countries to reinforce the implementation of the Convention on Biological Diversity and on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This Agreement was prepared and developed with UNEP's assistance in collaboration with other partners.

(7) **Environmental Information Network** - This UNEP activity was funded by the GEF for the development of National Database Capabilities for the environment in general, and biodiversity in particular, in Kenya, Uganda and Tanzania. One of these data bases developed under the project was The Linkages between Elephant Life and the Forest Ecosystem in Sango Bay, Rakai District, Uganda which is located on Lake Victoria;

(8) Sustainable Cities Programme - Cooperation between UNEP and HABITAT on economically and environmentally sustainable strtegies for cities entrered a new era in January 1998 when the two agencies embarked upon a full partnership in the Sustainable Cities Programme. Cities where such demonstrations are under way include Dar es Salaam. Typical issues that the sustainable cities process addresses include **water resources management, solid and liquid waste disposal, land resource management, flooding and drainage**, open spaces and tourism resources;

(9) Cleaner Production Programme - The programme also supports ten national cleaner poroduction centres jointly managed with the UNDP to help industry prevent the generation of pollution. A cleaner production centre has been put in place in Tanzania;

(10) The Global Programme of Action for the Protection of the Marine Environment from Land Based Activities - Primarily aims at assisting governments in the prevention, control and reduction of the degradation of the marine environment and associated freshwater systems;

(11) United Nations System-wide Special Initiative on Africa (UNSIA) - The Special Initiative on Africa is working to achieve UN system collaboration in support of the goal of equitable access to and sustainable use of the continent's water resources. A UN inter-agency Working Group on Water was set up in April 1996, co-chaired by UNEP and the World Bank, to decide on practical steps to meet the four objectives of the Special Initiative's water cluster, natable: (i) equitable access to a sustainable use of shared water resources; (ii) household water security; (iii) water for food production and (iv) water assessments.

Relevant project proposals have been developed (as indicated below) and in some cases relevant assessments have been carried out. Some of the proposals are:

* **Promoting Intergovernmental dialogue on Economic, Environmental and Equity Impact Assessment (EIA) in the WATER Sector**

* **Promoting the Management of Shared Water Resources: Experiences and Challenges in River Basin Management in the SADC Region**

River basin management and regional cooperation are vital if African nations are to meet their priority challenges for sustainable water resources management. International river basins link the issues of pollution, environmental degradation, and national water security across co-riparian countries. The externalities of uncoordinated basin management can increase localized poverty, negatively impact entire sectors of national economies (e.g., agriculture, energy, and industry), and even destabilize the political situation of an entire region. The challenge of conflict prevention and international negotiation must be met by countries which are highly reliant upon international waters and which face the threat of water scarcity, pollution, and degradation of catchment areas. The high prevalence of shared international rivers in Africa provides a significant challenge: the promotion of an effective multi-country focus and regional cooperation. In support of the above goals and principles, the main thrust of this cluster is to provide additional impetus to the ongoing dialogue on equitable access to and sustainable of water resources.

Furthermore within the framework of the United Nations System-wide Special Initiative on Africa, an assessment of the lower Limpopo River basin was carried out to provide baseline

information on, *inter alia*, agricultural uses and potential, freshwater resources and resource use pattern of the river as well as, legal and institutional arrangements addressing issues of land-based activities of pollution of the marine and coastal environment through the river Limpopo.

(12) Programme of the African Ministerial Conference on the Envirionment (AMCEN) - The three riparian countries actively participate in Regional Programme of AMCEN for which UNEP provides Secretariat Services (AMCEN);. AMCEN operations are (i) a Regional Technial Cooperation Network on Water Resources and (ii) a Committee on River and Lake Basin

4. UNEP'S EMINWA (ENVIRONMENTALLY SOUND MANAGEMENT OF INLAND WATERS) PROGRAMME: SELECTED EXPERIENCES

The concept of EMINWA has been introduced by UNEP in three categories of freshwater ecosystem, i.e. river, lake and groundwater aquifer. The experience gained in the last few years in the application of the concept in the formulation of basin action plans in the Zambezi River system and Lake Chad provide useful insights.

(i) EMINWA in Zambezi

- The Zambezi river system encompasses the territories of eight countries and, for some of them, constitutes the principal water resource. The countries are Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe. Together with its tributaries, the Zambezi river forms the fourth largest river basin in Africa;

- The diagnostic study on the state of the ecology and the environmental management of the common Zambezi river system was prepared by the Working Group of Experts on the Zambezi River system, established in 1985 by UNEP. The group identified the following main problems to be dealt with through selected activities as part of the Zambezi Action Plan (ZACPLAN):

  (a) inadequate monitoring and exchange of information concerning climate data, water quantity and quality, and pollution control;
  (b) soil erosion, inadequate soil and water conservation, inadequate flood plain management;
  (c) deforestation due to population growth and pressure on land;
  (d) lack of adequate drinking water supply and proper sanitation facilities;
  (e) insufficient community participation, especially on the part of women as 'end-users' of water, in the planning, construction and maintenance of water supply and sanitation systems;
  (f) inadequate health education for the public, especially women;
  (g) inadequate land-use and river-basin planning;
  (h) inadequate human resources development;
  (i) inadequate coordination and consultation both at the national and river basin levels;
  (j) degradation of the naturāl resources base;
  (k) degradation of flora and fauna;
  (l) inadequate information on the environmental impacts of water resources and related development projects, e.g. hydropower, irrigation,
  (m) inadequate dissemination of information to the public; and
  (n) inadequate protection of wetlands.

- The objective of ZACPLAN is to overcome these problems and thus to promote the development and implementation of environmentally sound water resources management of the entire system. It contributes to the incorporation of environmental considerations in water resources management while increasing long-term sustainable development of the river basin states. Thus the objective of EMINWA is being met by the implementation of ZACPLAN;

- The ZACPLAN was adopted by the basin countries. The SADCC council of Ministers decided at the time, that ZACPLAN implementation would be undertaken by the then SADCC Coordination Unit of Soil and Water Conservation and Land Utilization at Maseru, Lesotho. This responsibility was recently transferred to the SADC Water Sector Coordination Unit; and

- The Zambezi Basin Action Plan, or ZACPLAN, for the Environmentally Sound Management of the Zambezi River System has the following key elements:

  (i) **Environmental Assessment:** the collection and development of comparable data and information for the continuing and assessment of the main factors influencing water management and water-related environmental quality;

  (ii) **Environmental Management:** to ensure sustainable, environmentally sound development of the resource base, taking into account assimilative capacity of the environment, national development goals and the economic feasibility of their implementation;

  (iii) **Environmental Legislation:** development, review, and where necessary expansion, updating or strengthening of national legislation, and development and adoption of regional instruments, and

  (iv) **Supporting Measures:** such as intense training programs, promotion of public awareness, development of education and information programs, and development of the water supply and sanitation sectors.

- The Zambezi Action Plan is thus a curtain raiser in the implementation of EMINWA.

(ii) EMINWA in lake Chad

- Another example of a freshwater ecosystem where EMINWA was introduced is Lake Chad. The Lake Chad Basin is the largest inland drainage basin in Africa covering parts of Cameroon, the Central African Republic, Chad, Niger and Nigeria;

- The waters of the basin have been increasingly exploited over the years, as all the riparian states have mounted development projects in agriculture and industry which significantly draw on the basin's water resources;

- However, as the surface and water volume of the Lake Chad Basin have decreased tremendously since the early 1970s, the activities planned for the development of the area have met with difficulties;

- UNEP, in cooperation with the UNDP facilitated the preparation of the Diagnostic Study of the Environmental Degradation in Lake Chad Basin and the Master Plan for the Development and Environmentally Sound Management of the Natural Resources of the Lake Chad Basin, have since been completed and submitted to the Governments of the region.

- The action plan consequently aims at sustainable development of the basin, protecting the environment of Lake Chad by providing a comprehensive plan for the environmentally sound management of the entire areas of the lake;

- The Lake Chad Master Plan accords particular attention to the::

  (a) lake inflow and water balance control;
  (b) reinforcing the recharge of underground waters;
  (c) development of sound water use;
  (d) water and soil conservation projects;

(e) improvement of rain-fed irrigated agriculture; and
(f) restoration of vegetation.

RECENT GEF-RELATED INITIATIVES

The GEF Implementing Agencies (UNDP, World Bank and UNEP), are supporting processes for the environmentally sound and sustainable management of the:

(i) Lake Chad;
(ii) Lake Volta; and
(iii) Okavango River

The Agencies, individually and collectively, are keeping, under constant review, the state of River and Lake Basins, in the region with a view to identifying emerging issues requiring concerted action.

5. EMERGING DIRECTIONS IN UNEP'S WORK RELATING TO FRESHWATER

1. Freshwater and UNEP's High-Level Committee of Ministers and Officials (HLCOMO)

The HLCOMO emphasized UNEP's vital role in providing substantial environmental input for addressing freshwater issues, particularly at the regional and sub-regional levels. HLCOMO also highlighted the substantial, cross-cutting nature of the environmental dimension in human management and use of water resources by highlighting several areas for UNEP's consideration, including (i) access to safe drinking water, (ii) to sanitation, (iii) food production, (iv) agricultural irrigation, (v) industrial development, (vi) community participation, (vii) preservation of ecosystems (viii) integrated water management, and (ix) cooperation on transboundary water issues.

Recent international conferences in Harare (January 1998), Petersburgh, Germany (March 1998) and Paris (March 1998) provided the message that UNEP, in close cooperation with Governments and UN and other organizations, should also play a major role in (i) enhancing confidence-building measures for greater inter-Governmental cooperation, (ii) strengthening legal instruments for long-term cooperative management and use of transboundary water resources, and (iii) promoting application of economic instruments and principles.

UNEP submitted concrete proposals to the 5th Special Session of its Governing Council (May 1998) for an action programme to address the environmental aspects of transboundary freshwater resources. This programme will focus on the environmentally-sustainable management and use of international freshwater systems (rivers, lakes, groundwater).

2. UNEP Action Programme for the Environmental Aspects of Transboundary Water Resources

UNEP's transboundary action programme will comprise a two-phase approach, incorporating (i) the identification and diagnosis of the problem(s) and their underlying causes, and (ii) facilitation of the development and implementation of necessary actions to address the problem(s). Fundamental elements of this transboundary action programme, capitalizing on UNEP's comparative strengths, will include:

I. <u>ENVIRONMENTAL ASSESSMENT</u> - as the basis for identification and accurate diagnosis of freshwater problems, focusing on the transboundary environmental aspects. This includes identification of environmental "hot spots" requiring immediate national or international attention, as well as potential future problems before they become sources of international tension.

II. <u>INTEGRATED WATER RESOURCE MANAGEMENT</u> - as the basis for facilitating development and implementation of integrated action programmes. It will comprise:

- **Environmentally-Sound Management of Inland Waters (EMINWA)** as the basic approach to action - incorporating both scientific/technical and socio-economic aspects in integrated water management;
- **International Legal Instruments** as a basis for cooperation - particularly focusing on international legal instruments;
- **Economic Instruments** as fundamental tools for effective actions - including appropriate application of environmental impact assessment techniques, and determination of the economic costs of environmental impacts;
- **Environmentally-Sound Technology (EST)** as a means of facilitating prevention actions - including such elements as cleaner production, as facilitated by UNEP's Industry and Environment Programme Activity Centre (Paris), identification and application of EST, as

promoted by UNEP's International Environment Technology Centre (Osaka, Japan), and safe management of chemicals, as undertaken by UNEP's Chemicals Office (Geneva);

- **Public Awareness and Education** as a means of promoting greater involvement - to raise awareness of the role of the public on how they are contributing to the problems, and how they can contribute to the solutions;
- **Conventional and Unconventional Partnerships** as a stimulus for action - including partnerships with Governments, UN and other international organizations, the private sector, NGOs, academic and professional societies, and the public;
- **Pilot Projects** - to demonstrate that it can work, particularly in regard to transboundary components;
- **Integration of Freshwater, Coastal and Ocean Issues** as a proactive step - integration across "types of water", reflecting the hydrologic connection between freshwater basins and downstream coastal areas.

3. Global Environment Facility (GEF) as a Major Partner

To facilitate the goals the above-noted actions, UNEP will undertake further substantive activities within the context of the international waters component of the GEF. UNEP currently is implementing or finalizing activities focusing on transboundary diagnostic assessments and development of strategic action programmes for a number of international water systems, including the Bermejo, San Juan, San Francisco and Upper Paraguay River basins in Latin America, the West Indian Ocean, the Mediterranean and South China Seas, and the Canary Current Large Marine Ecosystem of West Africa. UNEP also is undertaking the Global International Water Assessment (GWA), which focuses on identification of significant water-related problems and their geographic distribution, and assessment of their underlying causes, as a basis for needed action programmes.

UNITED NATIONS ENVIRONMENT PROGRAMME

HIGH LEVEL SEMINAR
ON THE
ASSESSMENT OF INITIATIVES
FOR
ENVIRONMENTAL CO-OPERATION ON LAKE VICTORIA
8-9 SEPTEMBER, 1998
ARUSHA, TANZANIA

Presentation Notes and Points

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A. CONTEXT AND BASIS FOR UNEP'S NEW FRESHWATER STRATEGY

- **Water security** will soon rank with the other main concerns in security. The signs are clear that the world community must elevate the issue of water for peace policy:

- **As the demand for freshwater grows** and in the absence of clear consensus on how best to use shared water resources for the benefit of all, that competition has the potential of erupting into acrimonious disputes. There are already now many areas where countries could come into conflict over who gets how much water;

- UNEP is **strengthening its early warning** Progamme to alert countries of imminent conflicts over water resources, to integrate this information into environmental diplomacy and in the strategic investment decisions to which riparian countries are parties to;

- Furthermore, UNEP, in close co-operation with other relevant UN institutions has resolved to systematically identify **solutions to potential conflicts** over water resources. In this regard a number of steps are contemplated.

- **The first step is the inventory of the state of the freshwater resources** which will also include continuing identification of potential "hot spots";

- **The second step involves assessment of key priority freshwater issues,** including water quality, quantity and allocation to meet and maintain human lives and livelihoods, socio-economic development and maintenance of natural ecosystems;

- **The third step focuses on the development of innovative economic, legal and institutional instruments** for sustainable use and greater awareness, education and participation of the general public; and

- **The fourth step involves pilot projects** in key regions to test the effectiveness of these instruments for the governments and international organizations.

UNEP's knowledge of the linkages between freshwater resources and a complex web of social, economic, environmental factors and its experience in brokering important international environmental agreements give it the necessary edge. Increasingly, UNEP will be assisting in reviewing and refining international legally binding agreements on freshwater resources.

UNEP is making the best use of the outcome of important conferences, (Harare, and the 1st Petersburg Roundtable held in Bonn in March 1998), where recognition was given to the work carried out by the organization in promoting the integrated management of international freshwater basins, particularly in the Zambezi and Mekong River basins.

At a number of recent conferences and international fora UNEP was called upon, in close co-operation with other organizations, to play a major role in (a) enhancing confidence-building measures for greater co-operation among governments, (b) strengthening legal instruments for long-term co-operative management of shared freshwater resources, and (c) promoting the application of economic instruments.

Old section 5 items

- UNEP is exploring the possibility of developing a global action programme focusing on the environmental aspects of freshwater management with a regional component.

- UNEP will strengthen legal agreements for long-term cooperative management and the use of water resources important to more than one country, bearing in mind the efforts already under way. It will facilitate the development of regional and subregional action plans and agreements. It will promote the application of economic instruments for environmentally sustainable water resources, since water is not only an economic but also a social good.

- In this regard, UNEP is reviewing its assessment activities for establishing a system for predicting hot spots and developing early warning systems to alert Governments to potential disputes on shared water resources.

- UNEP is revitalizing the GEMS/Water Programme - the only global programme within the United Nations system directed specifically to water pollution issues.

With a surface area of 68,800 km^2 and an adjoining catchment area of 184,000 km^2. Lake Victoria is a source of life for tens of millions of people. As the second largest freshwater body in the world (by surface), the lake and its ecosystem also harbour unique biological resources representing a global heritage. The three riparian countries of Kenya, Tanzania and Uganda control 6% and 43% respectively of the area of the lake:

The ecosystem of the lake has undergone significant and by some considered alarming changes over the last three decades. Scientists, still examining the causes of these extensive changes, focus on three contributing factors: (a) the introduction of exotic species, (Nile perch) heavily predating on the plankton, (b) nutrient inputs from the adjoining catchment area causing eutrophication and (c) recent climate changes favouring the development of bluegreen algae and loss of oxygen in bottom waters.

The World Bank/UNEP mission identified a number of stresses on the Lake Victoria Environment including:

(i) Demographic Pressures

- Within each of the national sectors and their catchments, the natural resources are used to obtain food, shelter and energy, to secure household and industrial water supply as well as to meet transport needs, to irrigate land, and to dispose of human, agricultural and industrial waste; and

- As the population around the lake increased conflicting uses of the lake basin's resources have caused management problems This has posed threats to the ecosystem.

(ii) Fishing Pressure and Sustainability of Fish Stocks.

- The present upward pressure on fishing effort is triggered *inter alia* by rising demand for animal protein among riparian communities;

- In recent years, expanded export market demand for the prime table fishes (Nile perch and tilapia) is believed to have been the main inducement for increased efforts; and

- Investments in fish processing (filleting and freezing) plants are continuing unchecked and threaten to deplete stocks and or diver catches from being locally marketed by artisanal fishermen to meet local food demands.

(iii) Biodiversity.

- A prolific indigenous fish species diversity (300 species plus) is facing extinction. Phytoplankton productivity has increased two to three-fold and the biomass of the lake has increased probably by a factor of ten;

- Reduced biodiversity is of concern for several reasons. First, the reduction in the stocks of certain species has contributed to an increased prevalence of algae and thereby contributing to oxygen depletion at deeper levels of the lake - a deficiency which threatens the survival of fish, in particular the Nile perch, thus reinforcing downward pressures on fish stocks;

- The broad species fauna of the lake provides for greater variety in the diet of local people, and a greater variety in fishing efforts, thereby spreading the economic benefits from the fishery; and

- The conservation of indigenous species in Lake Victoria is of particular scientific importance as the adaptation of such species to ecological riches provide rate insights into evolutionary processes.

(iv) Pollution of the Lake Basin Environment.

- The use of Lake Victoria as a depository for waste is expanding with rapid population growth in the lake basin;
- Deteriorating water quality reduces benefits to riparian communities from using the lake, streams and rivers as sources of drinking water or for fishing;
- Polluted waters mean worsened sanitary conditions and spreading of water borne diseases, including cholera and typhoid fever;
- Pollution of the lake and its tributaries changes the environment for living resources and threatens the biodiversity of the lake basin;
- Lake pollution comes from many and dispersed sources such as . Eutrophication, which is considered the greatest threat to the lake's water quality and which adversely affects fisheries through induced algae blooms, oxygen deficiency at lower depths of the lake, and subsequent upwelling and mixing of waters resulting in fish kills;
- Much of the pollution emanated from within economic activities undertaken far from the lake shore in the upper parts of the basin; and
- Agricultural run-offs, aggravated by deforestation, and associated land erosion play a major role in the pollution process making land use in the catchment a major issue in lake management.

(v) Threat posed by the Water Hyacinth.

- The infestation of the water hyacinth which has occurred in recent years in Lake Victoria poses serious environmental, social and economic problems;
- The prolific spreading of this exotic weed is adversely affecting the biological productivity of the lake (reduced levels of dissolved oxygen and penetration of sunlight), restricts fish breeding and nursing areas, limits access by fishermen to landing areas, impairs water supply, provides suitable habitats for vectors of various human diseases e.g. schistosomiasis and malaria, and affects lake transport and hydro-power generation;
- Due to its high rate of evapotranspiration, the water hyacinth fosters the drying up of the riparian/wetland zones, thus enabling non-wetland species to invade this zone; and

These problems are most acute along the Ugandan shores of the lake. However, they are now rapidly spreading in Tanzania and in Kenyan waters.

1. Assessments

Some of the most important work carried out by UNEP is in the area of environmental assessment, in particular, in developing a better understanding of the state of freshwater resources at global, regional and subregional levels, and in identifying and facilitating effective corrective actions. The major assessment activities performed by UNEP include the identification and analysis of changes and trends in the state of water quality and quantity on a global, regional and subregional basis; of sources and impacts of land-based activities and pollutants; and of the associated social and economic driving factors (e.g., economics, law, institutions, politics). As identified below, some of the current water-related assessments conducted by UNEP include: the Global Environment Monitoring System (GEMS/Water); the Global International Water Assessment (GIWA); the Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP); and the Global Environment Outlook report series.

As a GEF implementing agency, UNEP has a major responsibility in international waters projects. Currently, UNEP is preparing a GEF proposal for a global international waters assessment. The purpose of the assessment is to provide the GEF Council with a scientifically sound information base on freshwater and coastal and marine water problems and issues at the regional and subregional levels, with a view to assisting Governments in setting international waters priorities.

The only global freshwater quality monitoring and assessment programme within the United Nations System is the UNEP GEMS/Water programme, implemented in cooperation with the World Health Organization (WHO), the World Meteorological Organization (WMO), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and other partners. The UNEP Water Branch, in cooperation with its Assessment Division, is currently working with many GEMS/Water collaborating centres in an effort to refine the GEMS/Water monitoring programme. The ultimate goal is to ensure that the GEMS/Water programme provides data and information that are useful both for making assessments of the state of the world's freshwater resources, and for decision-making and policy development. To this end, UNEP and its sister United Nations agencies also contributed to the preparation of the report on a comprehensive global assessment of the freshwater resources of the world, requested by the Commission on Sustainable Development.

UNEP will continue to place high priority on its assessment capabilities. Consistent with the findings of the UNEP Global Environment Outlook 1997 report, which set the environmental context for discussions at the special session of the General Assembly for the purpose of an overall review and appraisal of the implementation of Agenda 21, the assessment work by UNEP provides a basis for corrective actions in many important internationally shared water systems, such as the San Juan river, the Mekong river, the Zambezi river, the river Nile and the Lake Titicaca basins.

2. Integrated water management

Within the context of integrated water management, UNEP will further strengthen the integration of freshwater and coastal and ocean concerns into a single water-management continuum. In this undertaking, UNEP rejects the notion of administrative boundaries or arbitrary distances inland from the coastline as a basis for integrated coastal zone management. This approach also underpins the activities of UNEP as secretariat of the Global Programme of Action.

UNEP will further apply its lessons learned in integrated water management, working both within the United Nations system and with other international and non-governmental organizations, the private sector and civil society, in helping Governments to develop and implement practical policies and actions to achieve the environmentally sustainable management and use of shared water resources.

As UNEP is particularly well-placed to follow an integrated approach in tackling the multisectoral aspects of freshwater issues, it is able to bring greater attention to bear on the linkages between water and other environmental components, including, inter alia, land, biodiversity, persistent organic pollutants and climate change.

On the basis of its experience with freshwater issues in developing regions, through its chairmanship of the Water Working Group of the Secretary-General's United Nations System-wide Special Initiative on Africa, UNEP is paying special attention to the use of small-scale, collaborative demonstration projects, as a means of promoting equity in regard to water benefits. In supporting the Special Initiative, UNEP believes that large-scale water projects will not necessarily work to the benefit of all basin inhabitants, particularly in developing countries. In contrast, small-scale demonstration projects may provide a rational means of ensuring an equitable distribution of the benefits of water resources in developing countries.

3. Intergovernmental Agreements on Shared water resources

Some of the most complex freshwater issues are inter-jurisdictional in nature, demanding the best efforts of international environmental diplomacy. The experience gained by UNEP in brokering various international environmental agreements has given it the necessary expertise to review international legally binding instruments, including their roles, gaps, strengths and limitations. UNEP is also uniquely positioned to broker and negotiate multilateral agreements, at global and regional levels, for internationally shared waters, as a means of ensuring that regional needs are adequately incorporated in such agreements. Further, UNEP will continue to assist riparian Governments in the collaborative development of their international watercourses in an environmentally sustainable manner.

The potential for conflicts between riparian countries sharing common freshwater resources remains, however. Such conflicts can only be avoided through a process of honest brokerage of the relevant issues between riparian Governments. To this end, UNEP will further apply its experiences with internationally shared watercourses, such as the Zambezi river, Lake Chad, the Aral Sea, the Mekong river, Lake Titicaca and the San Juan river.

4. Technology development and transfer

At its special session, the General Assembly called for the strengthening of regional and international cooperation for technological transfer, as well as for the financing of integrated water resources programmes and projects. In response, and in collaboration with the UNEP International Environmental Technology Centre (IETC) and the UNEP Industry and Environment office (UNEP/IE) the UNEP Water Branch is working to identify and assess appropriate technologies and their effectiveness in many regions of the world.

A series of UNEP-sponsored regional workshops has been conducted, to enable experts and officials to share their experiences in the area of alternative technologies and approaches to water issues. The costs, effectiveness, strengths and limitations of alternative technologies were examined. One important output of these workshops was a series of source books, providing guidance for identifying and choosing between alternative technologies. UNEP is preparing a global version of these source books, designed for decision makers and managers.

5. Economic instruments

The economic valuation of water resources, particularly in regard to water-related environmental issues, is another major area in which UNEP can use its experience. UNEP has already convened a number of regional workshops to highlight the economic consequences of environmentally unsustainable water use. In collaboration with the UNEP Environmental Economics and Trade Unit, the UNEP Water Branch will intensify its work on water pricing and issues of water subsidies.

6. Awareness, education and participation

In addition to the importance it attaches to education and information, UNEP believes that civil society must be actively involved in the sustainable management and use of environmental resources. In facilitating such involvement, UNEP is focusing on effective public participation at the grassroots level. One example of such participation is, as noted above, the "Fair Share" approach for addressing water equity in the Special Initiative on Africa.

In addition to its ongoing activities (see section A above), an essential component of the contribution by UNEP to the sixth session of the Commission on Sustainable Development and beyond will be to encourage a more direct engagement of its member Governments and partner institutions in the approaches proposed below. To facilitate this engagement, and building on the activities UNEP is best placed to undertake, the High-level Committee of Ministers and Officials is invited to express its views on the following items and their financial implications.

1. Dialogue at the regional level

On the basis of the outcome of recent regional expert group meetings on chapter 18 of Agenda 21, regional and subregional forums should be organized, to develop a common vision and common perspectives on the priority freshwater-related issues identified by the special session, as well as to enable Government representatives and experts to provide policy inputs and advice on the full range of environmental and social and economic issues related to freshwater resources. Such efforts could be strongly promoted through the UNEP regional offices, as well as through its existing frameworks for regional cooperation and programmes. The latter include UNEP-supported regional forums, such as the ministerial conferences on the environment, the regional seas programmes and intergovernmental agreements on internationally shared river basins.

The status of implementation of the goals and objectives of chapter 18 ("Protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources") of Agenda 21, including the facilitation of regional and subregional forums, should be kept under review. The purpose of such forums is to ensure that Governments, or other relevant bodies and organizations, should inspire sound policy discussions and decisions on freshwater issues.

2. Best practices

Efforts should be made to promote the exchange and dissemination of information on sound policy responses and cost-effective technologies, and experiences and lessons learned, at the subregional, regional and global levels, in the environmentally sustainable management and use of freshwater resources.

Partnerships should be strengthened with major groups, such as the Water Supply and Sanitation Collaborative Council, the World Water Council, the Global Water Partnership, and regional institutions and networks, as a means of drawing on the range of available expertise in identifying best practice responses to freshwater-related environmental issues at all levels.

There is a need to develop environmental perspectives and to facilitate discussions on best practice responses with regard to policy, institutional, legal and economic options for addressing critical freshwater issues.

The application of environmental standards and guidelines based on best practice policy responses must be developed and facilitated.

3. Awareness-raising

Policy-relevant documents on freshwater issues should be developed for use by Governments in incorporating environmental considerations in sustainable social and economic development programmes.

Awareness must be raised at all levels on the environmental dimensions of the major freshwater issues highlighted by the General Assembly at its special session and by the Commission on Sustainable Development, through a process of advocacy to stimulate interest in water resources issues as a means of creating commitment and political will.

Subregional and basin-level dialogue must be fostered among countries, by ensuring broad participation and stimulating the exchange of experiences and best practices.

In conclusion, on the basis of the foregoing, the High-level Committee of Ministers and Officials may wish to assess the efficacy of the approach being taken by UNEP, and to provide its views on the priorities to be addressed in order to orient the preparation by the secretariat of its contribution to the intergovernmental discussions that will take place under the auspices of the Commission on Sustainable Development at its next session and beyond.

The World Bank, UNEP, UNDP, FAO and others as well as the Government of the three riparian countries closely collaborated in the development of the LVEMP currently under implementation

Kenya, Tanzania and Uganda, constituting a sub-regional project have so far held three meetings to agree on topics suitable for harmonization of laws.

The workshop enjoined the Governments of Kenya, Tanzania and Uganda to adopt the recommendations as soon as possible in order to realize the objectives of the Joint Project and to maintain the momentum already generated in the three countries.

Furthermore, the workshop urged that the recommendations adopted be transmitted to the Secretariat for East African Cooperation and other sub-regional initiatives for consideration and action.

As a follow up a sub-regional workshop of Permanent Secretaries and coordinators of the Project from Kenya, Uganda and Tanzania was held in April 1998. The workshop reviewed the objectives of the project and formulated strategies for the realization of the recommendations adopted at the February workshop.

The meeting of the Permanent Secretaries responsible for environmental matters in Kenya, Uganda and Tanzania was held in Nairobi, Kenya at the UNEP headquarters on 15 April 1998.

In particular, the Permanent Secretaries met to discuss, evaluate and asses the recommendations made by the six sub-workshops held simultaneously and back to back in Kisumu, Kenya 2-10 February 1998, and to decide on the appropriate course of action by their governments.

The Permanent Secretaries endorsed all the six reports of the sub-workshops together with the recommendations made with minor adjustments.

While requesting UNEP to assist in the implementation of all the recommendations made, the permanent Secretaries promised to commit themselves to support implementation of activities at national level.

In addition, they promised to ensure that the recommendations they adopted were forwarded to the EAC for implementation as proposed. They recognized the need for an overarching treaty or protocol on the environment which would facilitate future development of sectoral protocols on different priority areas.

To this end, they requested UNEP to facilitate and support EAC and the Governments in the development of the proposed protocols, at appropriate moments.

To synthesis their endorsement of the recommendations made by the experts, the Permanent Secretaries requested UNEP to assist and support them in the preparation of a Memorandum of Understanding (MOU) on Environment as a matter of urgency.

Consequently, the Permanent Secretaries mandated and instructed their National Coordinators to commence preparation of the draft MOU for their consideration.

Convention	Action Plan	Declaration and Protocols	Regional Coordinating Unit/Secretariat
No Convention	**North West Pacific Action Plan (1994)** China, Japan, Democratic Republic of Korea, Republic of Korea, Russian Federation		UNEP Water Branch
No Convention	**South Asian Seas Action Plan (1995)** Bangladesh, India, Maldives, Pakistan, Sri Lanka		South Asian Cooperative Environmental Programme (SACEP)
UNEP Supporting Cooperation for the Protection and Management of the Marine Environment	**South West Atlantic Action Plan (1996)** Argentina, Brazil, Uruguay		UNEP Water Branch
Bucharest Convention (1992)	**Black Sea Strategic Action Plan (1996)** Bulgaria, Georgia, Romania, Russian Federation, Turkey, Ukraine	Odessa **Declaration** (1993) **Protocol** on Cooperation in combating Pollution by Oil and Other Harmful Substances in Emergency Situations **Protocol** against Pollution by Dumping	Programme Coordinating Unit Black Sea Environmental Programme (BSEP)
	East Central Pacific (1996)	**Programme** for the Protection and Management of the Marine and Coastal Environment	
Artic and Antartic	First Exploratory steps are being taken towards the involvement of the Regional Seas Programme in the region		

Convention	Action Plan	Declaration and Protocols	Regional Coordinating Unit/Secretariat
Abidjan Convention (1981)	**West and Central Africa Action Plan (1981)** Angola, Benin, Cameroon, Cape Verde, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Namibia, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo, Congo	**Protocol** concerning Cooperation in Combating Pollution in Cases of Emergency	UNEP Water Branch Regional Coordinating Unit for the West and Central African Action Plan (WACAF/RCU)
Lima Convention (1981)	**South East Pacific Action Plan (1981)** Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Nicaragua, Panama, Peru	**Agreement** on Regional Cooperation in Combating Pollution by Hydro carbons or Other Harmful Substances in Case of Emergency Supplementary **Protocol** to the Agreement on Regional Cooperation in Combating pollution by Hydrocarbons or Other Harmful Substances **Protocol** for the Conservation and Management of Protected Marine and Coastal Areas **Protocol** for the Protection Against Radioactive Contamination	Regional Coordinating Unit of the Plan of Action of the South East Pacific Permanent Commission of the South Pacific (CPPS)
Jeddah Convention (1982)	**Red Sea and Gulf of Aden Action Plan (1982)** Egypt, Eritrea, Jordan, Saudi Arabia, Somalia, Sudan, Yemen	**Programme** of the regional Convention of the Marine Environment and Coastal Areas	Red Sea and Gulf of Aden Environment Programme (PERSGA)
Noumea Convention (1982)	**South Pacific Action Plan (1982)** Australia, Cook Islands, Federated States of Micronesia, Fiji, France, Kiribati, Republic of the Marshall Islands, Nauru, New Zealand, Niue, Palua, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, United Kingdom, United States of America, Vanuatu, Western Samoa	**Protocol** concerning Cooperation in combating Pollution Emergencies	South Pacific Region Environment Programme (SPREP)
Convention for the protection, management and Development of the Marine and Coastal Environment of the Eastern African Region	**Action Plan for the protection, management and Development of the Marine and Coastal Environment of the Eastern African Region (1985)** Comoros, France (La Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, United Republic of Tanzania	**Protocol** concerning Protected areas and Wild Fauna and Flora in the Eastern African Region **Protocol** concerning Co-operation in combating Marine Pollution in Cases of Emergency in the Eastern African Region	Regional Coordinating Unit of the Eastern African Region/ Seychelles (EAF/RCU)

	Lebanon, Libya, Malta, Monaco, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey, The European Union	**Protocol** for the Prevention of Pollution by Dumping from Ships and Aircraft **Protocol** for the Protection of the Med Sea against Pollution from Land Based Sources **Protocol** concerning Cooperation in Combating Pollution by Oil and Other Harmful substances in Cases of Emergency **Protocol** concerning Specially Protected Areas **Protocol** against Pollution Resulting from Exploration and Exploitation of the Continental Shelf, the Seabed and its Subsoil **Protocol** against Pollution from Land based Sources	Coordinating Unit for the Mediterranean Action Plan (MEDU), UNEP
Kuwait Convention (1978)	**Kuwait Action Plan (1978)** Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Arab Emirates	**Protocol** concerning Marine Pollution Resulting from Exploration and Exploitation of the Continental Shelf **Protocol** for the Protection of the marine Environment against Pollution from Land-Based Sources	Regional Organization for the Protection of the Marine Environment (ROPME)
Cartagena Convention (1981)	**Caribbean Action Plan (1981)** Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St. Christopher and Nevis, St. Lucia, St. Vincent and Grenadines, Surinam, Trinidad and Tobago, United States of America, Venezuela, the Caribbean Territories of France, Netherlands, United Kingdom	**Protocol** concerning Cooperation in Combating Oil Spills **Protocol** concerning Specially Protected Areas and Wildlife	Regional Coordinating Unit fot the Caribbean Environment Programme (CAR/RCU), UNEP
No Convention	**East Asian Seas Action Plan (1981)** Australia, Cambodia, China, Indonesia, Malaysia, Philippines, Republic of Korea, Singapore, Thailand, Vietnam	**Protocol** for the Prevention of Pollution by Dumping	Regional Coordinating Unit for the East Asian Seas Action Plan

Convention	Action Plan	Protocols	Regional Coordinating Unit/Secretariat
Barcelona Convention (1976)	**Mediterranean Action Plan (1975)** Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Ital		

Need for a Permanent Mechanism to Address Environmental and Fisheries Issues of Lake Victoria

THE LAKE VICTORIA FISHERIES ORGANISATION - FOR REGIONAL COLLABORATION IN THE MANAGEMENT OF LAKE VICTORIA FISHERIES.

By

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1. Introduction

Fisheries collaboration in East Africa, particularly between Kenya, Uganda and Tanzania, is perhaps one of the oldest in Africa. As early as 1928, it was recommended that a collaborative lakewide authority for regulation and the collection of fisheries statistics be established. With the establishment of the *East African Freshwater Fisheries Research Organization* (EAFRO) in 1947, a consolidated collaboration was established and further intensified with the formation of the East African Community in 1967.

In early 1970s, Kenya Uganda and Tanzania became members of the *FAO Committee for Inland Fisheries of Africa* (CIFA). Some of the objectives of CIFA are (a) to assist member countries to establish the scientific basis for regulatory and other management measures for the conservation and sustainability of inland fisheries resources; (b) to formulate such measures through subsidiary fisheries bodies or sub-committee as required and (c) to make appropriate recommendations for adoption and implementation by member states. In the case of Lake Victoria, implementation of fisheries/environmental measures was fairly well facilitated by the East African Community.

With the collapse of the East African Community in 1977, this important regional co-ordinating mechanism crumbled. However, since the riparian countries felt the need to continue collaborating in the development and management of fisheries of Lake Victoria a *CIFA Sub-Committee for Lake Victoria* was established in December 1980 at the Fourth Session of the FAO Committee for Inland Fisheries held in Blanyre, Malawi. This FAO-CIFA Sub-committee on Lake Victoria provided, since its formation, a unique forum for regional collaboration in the development and management of the fisheries of Lake Victoria.

Between 1991 and 1995 three seminars were held in the region, under the auspices of the FAO-CIFA Sub-Committee on Lake Victoria to discuss management issues, options and strategies for each of the riparian states. These seminars lead to a regional meeting for the management of Lake Victoria and the creation of Lake Victoria Fisheries Commission.

Further consultation between the riparian authorities with an FAO Mission led to the drafting of the convention establishing Lake Victoria Fisheries Commission. This draft was later approved by a Legal and Technical Consultation Meeting for the Establishment of Lake Victoria Fisheries Organisation (LVFO), in Dar-es-Salaam, Tanzania, 12-25 March, 1994.

The first meeting of the Council of Ministers responsible for fisheries development and management from Kenya, Uganda and Tanzania was held in Kampala, Uganda on 19th December 1996. Amongst other important issues undertaken by this Council of Ministers was the appointment of the Executive Secretary of Lake Victoria Fisheries Organisation, who reported at the Secretariat Headquarters in Jinja, Uganda. The main activities now are centred around establishing the permanent Secretariat at the Headquarters.

This paper presents the objectives, functions, responsibilities and the organs of the Organisation. Lake Victoria Fisheries Organisation is probably the best mechanism in the region to deal with the Lake Victoria problems and its fisheries. This is important considering that Lake Victoria is one of the development areas of common economic interest in the programmes of the East African co-operation. The Organization needs to be sustained and supported to achieve its main objectives.

2. ESTABLISHMENT

The Convention (Final Act) for the establishment of the ***Lake Victoria Fisheries Organisation*** was signed on 30 June 1994 by the ***"Contracting Parties"*** who include the Governments of the Republic of Kenya, the Republic of Uganda and the United Republic of Tanzania. The Organization is an independent inter-governmental organisation with legal capacity to contract, acquire and dispose of property and to be a party to legal proceedings.

3. LOCATION

The Headquarters of the Permanent Secretariat is at Jinja, Uganda.

4. OBJECTIVES

(a) To foster co-operation amongst the Contracting Parties, in all matters regarding Lake Victoria and specifically to:

(b) Harmonise national measures for the sustainable utilisation of the living resources of the Lake;

(c) Develop and adopt conservation and management measures to assure the Lake's ecosystem health and sustainability of the living resources.

5. FUNCTIONS AND RESPONSIBILITIES

(a) Promote the proper management and optimum utilisation of the fisheries and other resources of the lake:

(b) Enhance capacity building of existing institutions and develop additional institutions dedicated to, or likely to contribute to, the purposes of the Convention in co-operation with existing institutions established in or by the contracting parties and with such international, regional or non-governmental organisations as may be appropriate;

(c) Provide a forum for discussion(s) of the impacts of initiatives dealing with the environmental and water quality in the Lake basin and maintain a strong liaison with the existing bodies and programmes;

(d) Provide for the conduct of research concerning the waters of Lake Victoria, including without limitation the quality of such waters, in particular with respect to supporting the living resources of the Lake and the nature, extent and pathways of its pollution and other forms of environmental degradation;

(e) Encourage, recommend, co-ordinate and, as appropriate, undertake training and extension activities in all aspects of fisheries;

(f) Consider and advise on the effects of the direct or indirect introduction of non-indigenous aquatic animals or plants into the waters of Lake Victoria or its tributaries and to adopt measures regarding introduction, monitoring, control or elimination of any such animals or plants.

(g) Serve as a clearing-house and data bank for information on Lake Victoria fisheries and promote the dissemination of information without prejudice to industrial property rights, by any appropriate form of publication;

(h) In respect of any or all of the foregoing, adopt budgets, seek funding, formulate plans for financial management and allocate funds to activities of the Organisation, or to such activities of the Contracting Parties as it may determine to be in furtherance of the purpose of Organisations convention; and

(i) Undertake such other functions as it may determine to be necessary or desirable in order to achieve the purpose of this convention.

6. ORGANS

Lake Victoria Fisheries Organisation has the following Organs:

(i). **The council of Ministers**:

Is the supreme body of the Organisation comprising of Ministers responsible for Fisheries of the Contracting Parties or their authorised representatives.

(ii) **Policy Steering Committee:**

Comprising of Permanent /Principal Secretaries in the Ministries dealing with fishery matters.

(iii) **The Executive Committee**:

Comprises Heads of departments responsible for fisheries management and Heads of department responsible for fisheries research in each of the three contracting parties or their representatives. EAC and Designated representatives of key regional projects shall be represented without voting rights.

(iv) **Other Committees:**

The Fisheries Management Committee (Heads of departments responsible for fisheries Management),

The Scientific Committee (Heads of departments responsible for fisheries research) and any other committees, sub-committees and working groups as may be established by the Council of Ministers.

There are also going to be *National Committees* headed by the Permanent/Principal Secretaries in each of the riparian Governments to act as National Consultation fora for the Organisation. It is our hope that most of the stakeholders will be represented in these Committees. We propose to launched these on the week beginning 15th October 1998 as follows: 19/10/98 (Uganda), 21/10/98 (Kenya) and 23/10/98 (Tanzania).

(v) **The Permanent Secretariat**:

Has the following composition:

(a) *The Executive Secretary*: Is the chief executive and legal officer of the Organisation. Has duties to direct the work of Organisation in accordance with the policy and decisions adopted by the Council of Ministers and under the guidance of the Executive Committee.

(b) *The Deputy Executive Secretary* : To assist the Executive Secretary.

(c) *Senior Biologist*: Professional staff to deal with matters related to fishery biology, stock assessment and environment

(d) *Senior Economist*: Professional staff to deal with matters related to fishery management, planning, marketing, processing etc.

(e) *Administrative Officer:* Professional staff in charge of administration and finance.

(f) *Administrative Officer*: Professional staff in charge of information and database.

(g) **Internal Audit**: Professional staff appointed on part-time basis.

(h) *General Service Staff*: Secretaries, Drivers and other office Support Staff.

7. FUNDING

The core functions of the Organisation's bodies and the Permanent Secretariat are funded on equal basis by the three Member States. The annual contribution of each member state amounts to US$70,000 in 1997/98. This represents an annual funding of 10% by the three governments with the other 90% being funded by the global Environmental Facility (GEF). The GEF funding will last 5 years beginning July 1997 during which LVFO will have established itself fully. GEF is financing the formation and initial period of operation of the LVFO because it agreed with the need expressed by the Governments of Kenya, Uganda and Tanzania for an International body that would address the problems of the Lake and its fishery after LVEMP is finished. The European funded LVFRP has in many ways similar objectives towards the establishment of the LVFO. There is, therefore, the need to think about the future financial and material sustainability of the organization in the period beyond July 2002. This aspect will form a major focus of the LVFO in its strategic planning. We will seek for funds from donors and initiate viable activities/projects that will ensure long term self sustainability of the organization. We are welcoming you as partners as the LVFO begins to blossom.

8. PRIORITY TASKS FOR THE THREE CONTRACTING STATES.

Under the auspices of the LVFO Kenya, Uganda and Tanzania have set the following priority tasks.

- Reporting on effort and landings by fisheries, species and region;
- Assessing stocks and allocating total allowable catch (TAC) and analysing finishing trends;

- Monitoring the changes in the environmental characteristics of the lake due to activities generated
- Within the fishery sector and those imposed on the sector;
- Monitoring, control and surveillance (MCS) of fishing operations as well as the harmonisation and enforcement of appropriate fishing regulations;
- Collaboration with the private post-harvest sector at artisanal and industrial levels to develop management tools and mechanisms for resource management as well as for optimum utilization of the resource for consumption, export and employment;
- Improvement in interaction and information flow between all sectors of the fisheries;
- Promoting the development of an integrated management plan for Lake Victoria through the adoption of Integrated coastal Area Management (ICAM) techniques;
- Increased understanding of the social and economic framework of fisherfolk and fisheries.
- Improvement of hygiene and quality control ensurance of fish and fishery products.

LVFO will work with its partners to ensure that these priorities are met.

9. STRATEGIC VISION STATEMENT AND THE FUTURE

Based on the objectives, function and responsibility of the LVFO, we are now in the process of intensively promoting our Mission Statement(s) [Developed in a Regional Workshop at Jinja, Uganda, 15-16 July 1998] amongst all the Stakeholders in the Lake Victoria Basin during 1998/99/2000. This way and with your support LVFO is beginning to have a clear identity and is taking a leadership role in identifying and addressing the problems of Lake Victoria and its fishery. The initial efforts by LVEMP and the LVFRP are a good beginning towards building a strong regional mechanisms for an International body such as the LVFO. Efforts towards strengthen these initiatives for the benefit of the present and future generations need to be embraced by all of us.

Fisheries Research in the Light of the EU-funded Project

Lake Victoria: an example of ACP-EU fisheries research

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keywords: acp-eu fisheries research initiative; resource assessment; fisheries management; fisheries management plan; socio-economics; lake victoria; regional cooperation; kenya; tanzania; uganda; acp

BIODATA

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Martin van der Knaap, after long-term assignments in Senegal, Sri Lanka, Maldives and Cameroon, worked as fisheries adviser at the International Agricultural Centre (IAC) in the Netherlands, thus getting involved in the first phase of the LVFRP.

Introduction

The desire of the three countries around Lake Victoria to carry out resource assessment and to prepare a fisheries management plan dates back to 1984. After consultation with the countries, the EC produced a project proposal for a regional project. But the political climate was not conducive then, with the aftershocks of the East African Community break-up still being felt. As a result, the proposal was shelved until 1989.

In 1989, Phase 1 of the Lake Victoria Fisheries Research Project (LVFRP) started, initially scheduled for a period of one-and-a-half years. This first phase was devoted principally to rehabilitate the existing research vessels in Kenya and Uganda and to construct a new one in Tanzania. Furthermore, it was meant to harmonise fisheries data collection (and analysis) and thus strengthen the research infrastructure. It is good news that the *RV Victoria Explorer* has been handed over by the boatyard in Mwanza, Tanzania, to the Tanzania Fisheries Research Institute (TAFIRI) on 30 May 1997 (sic!).

In the meantime, the three riparian countries of the Lake have made efforts to strengthen regional cooperation in the spirit of the Agreement for the Establishment of a Permanent Tripartite Commission as signed in Arusha, Tanzania, on 30 November 1993. The countries committed themselves to the sustainable utilisation of Lake Victoria, its resources in general, and its living resources in particular.

Busy schedules for Lake Victoria countries

In March 1993, a mission of experts of the World Bank, FAO, UNDP and UNEP identified the needs for an overall environmental management plan for Lake Victoria. Numerous meetings and missions led eventually to the Lake Victoria Environmental Management Project (LVEMP) which took off in April 1997. Concomitantly, the preparation for the second phase of the Lake Victoria Fisheries Research Project took place, which became operational at the same time, thus allowing for some coordination.

The overall institutional framework has also been considerably strengthened through the establishment of the Lake Victoria Fisheries Organization (LVFO) (see this *Bulletin*, Vol 7(1), March 1994). LVFO has taken up it mandate and the newly appointed Executive Secretary, Dr. Michen J. Ntiba, started his duties on 1 July 1997. The ground for the LVFO has been prepared by the Sub-Committee for Lake Victoria of the FAO's Committee for Inland Fisheries in Africa (CIFA).

The above players are the key to a fisheries management plan for Lake Victoria, the target identified more than 10 years ago. The LVFRP will cater for the research work leading to the plan which will be implemented by the Lake Victoria Fisheries Organization. These fisheries management efforts take place in the context of even wider objectives for environmentally sound practices promoted under the LVEMP.

Collaborative ACP-EU research on Lake Victoria

The Research Project is becoming an interesting example of cooperation between ACP and EU institutions in fisheries research which is being promoted through a series of dialogue meetings since 1995 to develop the Fisheries Research Initiative between African, Caribbean and Pacific states and the European Union. The LVFRP has the privilege to be the first collaborative research project between a consortium of European research institutions and the fisheries research institutes of Kenya (Kenya Marine Fisheries Research Institute - KMFRI), Uganda (Fisheries Research Institute - FIRI), and Tanzania (TAFIRI) to be sponsored by the European Development Fund (EDF). Such collaborations are otherwise supported by the International Cooperation (INCO-DC) facility of the Union's Research Framework Programmes.

The successful tenderer for the European side is the consortium formed by UNECIA (Universities of Northern England Consortium for International Activities), the Marine Biological Centre of Crete and ASSIST, both from Greece. Three long-term technical assistants have taken up their assignment (see telex news in the last issue of the *Bulletin*). Their tasks, to be carried out in collaboration with their peers of the riparian research establishments, consist of harmonising data collection on board the research vessels and during socio-economic surveys, data analysis and presentation in forms useful for fisheries managers.

Resource assessment is the technical cornerstone of the project. Its quality will strongly depend on reliable catch estimates. Together

with studies of the biology of the commercial species, bottom and mid-water trawl surveys, acoustic surveys and limnology it is possible to produce a ecosystem dynamics model. Mid-water trawling has never been seriously carried out before on the lake. The collaborative mode of the project gives researchers in the region access to know-how from outside for this type of fishing, assuming that the present research vessels are suitable for this method.

The most sophisticated equipment will be available to carry out acoustic surveys on board the new Tanzanian vessel. Means are provided to install equipment on 'vessels of opportunity', which sail the lake on a regular basis. This type of recording may yield a treasure of data. Regular cruises of the three research vessels will furthermore provide possibilities to implement a thorough limnological sampling plan.

At present, electronic equipment is available on the market to run temperature and oxygen profiles in a matter of minutes. Data are stored automatically in electronic form for analysis on land. The eventual ecosystem dynamics model should in turn allow for the estimate of management related parameters.

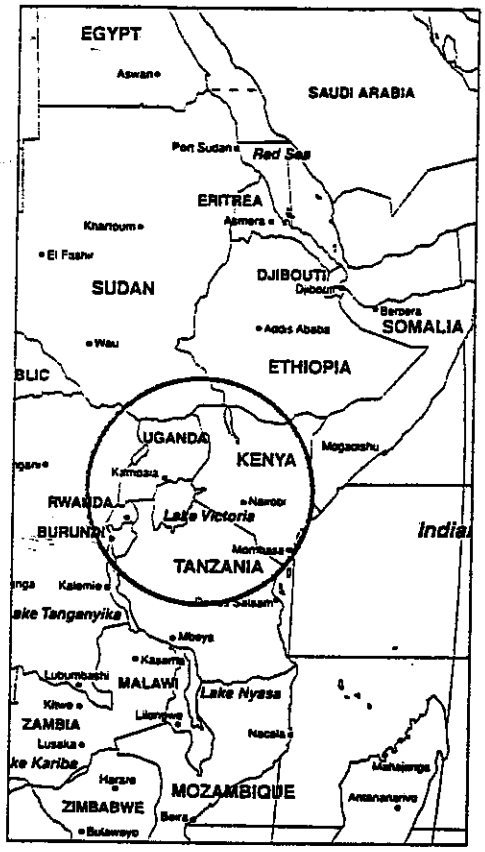
Challenge to research in support of management

The fisheries management measures derived from the resource assessment exercises should then be merged with the findings of the socio-economic section of the project (or the other way round) in order to come up with a co-management or common property resource management plan.

There is still a long way to go. How, for example, can the fish processing industry be involved in co-management? The recent (temporary) ban on import of regional fish products into the European Union had as serious impact on production, fish prices and employment. The LVEMP, LVFO and LVFRP have the opportunity to be on top of the events and study all the consequences.

The project also comprises an important capacity building component with possibilities for MSc training in East Africa and 'sandwich' PhD arrangements (emphasis on field work in the region in relation to project goals with course work in Europe).

The project offers extensive opportunities, however, there is room for complementary activities. It also has to take into account that there are new economic constraints in the national context. These will have impacts on the scale of national statistical data collection and thus part of the raw data the project was supposed to work with. In Uganda, e.g. data collection will suffer as a result of decentralisation of the activities of the Fisheries Department. In Tanzania, the Structural Adjustment Programme took its toll: numerous



data collectors and beach recorders left the shorelines of the Tanzanian part of Lake Victoria. Luckily, LVEMP will provide assistance to the fisheries departments, starting with a frame survey. Cooperation will be such that LVFRP has the human as well as the financial resources to train the personnel involved in the frame survey exercise.

Coordination is a must

Coordination of activities with both LVEMP and the LVFO is crucial and it is expected that LVEMP will play a leading role. Duplication of effort is otherwise a serious risk, especially where possible overlap exists between LVFRP and LVEMP work programmes. Both projects will need and undertake socio-economic studies. Thus, tuning of activities, choice of target communities and exchange of information will be of utmost importance. Both projects will design regional fisheries databases; if developed independently, the databases will look very different after some time. Here again, coordination and cooperation are required.

With the various interventions taking place at the same time, another risk may be competition for national and regional expertise. Especially the number of socio-economists in the region is still limited while more emphasis is now being placed on this type of research. A great advantage is that many researchers of the institutes are involved in either project and thus considerably facilitate coordination at the practical level.

As for the LVFRP is was attempted from the beginning to make it flexible. This worked out quite well when the Canadian International Development Research Centre (IDRC) intended to organise a workshop on the 'Sustainable Development and Management of the Lake Victoria Basin' for the Ugandan stakeholders of the lake (see telex this issue of the *Bulletin*). The LVFRP assisted in giving the workshop an essential regional character by funding Kenyan and Tanzanian participants.

Flexibility also means that the LVFRP will not focus on the water hyacinth problem which will be dealt with by LVEMP. This has been observed to have impacted, among others, the species composition of fish landings. Reportedly catches of catfish and lungfish in some Kenyan bays infested with water hyacinth are on the increase. LVFRP will, of course, look into such changes in the fishery.

No shortage of problems

Fish poisoning is common practice nowadays in western Tanzania. Fisheries managers of the lake expressed their concern about the recent developments and requested the LVFRP to study the phenomenon. Trials are underway to investigate the impact of the poisoning on the fish, among others, through exploratory fishing. Fishermen use clay balls filled with insecticide and throw them between shore and gillnets. Later on fish are collected and sold on the market or at the processing factories. The use of the poison is alarming and extension workers are trying hard to discourage the fishermen from using this method. Hopefully, the project will produce some hard facts which may be used in the battle against fish poisoning. This is an aspect in which the project can directly contribute to the LVFO's activities regarding fisheries management measures and eventually legislation.

Trawling has been banned in all three countries, but discussions about (partially) lifting the ban have flared up when Quality Control Inspection Teams of the European Union scrutinised the region. There is room for improving the quality of fish from the lake. In case fish remain in a gillnet too long, this will lead to loss of prime quality and thus reduce economic returns. Trawling might lead to reduced quality losses and research in this field is required urgently. It should be noted, of course, that the trawl ban was imposed for good reason!

In summary, the structure for fisheries and environment management on Lake Victoria is in place. Financial and human resources are available and supported by the political will of the three riparian states. Stakeholders of Lake Victoria and its basin should be made aware of the problems facing the lake, but also involved in their solutions. Time will tell whether management of the largest African freshwater body is possible. ■

The General Public's Involvement in Ongoing Activities and the Potential for the Future

MAIN ENVIRONMENTAL PROGRAMMES IN LAKE VICTORIA

Activities and Results Achieved with special reference to Public's Involvement and Potential for the Future

by

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HIGH LEVEL SEMINAR ON THE ASSESSMENT
OF INITIATIVES FOR
ENVIRONMENTAL COOPERATION ON LAKE VICTORIA
ARUSHA, September 8-9, 1998

Preamble: Quotable Quotes

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. All STATES and all PEOPLE shall cooperate in the essential task of eradicating poverty as an indispensable requirement.

Rio Declaration

A sector which uses natural resources in a way that cannot be sustained is undermining the basis for its own existence. An impact which is detrimental to the natural environment will prove detrimental to man.

Anonymous

Poverty, in any sense implying suffering, may be completely extinguished by the wisdom of society combined with a good sense and providence of individuals.

John Stuart Mill

A common denominator is to look for the opportunities, to encourage a new and constructive thinking and to engage people to be part of the solution instead of being part of the problem.

Coalition Clean Baltic

Of all the great lakes, Lake Victoria has the highest population concentration on its fringes. This has resulted into a serious human impact on the ecosystem through intense agricultural activity (cultivation and livestock rearing) as well as sporadic settlements and urbanization (viz Kisumu, Homa Bay, Mwanza, Bukoba, Entebbe, Kampala and Jinja). This is not to overlook effluent from the gro-based industrial establishments, including coffee and sugar estates. The consequence of this devastating human activity in the catchment has been loss of animal and plant life, deforestation and general land degradation, pollution and loss of water quality. In other words, the ecosystem is under increasing stress, for which we are both the ..... and victim.

Given the foregoing, there has been an urgent and compelling need for the restoration and conservation of the basin's biodiversity, by initiating threat abating environmentally friendly agricultural practices and protection of the catchment (wetlands); identification and restoration of endangered plant and animal species; control of pests and diseases; control of land degradation, run offs, siltation, and eutrophication in the lake and wetlands.

In the last three decades, specifically following 1960-1962 floods, there have been profound changes in the Lake Victoria fisheries and their supporting ecosystem, including the surrounding highlands whose contributory waters drain into the lake. Recent research-based observations indicate that, given the ecological changes in the basin, the fishery, in particular, is unsustainable at its present composition and yield. This has had a devastating effect on the social and economic welfare of the more than thirty (30) million people living in the lake basin. More and more people are living in object poverty. The consequence being that the problem facing the lake is not only a problem of the scientific research community but more seriously a disturbing concern of the stakeholder communities, herein referred to as the general public. For those of us who have been working with the grassroots peoples, it has been our responsibility to impress upon the general public to take the ecology of Lake Victoria basin seriously. Our improved resource management initiative has been geared to mobilizing stakeholder communities to participate in the management of the ecosystem. To explain changes and arrest the situation one of the greatest handicaps has been total lack of information or reliance on inadequate and unreliable information. It has been necessary, therefore, to adopt approaches that are strategic, applied and adaptive. The objectives being:-

- to bring together all different actors of Lake Victoria basin to strategically discuss key issues and problems;
- to exchange and disseminate information on what is being done in the region and by whom;
- to identify major gaps in knowledge, both indigenous and scientific, in order to foster development and conservation of the environment;
- to facilitate effective and sustainable participation among stakeholders and other actors for reliable linkages;
- to discuss adaptive mechanism and strategies that address problems and issues of the lake and its catchment;
- to evolve a "common language" and initiate dialogue amongst specialists and practitioners of different cadres and disciplines; and
- to promote community Participation in research, policy formulating, policy implementation, monitoring and evaluation of adopted strategies.

To realize these objectives, and ensure sustainability, it has been necessary to enhance linkages between research and the intended clients: between policy formulation and the target consumer organizations involved in community mobilization. I would like to single out OSIENALA for the purposes of illustration. Sometime in 1993, OSIENALA - Friends of Lake Victoria - organized a series of workshops for stakeholders and riparian communities to jointly brainstorm on what they felt were the problems facing Lake Victoria ecosystem and how they could be tackled and by whom. Among others, the specific objectives of the workshops included:-

- to determine suitable mechanisms for involving community participating in sustainable utilization of the lake's resources in order to improve their standards of living;
- to identify the strengths and weaknesses of the local communities in fisheries management and conservation, and interaction with various government agencies;
- to sensitize and mobilize the communities to participate in abating pollution and water quality degradation due to industrial, urban and agro-based affluent;
- to sensitize the communities through awareness creation campaigns on the dangers of water hyacinth and destruction of wetlands.

It needs to be noted that OSIENALA has not been alone in this venture nor has Kenyan side of Lake Victoria been the only active region. Even before Lake Victoria Environmental Management Project was launched, there were already community mobilization initiatives involving the riparian communities going on in Uganda and Tanzania both in the catchment and within the lake including the islands. These initiatives concentrated on such broad areas as Fisheries Management (fishing and fish stock assessment); Land Use and Wetlands (viz agricultural activities and deforestation); Urbanization and Industrialization, as well as Water Hyacinth menance.

Whereas the riparian communities have natural rights to the environment from whence comes their wealth, their responsibility of stewardship has been wanting. As a result, the stepped up exploitation of the resource has led to depletion and scarcity culminating into a phenomenon known as "the tragedy of the commons", that is, risk of depletion of a common resource. To check this, it has been the responsibility of the riparian governments and their agents to control exploitation by restricting individual or economic freedom of action. This command and control approach has often led to a stalemate between government agencies, namely, extension workers and the local communities at the grassroots. To overcome this it has been necessary to initiate dialogue: the consultative process, the quest for common language, between communities, stakeholders, researchers and policy makers.

In Tanzania, the process of dialogue has been spearheaded by, among others, Tanzania Fisheries Research Institute (FAFIRI), Tanzania Association of Fisheries and Lake Victoria Environmental Conservation (TAFLEC), International Council of Local Environmental Initiatives (ICLEI), Lake Basin Environmental Care Organization (LABECO) and Mwanza Women Development Association (MWDA).

The Uganda Sector has been very active on community mobilization. This has been promoted by Fisheries Research Institute (FIRI), FIRI-SWISS ECOTONE Project, Uganda Fisheries and Fish Conservation Association (UFFCA), National Environment Management Authority

(NEMA), Jinja Urban Wetland Woman Project (JUWWP); Kawanda Agricultural Research Institute (KARI) and Joint Energy & Environment Projects (JEEP).

The Kenyan shoreline has been dominated by OSIENALA - Friends of Lake Victoria: and Environmental Conservation Programme. However, other actors on the Kenyan side include Kenya Marine and Fisheries Research Institute (KEMRI). Centre for Environmental Research Aquatic Resource Development and Utilizaiton (CERARDU). Lake Victoria Fisherfolk Association (LVFA) and Madiany Community Development Programme (MCDP).

Apart from initiatives by government departments like TAFIRI, FIRI and KEMFRI, most of the activities of the aforesaid community-based-centred-friendly organizations are heavily backed or supported by international organizations like FAO, UNEP, UNDEP, World Bank, East African Development Bank, Lake Victoria Fisheries Organization, DANIDA, FINNIDA, NORAD, CIDA, IUCN and Lake Victoria Region Urban Authorities Cooperation (LVRUAC).

Details regarding institutional capacity, specific activities undertaken and results achieved by these bodies have not been available for the preparation of the present talk. At the same time, data regarding their being success stories has remained scattered an elusive. Of major significance, however, is the fact that tin most cases the conservation efforts overlap and at times suffer from uncalled for duplication of effort and resources leading to unnecessary wastage. It is for this reason that an assessment of initiatives for environmental cooperation on Lake Victoria as initiated and supported by Stockholm International Water Institute (SIWI) of Sweden, is not only requisite but timely. For those of us who are researchers-cum-stakeholders of the Lake Victoria Ecosystem the threat posed by human activities around the lake basin have disturbing adverse consequences or the economy, environment, health, and food security, thus entrenching the repugnant poverty in the lake region. Time has come for the communities and agencies to move from needs assessment and experimentation whose results are not only scattered but are to a large extent tentative.

Lake Victoria like the Baltic Sea is neither dead or dying - but it is a disturbed lake in great trouble. The reason behind the mushrooming of Environmental Programmes in Lake Victoria is the global concern that the local and global communities have a responsibility to take quick actions geared to securing sustainable development. Cardinal to the principle of sustainable development is the dictum that there is a limit to the burden that may be imposed on the environment, that is, the extent to which the environment is capable of absorbing the consequences of human actions.

All shades of threat abating activities have been going on in the Lake Victoria basin. These could be put into two broad categories. Category A include, Development of Institutional Capacity and Development of Participatory Process. Category B include Water Hyacinth Control; Water Quality and Ecosystem Management; Industrial and Municipal Waste Management; and Land Use and Wetland Management.

At the local community intervention level the main activities have included community mobilization, awareness creation, provision of health and educational facilities, provision of clean water and sanitary facilities, improvement of gear and vessel technology; provision of access roads and planning beach settlements.

For effective information dissemination it has been necessary to mount base-line data collection, assemble socio-economic information on the livelihoods of stakeholders; understanding fish marketing, processing and retail systems; and to appraise the nutritional and health impacts. For the sustainability of this process the challenges has been to call for dialogue and participation.

Dialogue, at whatever level, and whatever the purpose may be, the parties must be able to listen to each other. The ideal is to appreciate, respect and utilize the indigenous knowledge system in order to pave way for Effective Community Participation. We cal on the communities to tell us what problems they see, how they can be solved and by whom. Here we are tempted to borrow a leaf from the1920s Credo for Rural Reconstruction in China which says:-

Go to the people:
Live among the people:
Learn from the people:
Plan with the people:
Work with the people:
Start with what the people know;
Teach by showing, learn by doing.
Not a showcase but a pattern;
Not odds and ends but a system
Not a peacemeal but an integrated approach;
Not to conform but to transform
Not relief but release

Let us allow the general public to speak to us instead of us speaking to them. With this in place, we cannot go wrong and the attitudes and practices of the general public will not block our way.

In response to "POTENTIAL FOR THE FUTURE", I want to reiterate and insist that there is need for developing models that portray clear relationship between concerning biodiversity, poverty alleviation and food security within the parameters of community-based knowledge system and the continuous generation of creative thought and action within individual communities. What we need to diagnose carefully is the Theory of Indigenous Knowledge cycle, namely that indigenous knowledge forms the basis for indigenous decision making which is operationlised through indigenous organizations, and geared to generating indigenous experimentation and innovation. I emphasize this because, experiences of CERARDU have taught us that cultural and communicative competencies are crucial when it comes to generating consensus and momentum for joint action. In other words, we need to integrate the conventional government initiated command and control (legal framework) instruments, the economic (marked-based) instruments with community participation modules. We want to move with the general public or communities from (a) the Hunter-Gatherer situation, through (b) subsistence Economy situation to (c) the often complete and sophisticated Research and Development Intervention situation.

The task we have and face and the challenge of this high level seminar is to heed the words of Theodore Herzi (1860-1904) "whoever would change men must change the condition of their lives". The general public of Lake Victoria has to be sensitized to the realization that ecological

sustainability requires a real change in attitudes and practice. We need to consolidate a holistic approach and encourage a new constructive thinking and to engage people (the general public) to be part of the solutions instead of being part of the problem. This can only happen if the public ~~is~~ are persistently made aware of environmental issues and the relation of personal attitudes and practices to environmental problems. Our call is to fill gaps and avoid duplicaiton, promote education and training, exchange experience and knowledge and finally, support an economically, socially and environmentally sustainable development, that is, constant improvement of the living and working conditions of the people.

The general public within the catchment of Lake Victoria live in abject poverty. They suffer from social deprivation, cultural deprivation and material deprivation. But, as John Stuart Mill once said "Poverty, in any sense implying suffering, may be completely extinguished by the wisdom of society combined with a good sense and providence of individuals". The cardinal concepts here are wisdom, good sense and providence. How do these apply to the stakeholder communities?

First, wisdom of the communities is rooted in their indigenous knowledge of the ecosystem and the prevailing cultural orientation of the various peoples in the basin. This knowledge we must tap and assemble into a databank. Secondly, their good sense is portrayed in their value systems: their innovation ethic, social ethic, work ethic and business ethic. We must evolve a development ethics from the people. We must evolve a development ethics from the people.

Thirdly, the providence of the local people is discernable from their foresight, projections or production scenario building mechanisms, their capacity to fend for the future through savings and thrift. It is with these in mind that we must proceed to abate the threat to our environment.

Finally, and to link us with our friends from the Nordic world, the words of Professor Tinbergen, the Dutch Nobel Laureate are noteworthy. He said,

> More understanding for the poor countries is needed. We should be quite clear about the situation in which our world finds itself. Sociologists have shown us, by careful investigations, that the poorer an area, the more likely it is that conflicts multiply. Moreover, for a man in such a poor area to become a soldier often is relatively attractive. Governments in trouble are often looking for adventurous manoeuvres to distract attention from the problems they face. Unfortunately, national or even tribal rivalries can be easily exploited for such purposes. This means that misery can easily lead to wars.

The call of Kinda Women Group at Uwaria beach in Bondo District is noteworthy here. They told the President of IDRC of Canada when he (the President) visited them the following "HELP US HELP OURSELVES". This is what the general public is telling us at this High Level Seminar. They are the cause, the victim and the solution. A community centred approach to tacking environmental problems will not go wrong. The best this opportune and timely seminar could do is to launch on LVBS - 21, namely, Integrated Stakeholder Empowerment for Sustainable Development (ISESD) of the Lake Victoria basin with specifically defined areas for Lake Victoria action. These should touch on Agriculture; Forestry; Industry; Energy, Transport; Fisheries; Water

and Waste Water; Nature Conservation, Protection of Biodiversity; and of Course, Tourism.

An insight from our Baltic colleagues should do the trick; namely, what are our overall goals? What can the East African countries do together? What can each country do on its own? What can the communities do for and by themselves?

Thank you and God Bless.

Nairobi
7-9-98

THE BALTIC SEA ENVIRONMENTAL CO-OPERATION: A CASE STUDY

Intergovernmental Co-operation on the Baltic Sea Environment

INTERGOVERNMENTAL COOPERATION ON THE BALTIC SEA ENVIRONMENT

by Mr. Ulf Ehlin, Stockholm International Water Institute,
Executive Secretary, Helsinki Commission 1992 - 1996

Characteristics of the Baltic Sea

The Baltic Sea is the greatest semi-enclosed area with brackish water in the world. The entrances are both shallow and narrow. Inside them the Baltic Sea contains several deep basins divided by thresholds. The depth of the main basins is about 100 - 200 meters and the maximum depth is slightly more than 450 meters. The mean depth, however, is only 55 meters.

The drainage area has varying geographical conditions. In the north-western part you find mountainous areas, in the north and eastern part mainly forests, wetlands and lakes, in the south and west agricultural areas. Within the drainage area, there is a population of about 85 million people. These people are very unevenly distributed, with more than 50 million living on the southern side of the Baltic Sea. There are, however, even local areas in other regions with a great population, e.g. St. Petersburg and the Leningrad region, with more than 8 million.

The Baltic Sea is a very sensitive sea area. It depends on short and long term variations in weather and climate and has several times during its history transformed from lake to sea, from fresh water to saline water. The ecosystems are continuously under stress. The marine species are suffering from the decreasing salinity from the entrances to the Bothnian Bay and the limnic organisms from the increasing salinity in the other direction. The ecosystems are, therefore, especially sensitive to other disturbances, such as pollution.

A strong salinity stratification between the brackish surface water and the saline deep water originating from the North Sea reduces the vertical mixing of the water and the downward transport of oxygen from the surface. The saline deep water is exchanged with many years interval through rare pulses of oxygen rich water from the North Sea. The result is that the oxygen content in the deep water is reduced to zero for long periods and hydrogen sulphide is formed. Dead bottoms are the result over vast areas of the Baltic Sea.

The mean residence time for the whole water mass is of the order of 25 - 30 years. This means that it will take a long time before any results of reducing the discharges of, e.g., persistent toxic pollutants are to be observed in the open sea.

The human influence

The vulnerable marine environment is strongly threatened by human activities in the Baltic Sea and its drainage area. The threats originate from all the countries in the area but the most acute ones are those from the states on eastern, southeastern and southern side of the sea which are now in economic transition. Of the 85 million people living in the drainage area 30 million are lacking proper waste water treatment. Municipalities and industries are discharging their untreated waste waters directly to watercourses and coastal waters. The inadequate or total lack of municipal treatment is combined with lacking pre-treatment of industrial waste waters, which are discharged to the municipal sewage systems. Agricultural practices, including intensive livestock husbandry, are a major contributor to the high nutrient


DRAINAGE AREA OF
THE BALTIC SEA
NORWAY
Oslo
FINLAND
Helsinki
St. Petersburg
Tallinn
SWEDEN
ESTONIA
RUSSIA
Riga
LATVIA
DENMARK
Copenhagen
LITHUANIA
Kaliningrad
RUSSIA
Vilnius
Minsk
BELARUS
Berlin
Warsaw
GERMANY
POLAND
Kiev
UKRAINE
Prague
CZECH REPUBLIC
SLOVAK REPUBLIC
0 100 200 km

Figure 1

load. This is also true as regards nitrogen emissions by traffic. According to the second pollution load compilation by HELCOM, based on data from 1990, the approximate annual load into the Baltic Sea was in the beginning of the present decade 962,000 tons of nitrogen (both waterborne and airborne) and 45,800 tons of phosphorus (waterborne). It might be that the mentioned values, however, are too low due to uncertainties in the reported figures. About 30 percent of the total load of nitrogen emanates from atmospheric deposition. The mentioned load levels are estimated to represent three times those of the 1950s.

The inputs of large amounts of phosphorous and nitrogen compounds result in eutrophication and excessive growth of biomass. This is especially observed in the Gulf of Finland, the Gulf of Riga and in the coastal areas of the eastern, southern and southwestern Baltic Sea area. Intense algal blooms appear not only in local or regional coastal areas but also in the open sea. In some areas, even toxic algae appear, causing additional problems. The decay of this vast biomass depletes oxygen and the general decrease of oxygen in the water of the Baltic Sea is considered to be one to the reasons for the severely weakened cod catch. Significant increases in the prevalence of several fish diseases in the entrance areas are related to decreasing oxygen conditions.

Although concentrations of heavy metals in fish and shellfish have not changed significantly since the early 1980s, the concentrations are still higher than the background values. Enrichment of the most toxic metals, cadmium, mercury and lead, is about the same in both the Baltic and the North sea fish, and well below hazardous levels for human consumption, according to WHO standards. In the southern Baltic, a downward trend in lead concentration, probably due to the elimination of lead in car petrol, has been observed. The ban of the use of certain persistent toxic organic compounds, such as DDT and PCBs, has led to their significant decrease in the biota since 1974. Due to remedial action, the concentrations of toxic substances in biota have decreased distinctly in some parts of the Baltic Sea.

The effects of toxic substances on the biological system of the Baltic Sea are very serious. Since long, populations of birds and seals in the Baltic Sea, e.g., have been threatened by pollutants, such as heavy metals and organochlorines. The white-tailed eagle, e.g., was close to extinction. Due to decrease in discharges and other action, these populations in some areas now cause strong conflicts with fishermen and their organizations.

Fish with severe injuries were earlier found locally outside pulp and paper industry but have disappeared in pace with remedial action at the plants. For the moment, the stocks of wild salmon are close to extinction, not only due to over fishing but also due to a disease known as M-74 phenomenon, suggested to be related to the combined effects of pollutants.

The 1974 Helsinki Convention

In July 1971 the Government of Finland declared its willingness to convene an intergovernmental meeting to consider how a joint convention to protect the Baltic Sea could be prepared. This willingness was restated by the Delegation of Finland at the First UN Conference on the Protection of the Human Environment, held in Stockholm in 1972.

Thus in 1973, the first intergovernmental expert meetings were called to consider the possible structure and subjects of a convention and the measures that would be needed to implement and administer such a convention.

The Convention on the Protection of the Marine Environment of the Baltic Sea Area was signed by all seven Baltic Sea States at the end of the Diplomatic Conference on the Protection of the Marine Environment of the Baltic Sea Area, in Helsinki, Finland on 22 March 1974. The Signatory States were Denmark, Finland, German Democratic Republic, Federal Republic of Germany, Poland, Sweden and the Soviet Union.

The Baltic Sea Area, equal to the convention area, was defined to be the Baltic Sea, the Danish Sounds and the Kattegat, but not including the internal water of the Contracting Parties. The Contracting Parties undertake, without prejudice to their sovereign rights, to ensure that the purposes of the Convention will be upheld also in internal waters.

The Convention, often called the Helsinki Convention, was unusually comprehensive and aimed to protect the Baltic Sea from all kinds of pollution. The Contracting Parties shall individually or jointly take all appropriate legislative, administrative or other relevant measures to prevent and abate pollution and to protect and enhance the marine environment of the Baltic Sea Area without causing an increase of pollution outside the Convention Area.

The Contracting Parties shall counteract the introduction, whether airborne, waterborne or otherwise, into the Convention Area of a number of specified hazardous substances, i.e., DDT and its derivates, polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs). They shall further limit the introduction of noxious substances from land-based sources, whether airborne or waterborne. All appropriate measures shall be taken to control and strictly limit pollution by 16 groups of specified noxious substances and materials.

The Convention also stipulates criteria and measures concerning the prevention of land-based pollution, principles and obligations concerning prevention of pollution from ships, prohibition of dumping (exempting dredged spoils), cooperation in combating spillage at sea, and measures to be taken to prevent pollution from the exploration and exploitation of the sea-bed and its subsoil.

The 1974 Helsinki Convention entered into force in May 1980 when it was ratified by the parliaments of the Signatories. After the collapse of the Soviet Union the new independent republics of Estonia, Latvia and Lithuania acceded to the Convention, as did the Commission of the European Communities.

The 1992 Helsinki Convention

In 1992 a revised version of the Convention was signed by the Baltic Sea States and the Commission of the European Communities. This 1992 Helsinki Convention embodies developments in international environmental policy and law, in order to extend, strengthen and modernize the legal regime for the protection of the marine environment of the Baltic Sea Area. The key elements of this revised convention concern:

- inclusion of the internal waters of the Contracting Parties in the Convention Area. The Contracting Parties undertake to introduce relevant measures in the drainage area of the Baltic Sea to prevent and eliminate pollution of the sea;
- fundamental principles, including the "precautionary principle", the "polluter pays principle" and obligations to use the Best Available Technology (BAT) and the Best Environmental Practice (BEP);

- detailed priority groups of harmful substances and lists of substances banned from use or restricted;
- detailed criteria and measures for preventing land-based pollution, i.e., common principles for issuing permits for waste water discharge and air emissions; and
- detailed new measures for the prevention of pollution from offshore activities.

New provisions were introduced with regard to environmental impact assessment, prohibition of incineration, notification and consultation concerning pollution incidents, nature conservation and biodiversity, reporting and the exchange of information and information to the public.

The 1992 Helsinki Convention has been ratified by the Commission for the European Communities and all of the Baltic Sea States except Latvia and Poland.

The Helsinki Commission

The Baltic Marine Environment Protection Commission, The Helsinki Commission or, in short, HELCOM, was established for keeping the implementation of the Convention under continuous surveillance, keeping the contents of the Convention under review, making recommendations, defining pollution control criteria and objectives for the reduction of pollution, etc. The Commission, which consists of delegations representing the Contracting Parties, meets normally once a year in Helsinki. At special occasions, when important decisions or reports made, the Commission meets at the Ministerial level. Several intergovernmental organizations and international nongovernmental organizations are observers of the Commission and are allowed to participate and contribute to the work of HELCOM.

HELCOM has organized its work in four main committees and a Programme Implementation Task Force. The Committees are the Environment Committee, the Technological Committee, the Maritime Committee and the Combatting Committee.

The Environment Committee works on joint monitoring programmes covering different sectors of the marine environment, the open sea, coastal waters, and airborne pollution. The data are compiled into joint databases and evaluated at regular intervals by experts from the Baltic Sea States in order to assess the environmental conditions. The third assessment of the status of the marine environment was published in 1997.

The Technological Committee works on restriction of discharges into waters and emissions to the atmosphere from urban areas, industry and diffuse sources, including agriculture and traffic. Recommendations are prepared on banning or decreasing the use of certain substances or on reducing discharges and emissions. Also, it makes at regular intervals compilations on the pollution load to the Baltic Sea.

The Maritime Committee takes measures against all kinds of operational pollution from ships and off-shore platforms and deals with facilities in ports to dispose of ships´ wastes. It also coordinates the activities of the Baltic Sea States in matters concerning the protection of the Baltic Sea from pollution by ships. At present, one of the main concerns in how to reduce the illegal discharges into the Baltic Sea and how to develop a Baltic Manual on national legal systems concerning violations of anti-pollution regulations.

The Combatting Committee elaborates the rules and guidelines for cooperation in combatting spillages of oil and other harmful substances. It also coordinates airborne surveillance with remote sensing techniques to find and record oil discharges.

The HELCOM Programme Implementation Task Force plans and coordinates the implementation of the Baltic Sea Joint Comprehensive Environmental Action Programme.

The Headquarters of HELCOM, the international Secretariat, is placed in Helsinki. It is headed by an Executive Secretary. The staff consists of an Environment Secretary, a Technological Secretary, a Maritime Secretary, a Programme Coordinator, an Administrative Officer and Technical and Administrative assistants. For specific projects additional staff can be employed.

The decisions by the Commission must be unanimous. They are recommendations and not legally binding. Implementation of the Recommendations is the responsibility of each Contracting Party and is controlled by a system of obligatory regular reporting. In principle, the Contracting Parties share equally the administrative costs of the Commission.

Ministerial Meetings

During the late 1980s - and even more clearly after the collapse of the socialist regimes in Eastern Europe in the early 1990s - it was evident that the Helsinki Convention had not been the leading star for all the governments around the Baltic Sea with respect to action taken to protect the environment. Many of the decisions and recommendations by the Helsinki Commission had, unfortunately, not been implemented in practice. This was especially true in the countries in economic transition, where there were regions with partly destroyed environment. Industry operated with outdated technology and emitted harmful substances, including great amounts of harmful and toxic wastes stored in landfills without control or protection against leakage. Municipalities discharged their waste waters without any treatment. Agriculture did not take environmental conditions into account.

To combat this very serious situation, the Environmental Ministers from the Baltic Sea States in a 1998 Ministerial Declaration called for a 50% reduction by 1995 in emissions of substances most harmful to the ecosystem (i.e., nutrients, heavy metals, and toxic, persistent and bioaccumulating organic compounds). The Commission also adopted the "Baltic List of Priority Harmful Substances for immediate action in order to reach the 50% reduction goal by 1995". However, HELCOM failed to reach the goal. The report on what has been achieved was postponed and is expected to be presented at the 1998 Ministerial Meeting.

As the next and more powerful step the Prime Ministers of Poland and Sweden invited Heads of Governments and High Political Representatives of the Baltic Sea States, Norway, the Czech and Slovak Federal Republic, and the Commission of the European Communities to a meeting in Ronneby, Sweden, in 1990. The Prime Ministers decided to set up an ad hoc High Level Task Force to elaborate a programme with a view to reduce pollution decisively, in order to restore a sound ecological balance to the Baltic Sea.

The resulting Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) was approved as regards principles and strategies at a Diplomatic Conference held at Ministerial level in April 1992 in Helsinki. The Programme is expected to last 20 years, from 1993 to

2012, with the cost of implementation projected at about 18 billion ECU (more than 20 billion US $) The Programme is described more in detail by Stephen Lintner in an other presentation in this seminar.

The Visby Summit

In 1996 the Baltic Sea Prime Ministers met 3-4 May in Visby, Sweden. Among other high priority political topics the environmental conditions in the Baltic Sea were discussed on the bases of reports given by HELCOM.

For the first time HELCOM could report on positive trends concerning the pollution load on the Baltic Sea and subsequent improvements in specific environmental sectors, e.g., the levels of PCBs had decreased significantly in fish and eggs of guillemot as well as in seals. The health status of seals in the Baltic had improved. Also, concentrations of DDT decreased rather rapidly after the regulations and bans had been introduced, and the effect of the DDT ban is clear in respect to white-tailed eagle in the Baltic. After 25 years, the situation for the eagle had now returned to normal.

Concerning nutrients, the phosphorus inputs had decreased significantly in most areas of the Baltic Sea. For nitrogen, however, the situation was still unclear since decreased inputs from some sources were compensated by increased inputs from others.

A number of specific actions were called for in the Presidency Declaration from the Visby Summit and the subsequent adoption of action programmes for the Baltic Sea States by the Ministers of Foreign Affairs at their meeting as the Council for the Baltic Sea States (CBSS) in Kalmar, 2-3 July 1996. They concerned:

- an updating and strengthening of the Baltic Sea Joint Comprehensive Environmental Action Programme;
- the elaboration of an action programme for continuous reduction of discharges, emissions and losses of hazardous substances moving towards their cessation within the time frame of one generation (25 years);
- the expeditious implementation of the HELCOM strategy for Port Reception Facilities and the HELCOM assessment of future environmental risks of increased handling and transportation of oil in the Baltic Sea Region;
- the strengthening of actions to further limit emissions and leakage's of nutrients from agriculture consistent with the goal to restore the ecological balance of the Baltic Sea;
- the development of an annex to the Helsinki Convention on agriculture;
- the development of a coherent policy for sustainable fishing in the Baltic Sea based on a comprehensive plan to be elaborated by the Baltic Sea Fisheries Commission in consultation with HELCOM and ICES;
- the protection of biodiversity and nature conservation, including the further development of integrated coastal zone management;
- development of action programmes for transboundary water courses, and
- the elaboration of an Agenda 21 for the Baltic Sea Region.

BALTIC 21 - an Agenda 21 for the Baltic Sea region

The project on the elaboration of an Agenda 21 for the Baltic Sea Region, Baltic 21, was officially launched by the Ministers of Environment at their informal meeting in Saltsjöbaden,

Sweden, 20 - 21 October 1996. The Saltsjöbaden Declaration provides the basis for the Baltic 21 set-up and process.

The emphasis in Baltic 21 is on environmental aspects and it focuses on regional cooperation. Not only governmental ministries but also environmental movements, business/industry, universities, intergovernmental organizations and the international development banks are involved in the Baltic 21 process and are represented in the steering group, the Senior Officials Group.

The work focuses on seven sectors of crucial economic and environmental importance in the region. The sectors are agriculture, energy, fisheries, forestry, industry, tourism, and transports. The major outcome of Baltic 21 will be a regional action programme for sustainable development in the Baltic Sea Region and a common view of how sustainability can be reached in the region.

The agenda was presented to and adopted by CBSS in June 1998 and reported to the Prime Ministers at their next summit.

Follow up in 1998

At the Ministerial Meeting in 1988, the Ministers called for a reduction of 50% by 1995 in pollution load with respect to heavy metals, toxic or persistent organic compounds and nutrients going into the Baltic Sea. Ten years later at the 1998 Ministerial Meeting the gathered Ministers and the Commissioner from the European Commission could conclude that a number of important actions have been taken during the past decade. They welcomed the significant progress made in the reduction of discharges of organochlorine compounds and the significant reduction of lead from motor vehicles. They also welcomed the recovery in the populations of certain hitherto severely endangered species.

Nevertheless, the Ministers and the Commissioner recognized that many problems which so far have not been successfully addressed still exist, thus mitigating the realization of the 50% target. In particular they expressed concern at eutrophication resulting from high inputs of nutrients from agriculture, transport and municipalities, and at comparatively high concentrations of some heavy metals and persistent organic pollutants as well as illegal discharges from ships.

The Ministers and the Commissioner reaffirmed their commitment to achieve the strategic goals set up in 1988 Ministerial Declaration and to define a series of more specific targets to realized before the year 2005. They further decided to intensify the implementation of the Baltic Sea Joint Comprehensive Environmental Action Programme and place increased emphasis on the reduction of non-point pollution sources in agriculture and transport sectors.

In order to develop greater priority setting and targeting for tackling the more acute environmental issues around the Baltic Sea, the 1998 Ministerial Meeting also decided that HELCOM structures, procedures and programmes will be reviewed during 1998. The review is expected to result in changes in the role, organization and procedures of HELCOM which will better reflect the changing political and economic context and enable the Commission to react more rapidly and effectively to the environmental challenges.

The Baltic Sea Joint Comprehensive Environmental Action Programme

LESSONS LEARNED FROM REGIONAL ENVIRONMENTAL PROGRAMMES:

POTENTIAL APPLICATION OF THE BALTIC SEA EXPERIENCE TO THE LAKE VICTORIA REGION

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1. **Regional Environmental Programmes.** Over the last decade, at the request of its member countries, the World Bank has participated in an increasing number of regional programmes for environment and water resources management. Such programmes are designed to address a series of objectives which include alleviation of poverty, protection of human health, conservation of ecosystems and species, reduction of adverse economic and social impacts, and promotion of sustainable development. Many of these programmes are supported with funding from the Global Environment Facility (GEF) and often involve support from a variety of international financial institutions, bilateral donors and nongovernmental organizations. Representative examples include regional programmes for the Aral Sea, Baltic Sea, Black Sea, Caspian Sea, Danube River Basin, Lake Ohrid, Lake Victoria, Mediterranean Sea, Mekong River, Mesoamerican Barrier Reef, Nile River, and the Red Sea and Gulf of Aden.

2. **Common Themes.** The World Bank recognizes that water is a key resource for future prosperity and stability and views water as catalyst for cooperation rather than a source of potential conflict. A central principle adopted in the development and implementation of regional programmes is that water is a management continuum, which mandates an integrated approach to freshwater, coastal and marine resources. This requires adoption of a framework for linking policy dialogue, legislation, structural reforms, economic instruments, technical interventions, environmental management and social concerns at a variety of levels. Regional programmes should include support for complementary measures—preventive measures to avoid potential problems and curative measures to remedy existing ones. Implementation of these programmes consistently requires parallel investments in policy development and strengthening of institutions and human resources, along with traditional infrastructure investments to provide services required for environmental protection and natural resources management.

3. **Lessons Learned.** Regional environmental programmes have proven to be an effective means for cooperating countries to promote environmentally sustainable development on a regional level. The global experience of the World Bank with such programmes indicates that there are three key features to achieving success in their development and implementation:

- *Shared Vision.* Development of a "shared vision" provides a cooperatively prepared framework for identification and implementation of a range of long-term actions required for successful environment and natural resources management at the regional level. This

mandates the development of clear and achievable objectives that can be endorsed and adopted by all sectors of society.

- *Sustained Political Commitment and Public Support.* The success of regional environmental programmes is directly related to sustained commitment by political leadership and broad-based public support. Political acceptance needs to be complemented by a public commitment to undertake the wide variety of actions required to fulfill programme goals over a long period of time. Effective measures to explain the objectives of the programme to national and local governments, private sector interests, nongovernmental organizations and the public are critical to sustaining commitment to actions to be taken over a number of years.

- *Broad-Based Partnership.* The diversity of actions to be implemented in a regional environmental programme requires that a wide range of partners from within and outside the region work together to achieve the long-term programme goals. The role played by such partnerships has been critical in providing the basis for sustained political interest and strong public support, and greatly facilitates major resource mobilization efforts. Partnerships should be inclusive rather than exclusive and seek to include a full range of cooperating parties at the international, regional, national and local level.

4. **The Challenge.** In the context of global "lessons learned" from regional environmental programmes, it is clear that the greatest challenge lies in making the transition from planning to effective implementation of programmes at the field level. An important step in making this transition is the integration of the objectives and priorities of the programme into national and local development plans of the cooperating countries. Such integration mandates that implementation of the programme be broad-based and include a full range of partners from both the public and private sectors. Integration of priorities into investment plans has the added advantage of bringing together cooperating sectoral ministries, municipalities and other parties responsible for planning, finance, and environment to reach a consensus on actions in a formally structured manner. This integration process provides an important opportunity to support the coordinated use of funding from domestic and international sources and to more effectively use available grant, loan and private sector resources.

5. **The Baltic Sea - Potential Transfer of Experience.** The Baltic Sea Joint Comprehensive Environmental Action Programme (1992, 1998), which is implemented under the coordination of the Helsinki Commission (HELCOM), provides an excellent example of a regional environmental programme. It benefits from a shared vision, is sustained by strong political commitment and public support, enjoys a broad-based partnership and has successfully made the transition from planning to implementation. The Baltic Sea Environment Programme provides many opportunities for the potential transfer of a wide range of experience, with careful adaptation to local conditions, to the countries of the Lake Victoria basin.

6. **Key Factors for Success.** The experience in the Baltic Sea region has demonstrated how to address the key factors for success in a regional environmental programme:

- *Shared Vision.* The work of HELCOM provides a good example of the processes which can be used to both prepare and update a Strategic Action Programme that expresses the "shared vision" of a large number of diverse cooperating countries and parties. The methods used by the HELCOM Task Force in the development and implementation of the Baltic Sea Environment Programme could be used in the Lake Victoria region.

- *Sustained Political Commitment and Public Support.* Since the Baltic Sea Environment Conference in 1990, this programme has had the full support of the Prime Ministers and the public; the approaches used to gain and maintain this support could be adapted to the Lake Victoria region. Priority should be given to obtaining high level political support for the long-term programme of action required for environmental management.

- *Broad-Based Partnership.* Critical to the success of the Baltic Sea Environment Programme in resource mobilization from a diversity of sources has been the broad-based partnership which brings together the cooperating countries, international financial institutions, donor organizations, private sector and nongovernmental organizations. The development of such a partnership structure should be examined for the Lake Victoria region.

7. **Planning and Management Experience.** The two regions would benefit from the sharing of experience in the planning and management of regional environmental programmes:

- *Establishment of a Regional Environmental Commission.* The Helsinki Commission provides a potential source for sharing of experience and assistance in institutional strengthening and human resources development as a "twinning partner" for regional environmental management structures as they evolve in the Lake Victoria region. In addition to cooperation on environmental management, the Helsinki Commission could support activities for institutional strengthening in administration, financial management, planning and conference organization.

- *Use of a Programme Task Force.* Complex regional programmes have often benefited in their development and implementation from the use of a programme task force that includes representatives from the cooperating parties who meet on a regular basis. This approach, long used by the Helsinki Commission, could be employed with success at a number of levels in the Lake Victoria region.

- *Strategic Planning at the Basin Level.* The Baltic Sea Environment Programme has been developed through a strategic planning approach, which evaluated environmental trends and identified interventions at the basin level. This integrated approach resulted in identification of a series of priority areas for field-level interventions—"hot spots"—that have proven to be easily understood by decision-makers and the public. This approach could be used in the Lake Victoria region when properly adapted to local conditions. The strategic approach also included identification of emerging issues that may require action in the future.

- *Integration into Development Planning.* An important feature of the Baltic Sea Environment Programme that could be adapted for use in the Lake Victoria region has been the integration of programme priorities into development planning. In this regard, the experience of Estonia, Latvia and Lithuania would provide good examples.

8. **Environmental Management Actions.** A range of environmental management actions have been undertaken in the Baltic Sea Environment Programme which are of interest to the Lake Victoria region:

- *Preventive and Curative Measures.* An important factor in the success of regional environmental programmes is the incorporation of complementary preventive and curative

measures to protect the environment and promote conservation of natural resources. Preventive measures, by far the most cost-effective type of intervention, can be complemented by curative actions to remedy existing problems. The Baltic Sea Environment Programme provides an important example of how to broadly integrate the environmental dimension into the regional development process to assure its sustainability. This experience could be used to broaden the range of interventions that are used in the Lake Victoria region and allow for an increased emphasis on low-cost high return preventive actions.

- *Control of Point Source Pollution.* The Baltic Sea Environment Programme provides a wide range of examples of successful efforts for control of point source pollution from municipal, industrial and agro-industrial sites of a wide variety of types and a diversity of sizes. Activities to support development and modernization of municipal water and wastewater utilities provide good opportunities to exchange experience between the Baltic and Lake Victoria regions. They may also serve as excellent sites for the training of personnel in utility management, including administration, finance, technical issues and construction supervision. Good locations also exist for demonstrating the use of environmental audits in a wide range of industries.

- *Control of Non-Point Source Pollution.* The Baltic Sea region is the location of an active and innovative series of field-based demonstration and operational projects for the control of non-point source pollution from agriculture. The region is adversely affected by nutrients from livestock, fertilization of field crops and pesticides. Educational and technical interventions are being made at the regional, national, local and farm level that would be of long-term interest to environmental management in the Lake Victoria region.

- *Conservation of Wetlands and Protected Areas.* The conservation of coastal lagoons, wetlands and protected areas is an integral part of the management of the Baltic Sea. Many of these activities are being undertaken on a cooperative basis between national and local governments, the World Bank and the World Wide Fund for Nature (WWF). They provide excellent examples of participatory-based development of management plans for protected areas that have been the basis for significant mobilization of funds. This approach could be successfully applied to a number of priority areas for conservation in the Lake Victoria region.

- *Environmental Education.* With support from the Government of Finland and Coalition Clean Baltic (CCB), a structured series of activities for environmental education and public awareness has been a key element of the Baltic Sea Environmental Programme. This type of activity, in both the Baltic and Lake Victoria regions, is central to the long-term success of regional environmental programmes. This is an important area for potential cooperation between the regions to support sustained political commitment and public support.

9. **Operational Partnerships.** The Baltic Sea Environment Programme has benefited significantly from a diversity of operational partnerships that could be applied elsewhere with proper adaptation:

- *Participation of Local Governments.* The Baltic Sea Environment Programme has benefited from the active participation of local governments in the development and implementation of major management and investment activities. This work has been led by the Union of Baltic Cities and has included the conduct of urban environmental audits,

preparation of Local Agenda 21s and development of Local Environmental Action Plans (LEAPs). City to city cooperation between the two regions would allow for the transfer of this range of cooperative activities and may provide the basis for development of a similar association of cities in the Lake Victoria region.

- *Participation of Nongovernmental Organizations.* A key element of the Baltic Sea Environment Programme has been the active participation of nongovernmental organizations in the development and implementation of the programme. This has included implementation of significant activities for the management of coastal lagoons and wetlands by the WWF, support for environmental awareness and public information conducted by CCB, and involvement of local organizations in a range of small-scale activities. This approach, which involves nongovernmental organizations as direct participants in the programme, could be used in the Lake Victoria region to increase the cooperation of these parties with governments at a number of levels and to provide benefits to local populations.

- *Public-Private Partnerships.* The use of public-private partnerships is an expanding area within the Baltic Sea Environment Programme which has included the participation of the International Chamber of Commerce (Sweden) and the International Network for Environmental Management (INEM) in the Task Force. An important growth area for participation of the private sector is in the provision of water, wastewater and solid waste management services through a variety of arrangements. These experiences could be shared with the Lake Victoria region and opportunities identified to expand private sector participation in a manner that promotes increased efficiency and protects social welfare.

10. **New Issues and Opportunities.** Several new issues are being addressed under the Programme, while the Baltic 21 process provides new opportunities for innovation in environmental management:

- *Environmental Indicators.* The Baltic Sea Environment Programme is in the process of developing environmental indicators that will provide decision-makers and the public with an understanding of environmental trends and their implications. Indicators have been developed by the WWF for the management of coastal lagoons and wetlands, while the World Bank has worked with Estonia, Finland, Latvia, Lithuania, Norway and Sweden to develop indicators for water and wastewater utilities.

- *Addressing Agenda 21.* The Baltic Sea Programme, which is focused on implementation of the Helsinki Convention, has been recently complemented by the development of Baltic 21, a regional initiative which takes a comprehensive approach to environmental issues in a large number of sectors. Baltic 21 has also supported the development of environmental indicators for a number of sectors.

Figure 1. Environmental Hot Spots in the Baltic Sea Drainage Area - 1992 (Source: Helsinki Commission)

Figure 2. Environmental Hot Spots in the Baltic Sea Drainage Area - 1997 (Source: Helsinki Commission)

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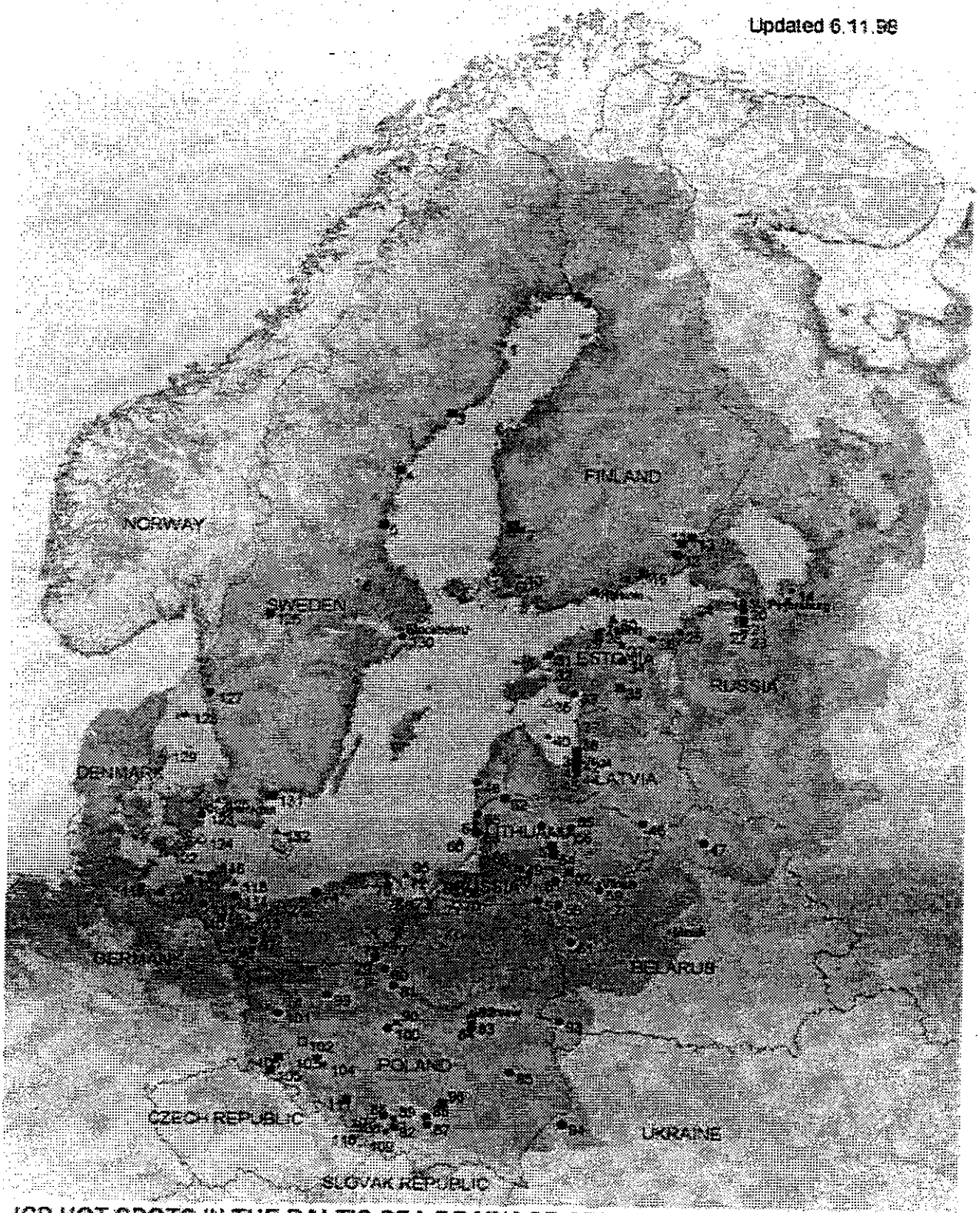
Figure 5-1 Map of the Point Source Pollution "Hot spots"[1]

1992



JCP HOT SPOTS IN THE BALTIC SEA DRAINAGE AREA, 1998

Industry / Municipal / Agriculture and / Waste / Coastal
Fish Farming Mariculture Lagoon

Removed

Activity ongoing

No activity

Information not received

Role of Non-Governmental Organizations (NGOs) in Environmental Co-operation – The Baltic Sea Case

ROLE OF THE NON-GOVERNMENTAL ORGANIZATIONS (NGOS) IN ENVIRONMENTAL CO-OPERATION – THE BALTIC SEA CASE

by Valdur Lahtvee
Coalition Clean Baltic

NGO ROLES IN SOCIETY

Non-Governmental Organizations (NGOs) are important stakeholders in society, very often called a "third sector" of the society besides the public and private (business) sectors. NGOs are party-politically independent, non-profit organizations, established to develop, implement and represent interests of certain group of people sharing the ideas and values. NGOs are to a very large extent based on the membership, as members are the driving force of the NGOs' activity by providing aims, contributing resources and, very often, voluntarily carrying out the work of the organization.

NGOs' position in the society depends very much on the level of development of the entire society. In the triangle model of the society, the NGOs are located close to the public, as unifying certain groups and channeling public interest towards the authorities and towards the business sector. A simplified description of the different roles of the stakeholders in society includes: authorities, who are established by mandate of the public and should serve the public interest by securing the society via distributing the welfare; business, which is established by the people for providing goods and services to the public with the aim of making profit for the owners; and the public, which influences the business sector greatly by being a consumer of the production, etc. In its entirety, society is like a puzzle, where by replacing the pieces you can achieve different pictures, but the picture is ready (and society functional) if all of the pieces are in the right position and none are missing. The also concerns the pieces provided by NGOs. Today, societies in the world are in different development stages, but the trend is common in that there is a move from representational democracy, where the public through elections gives mandate by electing officials who make decisions and run society for their representatives with little to say until the next election, to the participatory democracy, where the public is constantly involved in decisionmaking and therefore more actively implementing of those same decisions.

The role of the NGOs is rather limited, but still important. NGOs are the educators and awareness raisers, first of all of their members, as well as of the general public and also the decision makers, depending of their scope of activities. NGOs are mostly established for the gathering and dissemination of information, important to the group and channeling this information either to the members of the group or to the other stakeholders of the society. Secondly NGOs are playing very important roles as moderators for public participation: representing interests of the group towards the authorities and business sector and channeling responses back to the society. A more explicit way of expressing this is by describing NGOs as pressure groups and lobby groups that channel specific ideas, views and wishes towards authorities and other society groups, as well as forming and mobilizing public opinion in favor of those same ideas. Last, but not least, NGOs are serving as experts, because of the concentration to and enthusiastic work on certain issues, which has generated skills and developed experiences which may be taken as a valuable contribution into public use.

ENVIRONMENTAL NGOS THE IN BALTIC SEA AREA

In order to support intergovernmental efforts to protect the Baltic Sea marine environment, many environmental groups and networks have been established and are active in tackling environmental issues. Most active from these are Coalition Clean Baltic - CCB, Nordic-Baltic Energy NGO Network, Taiga Rescue Network, Friends of the Earth Europe - FoEE, World Wildlife Fund - WWF, Greenpeace, Keep Baltic Sea Tidy, European Union for Coastal Conservation - EUCC, Coastwatch Europe etc. Besides environmental citizens organizations, other NGO-s such as the Union of Baltic Cities, Baltic Universities Association, and so on are active in the environmental field. Even though there are many environmental groups operating in the Baltic Sea area, both on international level and even more in number on national level, there is very good cooperation between them, which have been proved by numerous joint activities and campaigns and joint efforts in the work within intergovernmental initiatives like HELCOM (Convention on Protection of the Baltic Sea Marine Environment) and Agenda 21 for Baltic Sea Region, where NGOs are invited to participate as observers by the governments.

One of the NGO networks that has been established specially for protection of the Baltic Sea marine environment and has gained certain success is Coalition Clean Baltic -CCB. According to constitution of the organization, CCB is a network for co-operation and co-ordination between non-governmental environmental organizations in the Baltic Sea region. CCB has its overriding goal to promote - on party-politically independent, non-profit-making basis - the protection of the environmental and natural resources of the Baltic Sea Area. SSB was establisher in 1990, and today unites 24 major national environmental organizations in all nine Baltic Sea Countries. Besides the Secretariat in Stockholm, CCB has three Information Centers in three Baltic States (Estonia, Latvia and Lithuania). Since 1991 CCB has been an official observer in HELCOM. In order to use effectively limited resources and to provide high-level expertise, CCB has concentrated its activities to five priority areas:

- promotion of ecological engineering - ecological solutions to reduce the loads of nutrients to the marine environment;
- river watch and river basin management of water resources;
- protection of the wild Baltic Salmon;
- prevention of harmful installations and harmful activities in the Baltic Sea Area; and
- promotion of sustainable agriculture.

Work has been carried out towards different target groups: local, national and intergovernmental authorities, general public, other NGOs and member organizations via a variety of activities. Among those are research, lobby and advocacy work as well as awareness and educational work by production of information materials, launching information and media campaigns, organizing seminars and conferences and publishing a regular CCB Newsletter and providing information via the CCB web-page on the Internet. Information work is supported by campaigns and field activities: clean-up campaigns, restoration of natural sites, construction of pilot installations, etc. Lobby and advocacy is supported by elaboration of documents presenting NGO visions and strategies (parallel to intergovernmental initiatives): Baltic Sea NGO Action Plan, An NGO Vision on Agenda 21 for the Baltic Sea Region, and active media work.

CCB's work has been recognized by continuous financial support of governments of Nordic Countries and EU, and by several international awards.

Role of the NGO-s on environmental co-operation

Baltic Sea case

Valdur Lahtvee
Vice-chairman, Friends of the Earth Estonia

NON-GOVERNMENTAL ORGANIZATION

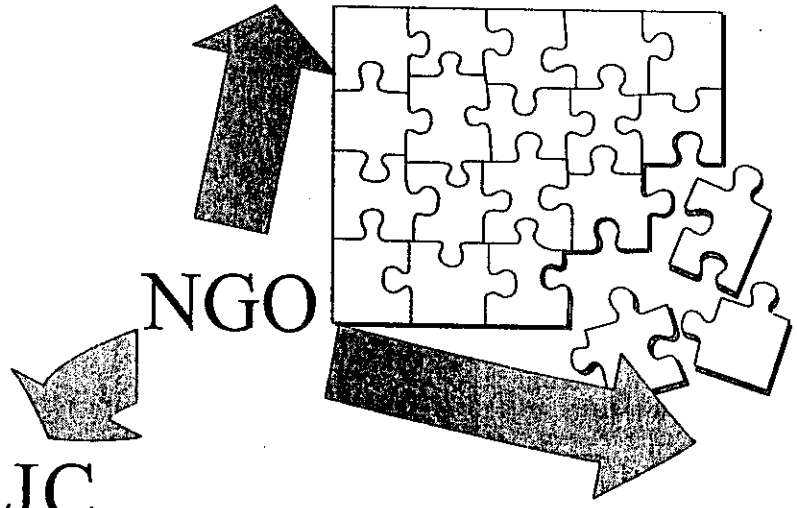
WHAT IT IS?

- PARTY POLITICALLY INDEPENDENT
- NON-PROFIT
- ORGANIZED
- BASED ON COMMON INTEREST
- BASED ON MEMBERSHIP

NON-GOVERNMENTAL ORGANIZATION

WHERE IT STANDS?

AUTHORITIES



PUBLIC

BUSINESS

☞ MOVE FROM REPRESENTATIONAL TO PARTICIPATORY DEMOCRACY ☞

NON-GOVERNMENTAL ORGANIZATION

WHAT IS THEIR ROLE?

- EDUCATORS AND AWARENESS RISERS
- MODERATORS FOR PUBLIC PARTICIPATION
- PRESSURE GROUPS
- LOBBY GROUPS
- EXPERTS

NON-GOVERNMENTAL ORGANIZATION

HOW THEY LOOK LIKE?

SOCIAL

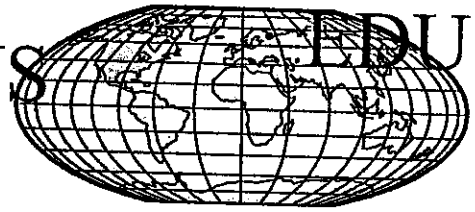
WOMAN

BIG VARIETY

INTERNATIONAL

NATIONAL

RELIGIOUS



EDUCATIONAL

CULTURAL

ENVIRONMENTAL

SPORTS

MINORITY

HOBBY

SCIENTIFIC

GRASSROOT

RADICAL

LOCAL

Environmental NGO Networks in Baltic Sea Area

- Coalition Clean Baltic - CCB
- Nordic-Baltic Energy NGO Network
- Taiga Rescue Network
- Friends of the Earth Europe - FoEE
- World Wildlife Fund - WWF
- Greenpeace
- Keep Baltic Sea Tidy

Coalition Clean Baltic

For Protection of the Baltic Sea Environment

- CCB is a network for co-operation and co-ordination between non-governmental environmental organisations in the Baltic Sea region. The CCB is a party-politically independent, non-profit-making association.
- CCB has as its overriding goal to promote - on party-politically independent, non-profit-making basis - the protection of the environmental and natural resources of the Baltic Sea Area.

Coalition Clean Baltic

For Protection of the Baltic Sea Environment

- CCB was established in 1990
- CCB is observer in HELCOM
- CCB has 24 memberorganisations in all 9 Baltic Sea countries
- CCB Secretariat is located in Sweden
- CCB has 3 Information Centres (in Estonia, Latvia and Lithuania)

Coalition Clean Baltic

Priority Activities

- Promotion of ecological engineering: ecological solutions to reduce the load of nutrients to the marine environment
- River watch and river basin management
- Protection of the wild Baltic salmon
- Prevention of harmful installations and harmful activities in the Baltic Sea Area
- Promotion of sustainable agriculture

Coalition Clean Baltic

Example from CCB Activity Plan 1997

AREA	LONG-TERM GOAL	SHORT-TERM GOAL	ACTIVITIES	RESPONSIBILITY	FUNDING
4. Harmful Installations	To reach international consensus between the states of BSR, guaranteed by legally binding regulations, that measures are taken to avoid planning and construction of harmful installations (dambs, nuclear power-plants, high voltage power-cables, megabridges, oil-terminals etc.) and harmful activities (dumpings to the sea, large melioration schemes and drainage of wetlands, military exercises etc.) which have negative consequences to the ecosystems of the Baltic Sea and the catchment area: To stop already planned HIA-s and planning of new ones.	4 a. To rise public awareness about negative consequences of HIA-s 4 b. To get the HIA-s as issue on intergovernmental agenda 4 c. To establish regional NGO - working group for dealing with HIA-s 4 d. To serve as experts to the intergovernmental organizations and influence their activities towards HIA-s	4.1 Updating the information about HIA-s; information seeking from press, NGO-s, GO-s, developers, meetings etc. 4.2 Information and public awareness work (leaflet, video, reports in media) 4.3 Campaining against HIA-s (national and local protest campaigns) 4.4 Advocacy and lobby in Intergovernmental organizations and at their meetings (HELCOM meetings and committees, HELCOM ad hoc working group on oil study, CBSS, Agenda 21 for BSR, IMO etc.)	Leadparty, BSS-Est, Lat, Lit Leadparty, BSS-EST,Lat, Lit MO BSS-EST ,Lat, Lit, MO´s in Rus, Pol Leadparty, experts from MO´s	CCB, SIDA CCB, SIDA, EU PHARE, MO CCB SIDA, MO CCB, SIDA

Coalition Clean Baltic

Some examples from CCB activities

- CCB has organized extensive **beach and river cleanup projects** in Latvia and Poland. Thousands of people have participated year after year
- CCB is involved in **river-watch programmes** in Estonia, Latvia, Lithuania, Poland and Russia
- CCB has organized **inventories of Baltic salmonid fish species** in 50 small rivers and watercourses
- CCB has established ecological engineering projects and demonstration sites to show **concrete implementation of eco-technologies for waste water treatment** (wetlands, biopond systems, ecological toilets etc.)
- CCB campain resulted **remove of radio nuclid batteries** in lighthouses in the Baltic Sea Area
- CCB has organized **Baltic Sea Ship Campaigns** in Sweden, Finland, Estonia, latvia, Lithuania and Russia for information about the sea, its environment and

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Annex I

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LIST OF DISTRIBUTED MATERIALS

LIST OF DISTRIBUTED MATERIALS & RESOURCES

Contact the respective organization to receive copies of materials.

Brochures

- The East African Co-operation (Secretariat of the Commission for East African Co-operation)
- Coalition Clean Baltic, Environmental Citizens Organisations (ECO) in Cooperation
- 10 Areas for Action to Save the Baltic Sea (Coalition Clean Baltic for Protection of the Baltic Sea Environment)
- Helsinki Commission, Baltic Marine Environment Protection Commission
- Stockholm International Water Institute
- World Wildlife Fund Baltic Programme

Reports

- Baltic Bulletin 1/98, WWF International Baltic Programme
- Baltic Sea Environment Proceedings No. 56, Intergovernmental Activities in the Framework of the Helsinki Convention 1974-1994, Helsinki Commission
- Baltic Sea Environment Proceedings No. 64 A, Third Periodic Assessment of the State of the Marine Environment of the Baltic Sea, 1989-1993, Helsinki Commission
- Baltic Sea Environment Proceedings No. 71, Final Report on the Implementation of the 1988 Ministerial Declaration, Helsinki Commission
- Baltic Sea Environment Proceedings No. 73, Overview on Activities, Helsinki Commission
- Baltic 21 Series, No. 1/98: An Agenda for the Baltic Sea Region: Baltic 21, Adopted by the Foreign Ministers at the Council of the Baltic Sea States Meeting, June 22-23, 1998, Helsinki Commission
- Baltic 21: Towards Sustainable Development in the Baltic Sea Region, Swedish Ministry of the Environment
- Baltic 21: Creating an Agenda 21 for the Baltic Sea Region, Stockholm Environment Institute
- East African Co-operation Development Strategy, EAC
- CCB's Baltic Sea Action Plan, Coalition Clean Baltic
- Coastwatch Baltic Report '97, Children's Environmental School & Coalition Clean Baltic
- Convention for the Protection of the Marine Environment of the North-East Atlantic
- Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992, Helsinki Commission
- Great Lakes Basin Compact, Great Lakes Commission
- The Fair Share Water Strategy for Sustainable Development in Africa, UNEP
- Water For Sustainable Development in Africa, UNEP
- Lake Victoria Basin: National Resources Under Environmental Stress, Sida
- A Gender Perspective in the Water Resources Management Sector, Sida
- Water and Security in Southern Africa, Sida
- Study of Water Resources in Zimbabwe, Sida
- Towards an Ecological Approach to Sanitation, Sida
- Integrated Lake and Reservoir Management: World Bank Approach and Experiences, World Bank

Newsletters

- EAC News, 1/98
- Coalition Clean Baltic, CCB Newsletter, 1/98
- Stockholm Water Front, SIWI Newsletter, 3/98
- UD Info: Africa on the Move – Revitalising Swedish Policy Towards Africa for the 21st Century, March 1998, Swedish Ministry for Foreign Affairs

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