IUCN Eastern Africa Regional Programme

Accurate reporting of the real issues of Lake Victoria's management

26 - 28, April 1999 Sunset Hotel, Kisumu, KENYA

Workshop Report

October 1999

IUCN
The World Conservation Union

IUCN Eastern Africa Regional Programme

REGIONAL ENVIRONMENTAL NGO PROGRAMME

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Edited by

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BACKGROUND

Introduction

The Journalists Environmental Association of Tanzania (JET) and The World Conservation Union (IUCN) held a joint workshop in Mwanza, Tanzania on the shores of Lake Victoria in June, 1998. This was to examine the prospects for sustainable management of the Lake Victoria ecosystem and to promote exchanges between technical experts on the lake and the media. During the meeting technical presentations on Lake Victoria, water hyacinth, Nile perch and pollution were made by technical experts. These were then discussed and explained to the various representatives from the media of Kenya, Tanzania and Uganda - who subsequently made media releases of the material. The meeting also allowed the Lake Victoria Environmental Management Programme (LVEMP) to describe their work and to de-mystify their plans for environmental management of the basin. The participants agreed that there should be a follow-up quite soon, which IUCN should organise in another riparian location on Lake Victoria.

The Lake Victoria basin is still faced with many threats to its integrity and to the resources therein so that wise management is essential for its survival. Accurate and informed reporting of the management issues of the lake and its environs can only help the process of sensible decision-making for the management of this important and valuable resource. Most people in the lake basin (as elsewhere) derive their knowledge and views about the issues relating to Lake Victoria from the media. Over the last years there have been many radio news items, press statements and newspaper articles and reviews about the declining state of the lake environment. Many of these have been tinged with political perspectives and sometimes even fantasy to make them more "interesting" and saleable - and some have turned non-technical opinions into "facts" because of continual repetition that sounds like truth. In many cases people have been given unrealistic slants on such issues as water hyacinth infestation, effects and control, Nile perch exploitation, lake pollution and fish poisoning as well as the intentions of LVEMP. IUCN through its Eastern Africa Regional Programme is intent upon ensuring that people have a technically accurate view of the lake ecosystem. Thus the regional NGO programme of IUCN resolved to assist with the transmission of accurate information about the lake to the media and hence to the people. Lake Victoria and its basin is the most important ecosystem shared by the three riparian states of East Africa and has natural resources that influence and support millions of people. Hence the need for the development of accurate reporting of lake issues to assist with realistic opinions, policies and actions in relation to the lake.

To address this continuing need, and as a follow up to the first meeting, IUCN held a workshop with environmental journalists and experts in environmental issues of the lake basin in Kisumu, Kenya. The objectives of the meeting were:

- to present an update on activities around the Lake from other institutions working with LVEMP and to discuss some pertinent issues of the Lake Victoria Basin,
- to facilitate the flow of technical information (especially about the Lake Victoria Basin)
- to facilitate the formation of a regional network of environmental journalists centred on the Lake Victoria basin and responsive to journalists' needs,
- to develop ideas for training of media representatives in reporting of technical issues in the Lake Victoria basin (and beyond).

2. Workshop structure

The workshop was held at the Sunset Hotel, Kisumu, Kenya from 26th to 28th April, 1999 and was organised and funded by the IUCN Regional NGO Programme.

Participants at the meeting included journalists from the three countries, Kenya, Uganda and Tanzania and included print and electronic media (mainly radio) representation, technical experts from LVEMP from the three countries, and communication/information officers from key NGOs and CBOs working around the lake. All in all there were thirty participants. An expert on environmental journalism was invited to facilitate the discussions and assist with the last objective. Several experts were invited to discourse on their topics of experience in lake management.

The programme was organised with updates and technical presentations on issues to do with management of Lake Victoria. This was interspersed with discussions and training on reporting on the environment. A field visit on the second day also prepared the journalists on what to look for when looking out for a story. This was followed by an interactive session. The last morning was dedicated to discussing networks and deliberation on a network for Lake Victoria. It was then left to IUCN to finalise the concept and try to market it. It was hoped that the next meeting could be a meeting of the network.

The workshop was a great success due to the efforts of Mine Pabari, Programme Officer at IUCN EARO, assisted by Kate Thuo, Admin Assistant. IUCN's NGO partner in Kisumu, OSIENALA also had great input towards the realisation of this workshop. The workshop was organised and financed by the IUCN NGO programme as part of its technical forums and capacity building activities. This programme is funded by SIDA Sweden.

1. ANALYSIS OF PREVIOUS WORKSHOP'S REPORT

During the first session of the meeting, participants went through the proceedings of the last meeting, the publication, 'Water Hyacinth, Nile Perch and Pollution: Issues for Ecosystem Management in Lake Victoria'.

The editors of the proceedings explained that they had prepared the technical reports in the workshop report to illustrate various ways in which data can be presented:

+ Narrative with summary chart and map (Howard),
+ Details with explanation and maps (Twongo),
+ Research results and detailed review of others' work with substantial references for further investigation (Abila), and
+ Summary, point-listed narrative with detailed tables of data.

These are but different ways of presenting the technical information and all are valid despite their different forms.

The editors asked if such publication of the technical presentations was useful and the participants said that it was but that they would prefer some interpretation and it would be better if it could be also summarised in "fact-sheets".

During following discussion of the proceedings, it was noted that:

The publication was extensively used by journalists for information in relation to the fish-poisoning incidents, following the banning of fishing in Kenya. The East African Standard had a number of features on the issue.

Comment: Page 41: The meeting held last year recommended co-management. While this is still a new issue in East Africa, journalists should make an effort to find and share experiences, and sensitise governments, who are unwilling to share management. The recent ban on fishing around Lake Victoria by the three Governments was like a blessing. This experience has two lessons: for the community, they have learnt that they can be stopped from using the resources which they consider their own, while the Governments have learnt that they cannot control what happens to the resources.

2. CONCEPTUALIZING THE ENVIRONMENT

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Introduction

Environmental protection is among the greatest challenges facing humankind today. Although a lot of effort and investment has been directed to meet this challenge, few would disagree that significant changes need to occur in citizens' environmental knowledge, attitudes and behaviour, if a sustainable future is to become a reality. Among the key players charged with this responsibility such as environmentalists, policy makers, scientists, voluntary organisations, researchers and community development educators, the mass media is increasingly being recognised as a powerful tool in motivating large-scale public participation towards environmental conservation.

Indeed, public response to environmental challenges depends to a large extent on the environmental information they receive. Such information must be empowering and should aim at the development of an environmentally responsible citizenry, that is, a citizenry that is both competent and willing to take that action. Unfortunately, most environmental stories have not encompassed this dimension. Several studies that have attempted to analyse environmental articles in the mass media (UNESCO 1980; Ozoh 1992; Nyirenda 1992; Kaberia 1991) have found that:

a) The mass media tends to present superficial and inadequate new stories on the environment;

b) The mass media exercises selectivity and sensationalism when reporting on the environment in order to maximise their audience; and that,

c) The public is suspicious of the information on the environment that they receive from the media.

These findings are not surprising, considering the fact that, very few journalists in developing countries have any formal environmental education. This is coupled with the general misconception by most media editors that environmental reporting is a simple task to be handled by any reporter. The truth is that environmental issues are highly complex, and cross-traditional mass media specialities or beat others such as politics, science, economics, religion, medicine, agriculture and business management issues.

The complexity of the inter-relationships within nature and social systems, pose unique behavioural challenges to the realities of environmental journalism. When those who report on the environment are as misinformed about environmental issues as the rest of the public, they perpetuate misconceptions about the environment to a majority population whose only source of environmental information is the mass media. Yet, the work of the environmental journalist has widespread ecological and environmental responsibility, with implications for the direction towards which they influence the public on the utilisation of environmental resources. It is thus imperative that environmental journalists be exposed to the concept of the environment and the BASIC principles of environmental reporting, in order to facilitate the production of environmental stories capable of influencing government policies, educational programmes, business and industry, and the choices of millions of consumers towards responsible environmental behaviour.

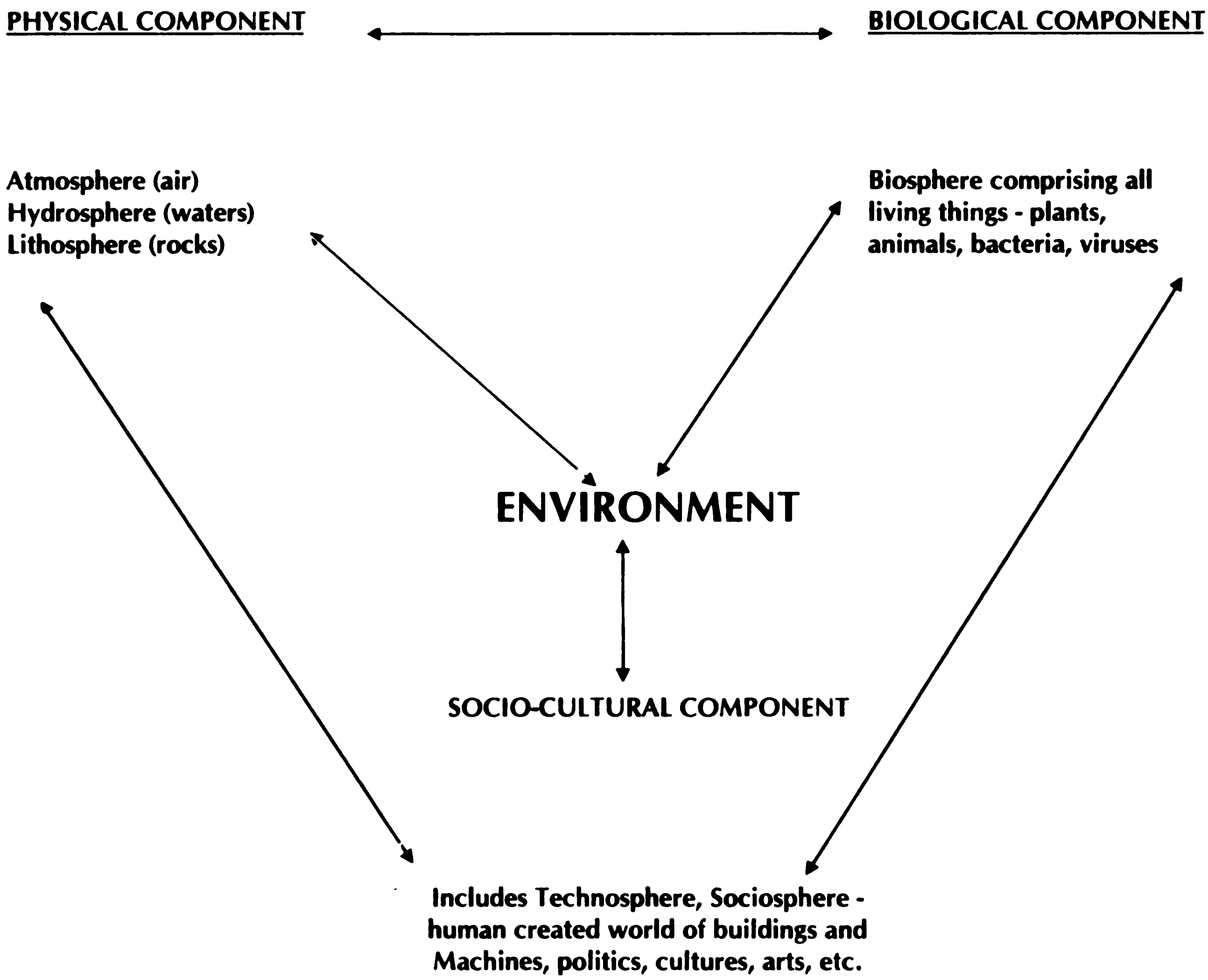
What is "Environment?"

The environment comprises natural systems and the interactions that surround us. Three components make up the environment, viz.:

- the *physical component* made up of air, water, rocks, and land;
- the *biological component* which is constituted of all living things and
- the *socio-cultural component* which includes the technosphere and sociosphere such as politics, culture, arts and technology.

These are interrelated and can be imagined to be linked as in Figure 1.

Figure 1: THE CONCEPT OF THE ENVIRONMENT



The three components are the levels of being which are inter-related and inter-dependent. Any stress on any one of them affects all the others.

Within the natural orders of things, it is important to note that:

a) Each of the three levels of being (physical, biological and social) obeys the same physical laws and are similar in behaviour, although local variations lead to complexities that are sometimes difficult to understand.

b) Environmental components operate on different time-scales, which make their management difficult. A good example is the formation of soil. While it takes nearly 300 years to form 3 centimetres of good top soil (physical component), poor cultural practices such as overgrazing (social component) can remove that soil within 5 years; similarly, reforestation (biological component) on exhausted soil would take almost 25 years, while one violent storm (physical component) on overgrazed land can remove the fertile soil in a day.

c) The materials necessary for life undergo continuous transformation, which ensures that nothing is destroyed or lost. The materials pass through bio-geo-chemical cycles that maintain the purity and the availability of these resources for life. In nature, the output of one process is continuously made the input of some other process, which is well described by the concept of food webs. Everything is food for something else, and every kind of waste is input to something else.

Simply put, the environmental systems are highly complex where everything is connected to everything else, as Chief Seattle - quoted by Meadows 1989 - says

> *All things are connected like the blood which united one family. Whatever befalls the earth, befalls the sons of the earth. Man did not weave the web of life; he is merely a strand in it. Whatever he does to the web, he does to himself.*

Journalists need to understand these components and their inter-relationships in order to sensitise people to understand their role in the creation of certain phenomena such as desertification, which although to some extent is a natural occurrence has been accelerated by human beings through ignorance and greed. Since human beings are the only creature that possess, perceive and appreciate consciousness and self-awareness, they are, on the same token given the special responsibilities for environmental stewardship. To carry out that responsibility, humankind needs to be guided by morality and ethics. These elements need to be incorporated in reporting environment, especially now that human beings more than ever before have arrogantly interpreted the concept of stewardship.

Consider another phenomenon such as deforestation. When people cut down trees, they remove the soil protectors. The driving force for such activity is to satisfy social needs like building, agriculture or simply for self-actualisation. The result of such removal of vegetation cover is a destabilising effect on the "air conditioner" and "carbon dioxide sink". Rainwater is unable to percolate into the soil, the water table is lowered, siltation occurs as loose unprotected soil is washed away fast, the life span of rivers and dams is shortened and they eventually dry up affecting agricultural productivity and ultimately causing conditions such as famine and environmental refugees.

Similarly, when carbon dioxide levels increase as a result of loss of vegetation which act as "carbon-dioxide sinks", the phenomenon of global warming and consequent climate change sets in. The simple act of cutting down trees manifests itself as the emerging global environmental issues that the earth is experiencing today.

There is need for journalists to address the interactions that cause environmental degradation by emphasising the simple steps within people's means that can help alleviate environmental problems, such as preparing them to plant trees at the onset of rains or to harvest rainwater. The concern of environmental journalism is to provide information that changes behaviour towards the environment. This can only be realised if journalists moved away from the now referred to "tired role of journalism", that of awareness creation through provision of information to the audience, to that of education and advocacy. In any case, it is now widely acknowledged that awareness of environmental issues does not necessarily lead to action. Instead, a set of other variables interact in a complex manner to realise behavioural changes. Such variables have been studied and through correlation and elimination, three main variables namely entry level, ownership and empowerment towards the environment appear to strongly predict behavioural changes. These are the ones that journalists should incorporate in the nature of stories they produce for public consumption (see figure 2 for illustration).

Figure 2: VARIABLES INVOLVED IN ENVIRONMENTAL CITIZENSHIP BEHAVIOUR

Entry-level variable →	Entry-level variable →	Entry-level variable →	CITIZENSHIP BEHAVIOR
Major variables	**Major variables**	**Major variable**	
Environmental Sensitivity	In-depth knowledge about issues	Knowledge of and perceived skill in using environmental action strategies	
	Personal investment in issues and the environment	Locus of control (expectancy) reinforcement	
		Intention to act	
Minor variables	**Minor variables**	**Minor variables**	
Knowledge of ecology	Knowledge of the consequences of behaviour - both positive and negative	In-depth knowledge about issues	
Androgyny			
Attitudes toward pollution, technology, and economics	A personal commitment to issue resolution		

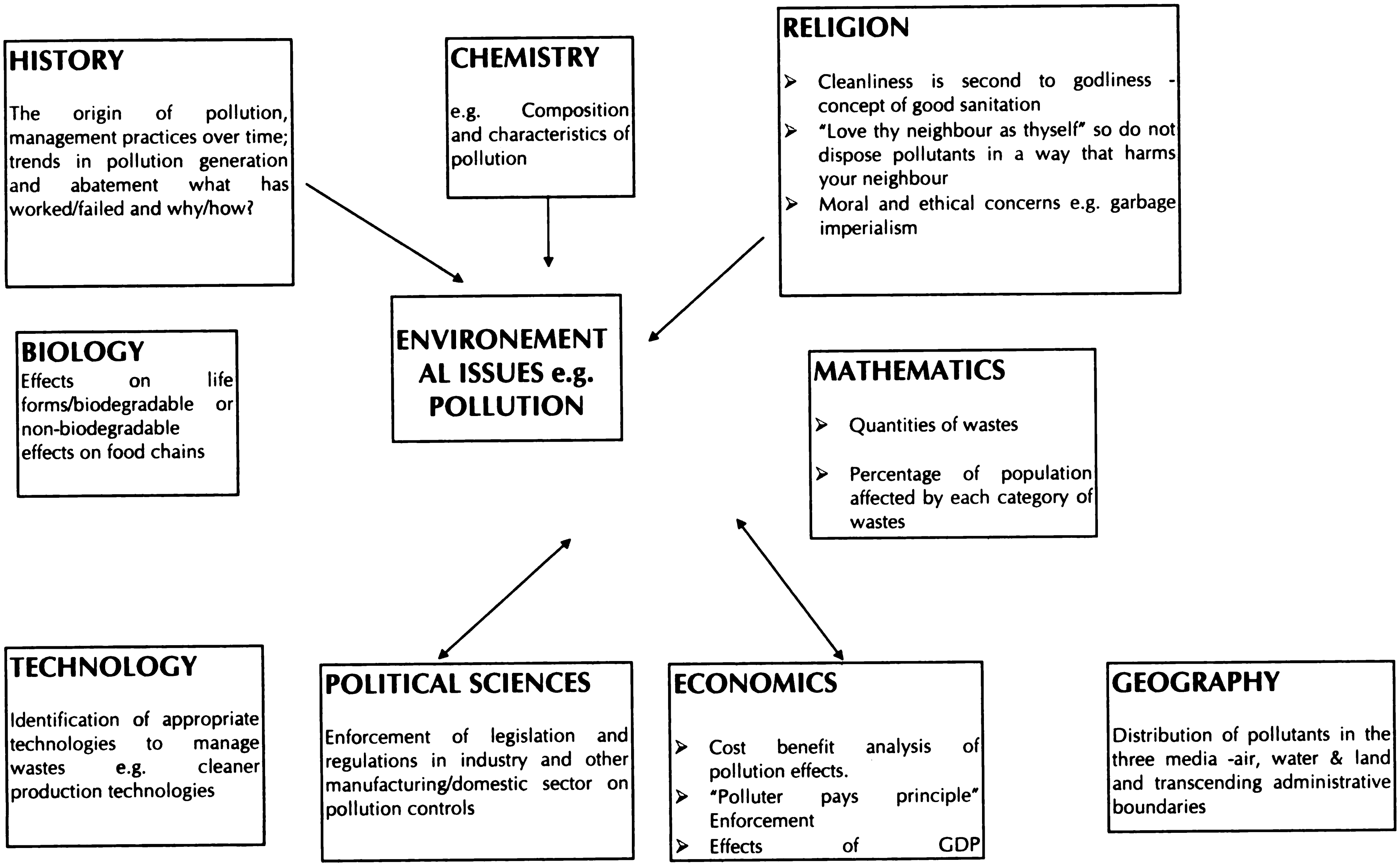
These variables revolve around awareness, sensitivity, concern and motivation to act individually and collectively, skills acquisition for identifying and solving environmental problems as well as in-depth knowledge of issues that encourage participation at all levels in working towards resolution of environmental problems and issues.

Further reporting on the environment is related to certain principles, drawn from the conceptualisation process of the environment. These include:

a) Strategic changes in outlook by reporters. Here, the communicator must look at a holistic view of environmental issues. There is need to consider the environment in totality including the natural, man-made and social aspects - economic, political, cultural, historical, theological, etc., understanding that environmental reporting is a political story, a social story, just as it is a scientific and legal story. The media must provide adequate background information on environmental issues in order to enable people to make decisions and empower them through informed choices.

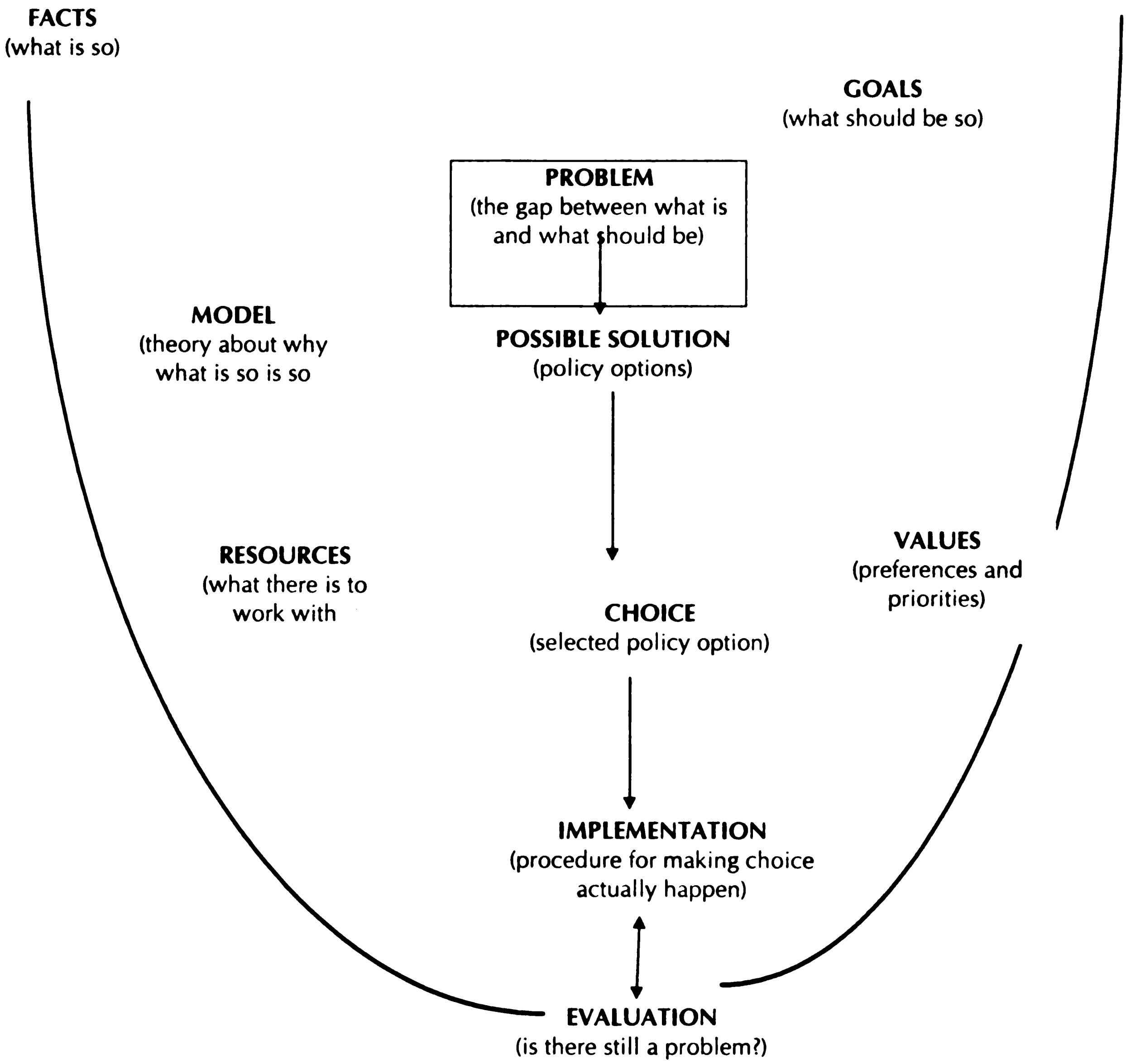
b) The communicator should adopt a problem solving approach from the philosophy basis of holism, sustainability, enhancement and stewardship. The goal is to solve the environmental problem thoroughly without creating new problems. The process of identifying alternative solutions should be participatory right from conceptualisation of the problem through implementation to evaluation. The target audience needs to be familiar with the journalist in order to realise maximum involvement and contribution. The process as summarised in Figure 3 is easily adaptable to any environmental problem from the seemingly simple, such as household garbage disposal to the more complex global issues such as ozone layer depletion and climate change.

Figure 3. HOLISTIC VIEW OF ENVIRONMENT IN RELATION, FOR EXAMPLE TO POLLUTION



c) Communicating the environment involves the adoption of an interdisciplinary approach, which implies drawing on the relevant content of each discipline in making possible a balanced perspective to the environmental issue in consideration. There is not one single discipline that can claim solutions to environmental problems. Most often, journalists shy away from reporting on the environment arguing that it is science, while in actual fact, environmental issues are more social than they are scientific. Consider the case of an environmental problem such as pollution. As illustrated in Figure 4, all disciplines have a stake in providing solutions. The onus on reporters is to establish as many sources of environmental information as possible, from natural to social scientists.

Figure 4: THE PROBLEM-SOLVING APPROACH



d) Communicating the environment includes the need to relate environmental sensitivity, knowledge, values and skills to every age, but with special emphasis on environmental sensitivity to the audiences' own community. The report must encourage the audience to identify with the environmental issues from the various levels of development e.g. the Lake Victoria environment.

e) Environmental communication calls for examination of major issues at local, national, regional and international levels to give the audience an insight into environmental issues in other geographical regions. This is summarised by the ethical international environmental slogan "Think globally, Act Locally".

In view of the above, the challenge for environmental communicators is not only to sensitise the public, but to lead them to change behaviour and attitudes towards the environment. This revolves around a sense of environmental ownership and empowerment to act either individually and/or collectively. The environmental journalist could achieve this through the production of environmental stories that:

- Increase awareness and understanding of environmental trends and conditions, their causes and consequences to all stakeholders;
- Provide a foundation for improved decision making at all levels, from individuals to national governments and international organisations;
- Facilitate the measurement of progress towards sustainability through the provision of credible information;
- Promote environmental sensitivity and public consciousness about environmental issues;
- Inculcate positive attitudes towards the environment through innovative use of media (cartoons, one-minute slots, humour, etc.) thus avoiding boring the audience;
- Update the knowledge and skills of civil society and decision makers in order to equip them better to respond to the challenges posed by the environment and development debate, i.e., messages that ignite public desire for more information on environmental systems and their interactions.

Of particular relevance to the local environmental communicator is the need to help the audience to get out of the common traps on the status of the environment that most of our stakeholders are in (see Annex 3). Another important aspect, is that of networking in order to improve the delivery mechanisms of environmental messages as they relate to the underlying poverty and social economic status, and most importantly, helping the audience to be able to harmonise developmental activities with environmental issues as they relate to their daily lives. Equally important is encouraging the target audience to set the environmental agenda, in challenging the political, economic and developmental institutions that do not respect the environment.

3. COLLABORATION BETWEEN THE MEDIA AND THE LAKE VICTORIA FISHERIES ORGANIZATION (LVFO)

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Introduction

Lake Victoria is a common resource that belongs to all the people of East Africa. Involving the stakeholders in the management of Lake Victoria is a prerequisite to ensuring proper management of this natural resource. The Lake Victoria Fisheries Organisation (LVFO) is committed to collaborate and establish partnerships with the institutions, organisations, groups and individuals who are interested in maintaining the health of the lake ensure sustainable utilization of its resources and socio-economic development of the riparian people.

Background

Fisheries collaboration between Kenya, Uganda and Tanzania is considered perhaps the oldest in Africa. As early as 1928, it was recommended that a collaborative Lake Victoria authority for regulation and the collection of fisheries statistics be established. The East African Freshwater Fisheries Research Organisation (EAFFRO) was established in 1947, and further consolidated with the establishment of the East African Community in 1967. The East African Community was highly instrumental in facilitating the implementation of fisheries and conservation measures on Lake Victoria.

In early 1970 Kenya, Uganda and Tanzania became members of *FAO Committee for Inland Fisheries of Africa (CIFA)*, whose objectives were to:

- assist member countries to establish the scientific basis for regulatory and other management measures for the conservation and sustainability of inland fisheries resources,
- formulate such measures through subsidiary fisheries bodies or sub-committees as required, and
- to make appropriate recommendations for adoption and implementation by member states.

The collapse of the East Africa Community put an end to this formal mechanism of co-operation. Realising the need for continuing collaboration on Lake Victoria issues, a *CIFA Sub-Committee for Lake Victoria* was formed at the Fourth Session of the FAO Committee for Inland Fisheries in December 1980 at Blantyre, Malawi. This sub-Committee provided a forum for regional collaboration in fisheries research, development and management of Lake Victoria.

A number of seminars held in the region under the auspices of the FAO CIFA Sub-Committee on Lake Victoria between 1991 and 1995 led to a regional meeting that resulted in the creation of Lake Victoria Fisheries Commission. The draft convention establishing Lake Victoria Fisheries Commission was 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 Convention for the establishment of the LVFO was signed in June 1994 in Kisumu, Kenya by the Governments of Kenya, Uganda and Tanzania as the three Contracting Parties.

The First Council of Ministers responsible for fisheries development and management in Kenya, Uganda, and Tanzania was held on 19 December, 1996 in Kampala, Uganda. Among the activities it performed was to appoint the first Executive Secretary of LVFO who reported on duty I July 1997. After the recruitment of all the staff of the Secretariat, the Organisation embarked on the activities that would firmly establish it within the region.

What is LVFO?

Lake Victoria Fisheries Organisation is an independent inter-governmental body, established by a Convention signed on 30th June 1994, by the three East African Countries of the Republic of Kenya, Republic of Uganda and the United Republic of Tanzania as *contracting parties*, for the common management of Lake Victoria. The Organisation is a legal entity with powers to contract, acquire and dispose of property and to be a party to legal proceedings. The headquarters of the Permanent Secretariat is located at Jinja, Uganda.

Organisation Structure of LVFO

The organs of the Organisation are:

I. The Council of Ministers is the Supreme Body of the Organisation and is composed of the Ministers responsible for fisheries of the Contracting parties

II. The Policy Steering Committee is responsible for steering policy and is composed of Permanent Secretaries of Ministries responsible for fisheries of the Contracting Parties

III. The Executive Committee consists of six members who are heads of the departments responsible for fisheries management and the heads of fisheries research in each of the three Contracting Parties

IV. The Fisheries Management Committee, the Scientific Committee, the National Committees and such other Committee as may be established. The National Committees are to be headed by the Permanent Secretaries of the ministries responsible for fisheries in each of the member states. These committees are to serve as national consultation fora for Lake Victoria. Various stakeholders, for example, the riparian communities, regional projects, NGOs and CBOs, and other relevant ministries are to be represented in these committees

V. The Permanent Secretariat is comprised of the Executive Secretary, the Deputy Executive Secretary, Senior Scientist, Senior Economist, Administrative Officer in charge of administration and finance, Administrative Officer in charge of information and database, Internal Auditors (appointed on part-time basis) and the General Service staff

Objectives of LVFO

The objectives of LVFO are to:

Foster co-operation among the Contracting Parties, and especially to:

- Harmonise national measures for the sustainable utilisation of the living resources of the lake, and

- Develop and adopt conservation and management measures to assure the Lake's ecosystem health and sustainability of the living resources

Function and Responsibility of LVFO

In order to achieve the above objectives, LVFO has the function and responsibility to:

I. Promote the proper management and optimum utilisation of the fisheries and other resources of the lake;

II. 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 organizations as may be appropriate

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

IV. 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 nature, extent and pathways of its pollution and other forms of environmental degradation

V. Encourage, recommend, co-ordinate and, as appropriate, undertake training and extension activities in all aspects of fisheries

VI. 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

VII. 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

VIII. 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 Organisation's convention; and

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

Funding

The Lake Victoria Fisheries Organisation is 90% funded by the Global Environmental Facility (GEF) through the World Bank, and 10% by the three governments of Kenya, Uganda and Tanzania. This arrangement is for a period of five years up to June 2002, when the Riparian Governments will become fully responsible to finance the Organisation. The GEF is financing the formation and initial period of operation of the LVFO because it agrees with the need expressed by the Riparian Governments for an international body that would address the problems of the lake and its fishery after the Lake Victoria Environment Management Project (LVEMP) is finished.

The funding of the LVFO by the GEF has three objectives; Firstly, to enable the procurement of goods and works needed to physically establish the Organisation. Secondly, to provide initial support to the LVFO staff salaries and staff training. Finally, and most important, to support activities of the LVFO that have the objective of defining its present and future role in the lake resources management.

Therefore, it is important to think about the future financial and material sustainability of the Organisation for the period beyond 2002. One of the LVEMP components is the establishment of a Fish Levy Trust Fund. Its purpose is to provide sustainable funding for fisheries management, research extension and development. This fund will enable the national benefits from the lake to filter down to the grassroots fisher communities. The LVFO has a mandate to solicit for funds for its programmes at home, in the region and elsewhere through partnerships and other linkages. The Organisation focuses on this by initiating viable activities and programmes that will emphasise its role in the management of the lake resources and ensure its long-term self-sustainability. A strategic vision 1999-2015 was developed as a way forward to guide the LVFO in its future undertakings.

Achievements

The first regular session of the Council of Ministers, which was held in December 1996 in Kampala, inaugurated the LVFO and appointed the Executive Secretary. He reported for duty at the Secretariat in Jinja in July 1997. A fact finding mission was made to the Great Lakes of Canada and USA by the Executive Secretary and some members of the Executive Committee to learn how those lakes are managed. By the end of June 1998 all the senior personnel had reported and most junior posts also filled. With the staff in place, the LVFO held the first strategic planning workshop in July 1998. The participants were drawn from the Organisation's stakeholders, including representatives of fisherfolk, National Environment Management Authority (NEMA) and the East Africa Co-operation (EAC) and these were people with considerable knowledge on lake issues. The second workshop to finalise the strategic plan was held in March 1999 and the stakeholders adopted it as the operational document for the Organisation and is known as *the Strategic Vision for Lake Victoria*. This document will be signed in July 99 by the Ministers responsible for fisheries of the contracting parties.

Other activities undertaken included: the second session for the Council of Ministers and the first policy steering committee meeting, which were held in November 1998; the Executive Committee and Fisheries Management Committee meetings, which are held annually or as special sessions to address routine and emerging issues, such as the European Union ban on fish exports from East Africa. Recently, the Executive Committee and the Policy Steering Committee met between 22-25 March 1999 in Nairobi to come up with a policy and measures to deal with the issue of fish poison. The LVFO also participated in harmonisation meetings and workshops, e.g., on fisheries legislation, water hyacinth, vessel use, biodiversity and conservation, and socio-economics. In August 1998, the LVFO hosted a Technical Committee meeting for regional harmonisation of socio-economics projects on Lake Victoria.

Efforts have been made to establish partnership and collaboration both with national, regional and international agencies such as the East African Co-operation, the Great Lakes Commission of the United States and Canada, the fisherfolk organisations (namely, UFFCA), LVEMP, LVFRP, national universities, IDRC, UNEP, EU, IUCN, United Nations University (UNU/INWEH), SIDA, UNEP, CIDA and the University of Zurich. Memoranda of understanding have been signed with some of these organisations. The EAC is ratifying its treaty to include the LVFO in their protocol as its specialised agency on Lake Victoria matters. Partnerships are not limited to fisheries related organisations but are also extended to others dealing with other aspects of the lake.

Recognising the important role played by local communities in Lake Victoria management, the LVFO collaborates with fisherfolk organisations to mobilise the communities toward the conservation and sustainable utilization of the resource. The staff have visited some of the landing sites in Uganda to interact with the communities and establish working relationship. To this effect, LVFO welcomed the initiatives of IUCN-The World Conservation Union, Eastern Africa Regional Programme, to collaborate among others, on conservation and socio-economic aspects.

Acknowledging that fish do not exist in isolation, joint action plans have been made to address environmental issues such as pollution from point and non-point sources, water hyacinth and algal blooms on the Lake. The UNU/INWEH, Hamilton, Canada is a United Nations University campus focusing on water, environment and health issues. Its mission is to help developing countries build their capacity to achieve integrated watershed management and conservation. Through LVFO initiatives, it is setting up an Ecotoxicology Centre at Makerere University to establish a Monitoring and Evaluation Unit for the East Africa region. It is also assisting the Organisation to set up a regional database and has provided it with a page on its website. The University of Zurich, which has been collaborating with the Fisheries Research Institute, Jinja, which signed a Memorandum of Understanding with LVFO to extend its Ecotone-wetland programme to Kenya and Tanzania.

The way forward

The Strategic Vision for Lake Victoria was developed by the stakeholders through consultations and workshops. The LVFO aims to build a regional consensus on Lake Victoria through establishing partnerships, collaborations and linkages as a means of achieving the objectives stipulated in the Convention. The LVFO considered it a priority to have a plan that will guide its course of action.

The Strategic Vision aims to assure a healthy Lake Victoria ecosystem, sustainable utilisation of its fisheries and other resources as well as socio-economic development of the riparian communities for the benefit of the present and future generations. In order to achieve this vision, the LVFO has five specific goals which are interlinked and have equal priority:

- *A healthy Lake Victoria ecosystem*, whose focus is to restore and maintain the natural condition of the lake including its plants and animals in relation to their environment

- *Integrated fisheries management* aims at implementing a holistic multidisciplinary and intersectoral approach to the management of the fisheries resources, taking into account the factors that are generated and those imposed on the sector

- *Co-ordinated research* focuses on laying a scientific basis for integrated management of the lake by implementing co-ordinated research activities among the Contracting Parties

- *Information generation, flow and dissemination* aims at establishing common data standards; shared databases; and also co-ordinated/joint data collection and analysis to foster effective and efficient information generation, flow and exchange for Lake Victoria

- *Institutional/stakeholder partnership* focuses on building a regional consensus on matters of Lake Victoria, through establishing partnerships, collaborations and linkages with the communities, institutions, organisations, groups or individuals of the member countries and others genuinely interested in the lake and its environment

The LVFO concretises its interaction with the various groupings by establishing friendly relationships, memorandums of understanding and other mutual arrangements with the stakeholders and other interested groupings. Memoranda of understanding have been signed with the Great Lakes Commission of the United States and Canada, the United Nations University (UNU/INWEH) in Canada, the East African Regional Office of the World Conservation Union (IUCN-EARO), the University of Zurich and IDRC among others. The LVFO's major wish is to have a memorandum of understanding with all the communities of Lake Victoria, as the major stakeholders. While their activities impact directly on the lake, their livelihood also highly depends on it. The Organisation considers involving communities in the lake management as a very crucial element to effectively address the issues in the lake basin. Representative of the communities will be nominated to the National Consultative Committees for the lake which will be formed in each member state and launched this year. These will serve as fora for consultation, co-ordination, and information on activities concerning Lake Victoria.

The Convention stipulates that each National Consultative Committee shall be composed of, but not limited to, representatives from:

- the departments or various institutions responsible for fisheries, scientific research, environment, agriculture, forestry, water quality, planning, industry, development, tourism and finance;

- representatives of the private sector whose activities have an impact upon, or derive benefit from, Lake Victoria ecological systems.

Linkages between the LVFO and other organisations on the lake

The government agencies and programmes, such as, the fisheries departments and research institutions, other relevant institutions and ministries, as well as regional projects such as the LVEMP and the Lake Victoria Fisheries Research Project (LVFRP) are instrumental in supporting the establishment of the LVFO.

1. The LVEMP and the LVFO are linked in a number of ways, such as:

    - The LVFO is a permanent mechanism established by the governments of Kenya, Uganda and Tanzania to facilitate collaboration amongst these countries in matters concerning the lake, its fisheries and other resources. The LVEMP is a five year regional project conceived by governments of the three riparian countries (Kenya, Uganda and Tanzania) for rational and sustainable utilisation of the lake. Both are partially funded by the World Bank/GEF

    - The Convention for the establishment of the LVFO was signed in August 1994, whereas the LVEMP agreement was signed in August 1994, the condition to the LVEMP agreement was that the project should not start before the LVFO was in place

    - Funding to the LVFO from the World Bank is channelled through the LVEMP national secretariat in Uganda, where the LVFO Permanent Secretariat is situated at Jinja

    - The establishment of the LVFO is a major activity of the LVEMP to prepare the Organisation to take over the co-ordination of the lake activities, particularly, when the project is completed.

2. The LVFRP, which is funded by the European Union, started in 1989 with the objective of rehabilitating the existing research vessels in Kenya and Uganda and to construct a new one in Tanzania. The other objective is to harmonise fisheries data collection and analysis and strengthen the research infrastructure. The project is in its second phase and is currently carrying out stock assessment activities on the lake. It also carried out socio-economic studies in order to come up with a co-management or common property management plan for Lake Victoria. The LVFRP assistance to the establishment of LVFO includes setting up a regional database and information network, and the publication of the African Journal of Hydrobiology and Fisheries.

Both these projects support the establishment of the LVFO, principally as a co-ordinating body; and secondly as a permanent mechanism that will ensure sustainability of their activities.

Other Initiatives

There are a number of local, national, and regional interventions on the lake initiated by governments, NGOs and CBOs. Many of these benefit from donor assistance in one form or another. Most are initiated to address specific issues and they have specified lifespans, which may be extended through negotiations.

The NGO initiatives include the Lake Victoria Ecological Society based in Mwanza, which focuses on environmental management of the lake, the East African Communities' Organisation for management of Lake Victoria Resources (ECOVIC), which is an umbrella body for the non-government and the community based organisations in the Lake Victoria basin. There is also the African Urban Authorities of Lake Victoria whose preoccupation is to ensure a healthy lake through the institution and implementation of regional measures to control municipal (industrial and household) pollution, among others.

The CBOs include OSIENALA (Kenya), whose concern is to enhance the Lake Victoria environment and protect its catchment area, the Uganda Fisheries and Fish Conservation Association (UFFCA) whose purpose is to be a voice for the artisanal fisherfolk, and the Tanzania Association of Fisheries and Lake Victoria Environment Conservation (TAFLEC).

The LVFO recognises that isolated approaches designed by individuals, groups, institutions, organisations or member states cannot adequately address the problems on the lake. It is through concerted efforts of all stakeholders, through programmes and activities designed in a comprehensive manner, that the lake issues could effectively be addressed. The LVFO is a co-ordinating and collaborative mechanism for the programmes in the Lake Victoria basin, and in particular those whose activities have a regional bearing/impact even if they are implemented nationally or locally.

The LVFO is negotiating with IUCN-EARO to have the Nile Perch Project, which is being implemented with the Kenya Marine and Fisheries Research Institute, Kisumu, Kenya, extended to Uganda and Tanzania. Similarly, the Organisation is negotiating with the University of Zurich to extend the SWISS Ecotone Project on the Jinja Wetlands, which they implement jointly with Fisheries Research Institute in Uganda, to Kenya and Tanzania. The LVFO has the responsibility of co-ordinating the activities that are implemented in the lake basis, which affect the lake's ecosystem and catchment area, the sustainability of its resources, and the socio-economic development of the riparian population.

Relationship between the LVFO and the media

One of the major objectives of the information generation, flow and dissemination goal of the Strategic Vision is to promote and publicise the LVFO in its activities among the stakeholders, general public and international community as the permanent mechanism for the management of Lake Victoria, its fisheries and other resources.

The interaction between the LVFO and the media is a reciprocated relationship. The media benefits include:

- The LVFO provides information and news to the media houses which can be used in their reporting to serve their clientele, thus contributing to their staying in business
- It increases their leadership/viewers by including those people who the LVFO specifically targets, who may not be their usual audience
- The LVFO may sponsor programmes and feature articles or advertise in their print or electronic media channels
- It enhances the employment of the individual media people who source information from the organisation
- The media people may participate in the LVFO workshops, training, seminars and conferences at the local, national and regional levels.

The benefits from the media for LVFO include:

- Disseminating information to the target groups and the general public; provision of space in their newspapers, magazines, radio and television programmes
- Promoting and publicising the LVFO activities through factual (accurate) reporting
- Reaching and getting to be known to wider audience in a shorter time than through the use of the other contact approaches.

Conclusion

The LVFO is grateful to the IUCN-EARO for inviting it to attend this workshop on "Accurate Reporting of the Real Issues of the Lake Victoria Management". This has enabled the Organisation to link with the media at a forum where ideas are mutually exchanged to the benefit of both parties. We hope that this is going to be the beginning of a long and fruitful relationship between the media and LVFO and its constituency.

Questions/Discussions

Q. What activities, other than monitoring fish poisoning, are you (LVFO) involved in?

A. The monitoring of fish poisoning is not a key area for LVFO, but came as an emergency issue. It fell under illegal fishing methods, and has implication at a national level and global level and therefore had to be dealt with immediately.

Q. Is there any mechanism which harmonises legislation on fisheries in the three countries?
A. Under the second objective, LVFO aims to harmonise national legislation, and this includes measures such as harmonising the mesh sizes for the Nile perch in the three countries, among others.

Q. If a management plan is developed for Lake Victoria, who would be the management authority.
A. LVFO's role is to coordinate. We are working within the limits of the national governments. Where does LVFO get its power, from the stakeholders. There is a plan to develop a Management plan in the future, however, I cannot commit myself to answering that question.

There then followed a general discussion about environmental journalism, whereby interventions were invited from the journalists. Below are some of the comments:

- Should the media managers be involved in meetings like this one?
- Is it true that the editors stop the stories or are biased against environmental stories?
- Environmental reports never get to the front or back pages, this is reserved for the hard news.
- Environmental reports usually appear as features and are to be found in the inside pages on particular days.

The African Centre for Communication and Education has held three workshops for journalists. When listing their constraints, journalists listed as their top problem, the fact that they research a story well, but when it gets to the paper, what the writer thought was important is not what the editor thinks is important, and so some portions are removed. One way of dealing with this is for journalists to make sure that their key conclusions are not always at the end, so that if some information does get cut off, the message is still reported clearly.

In Kenya the three daily papers are reporting specifically on the environment, but is that enough?

In Mwanza, Tanzania, environmental stories are being aired frequently as DANIDA has paid for airtime on the radio for that purpose

In Uganda, there are regular features on the environment by an environmental journalist, Ndyakiira Amooti. In addition, Uganda Wildlife Society, a local NGO, has gone into agreement with the 'New Vision', a national newspaper to include its newsletter 'Nature Watch' in its newspaper. Partnerships between private sector, like the 'Nature Watch' and the 'New Vision' should be encouraged.

It was observed that while there are business journals, tourism journals, financial journals, etc., there is no environmental journal, and it was suggested that perhaps journalists should look at working on that.

It is also possible to extend this to the electronic media, where short, thirty second updates, can be produced.

Shortness of material for radio broadcasts e.g for the vernacular service in Kisumu is a constraint.

There is a need to liaise with the research institutions for material. Their writing however, tends to be more scientific.

4. CHANGES IN FISH FAUNA OF LAKE VICTORIA BASIN IN THE LAST THREE DECADES: IMPLICATIONS FOR FISHERIES MANAGEMENT

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Introduction

The fishery of Lake Victoria in the 1920s was dominated by the Haplochromine cichlids and endemic tilapia species, in addition to other commercially significant species such as the lungfish, catfishes and several cyprinids. Lake Victoria, therefore, used to support a very rich, endemic and indigenous fishery. Out of the 300+ species which used to exist in the lake, many are threatened, some are very rare and others are thought to be extinct. The species makeup of the commercial species of Lake Victoria from 1976 to 1992 show a steady increase in exotic species against the other (indigenous) species, which have declined in catch from 63% to about 2% of the total weight in the same period. There were only two endemic tilapiine cichlids in Lake Victoria but four more were introduced between 1951 and 1953 (Barel *et al.*, 1985; Hecky, 1984; Hughes, 1986; Ogutu-Ohwayo, 1990a; 1990b). Out of the introduced tilapiines, *Oreochromis niloticus* has featured prominently in the commercial catches (Asila & Ogari, 1988; Rabuor, 1988).

The catchment area of Lake Victoria (Kenya side) consists of highly developed monoculture agriculture for coffee, tea and sugar. It is estimated that 32% of the land in this area is under agriculture and 62% is under natural vegetation (Jaetzold and Schmidt, 1982). The high yielding varieties of these crops require high inputs of inorganic fertilizers. Some of these fertilizers are washed into the lake which results into eutrophication with adverse effects on the aquatic environment (Kilham & Kilham, 1990; Ochumba & Kibaara, 1989; Talling, 1966;1969;).

A more serious threat comes from agricultural development, through the rampant use of insecticides, fungicides and pesticides. Among these agricultural chemicals, *Captan* and *Fenvalerate* are known to be highly toxic to fish and crustacea (Akech *et al.*, 1992).

Apart from intensive agriculture, there are also well-developed industrial installations for processing various agricultural products. Some of these industries and factories include paper mills, breweries, coffee processing, sugar refineries and agro-chemicals.

There are additional inputs of nutrients from the numerous urban centres in the region. A majority of the inputs come from sewage discharges but there are also discharges from pit latrines, septic tanks and open drainages. Depending on the urban population, the daily leachate BOD_5 works out to 1.7 tones per day from refuse/solid waste in Kisumu town alone according to Akech *et al.* (1992). The table below gives typical refuse/solid waste estimates for Kisumu Municipality:

Table 1: Estimated typical refuse/solid waste generation and discharge from Kisumu Municipality

Population		185,000	
Population connected to sewer		1/3 -	61,667
Population with septic tanks		1/3 -	61,667
Population with pit latrines		1/3 -	61,666
Solid waste generation rate		-	0.4 kg/capita/day
Waste generated	185,000 x 0.4	-	74,000 kg/day
		-	74 tonnes
Average leachate daily BOD_5		-	9.5 g/capita
Daily leachate BOD_5 from refuse/solid waste 185,000 x 9.5		-	1,757,500 g/day
		-	1.7 tonnes/day

Source: Akech *et al.* (1992)

Impact of Actvities in the Catchment Area

Some of the changes which have occurred as a result of activities in the catchment area, include the primary productivity of the lake which has increased by a factor of two over the last 30 years, increased nutrient loads from various sources, almost predictable biannual algal blooms dominated by the blue green algae (Ochumba & Kibaara, 1989) and the recent invasion of the lake by water hyacinth (*Eichornia crassipes*)

Changes in chemical characteristics

The chemical characteristics of Lake Victoria in 1950 showed that the conductivity was between 95-98 $\mu S\ cm^{-1}$ while the pH ranged between 8.2 and 9.0. Phosphates and nitrates were below 21 and 11 $\mu g\ l^{-1}$ respectively (Kendall, 1969). The chemical characteristics of Lake Victoria have changed in the recent past partly as a result of pollution, which is also probably responsible for other ecological changes being observed. The conductivity in the lake has increased and varies from 132 to 140 $\mu S\ cm^{-1}$ while the pH now range from 5 to 8 indicating an increased ionic concentration and acidification (Ochumba & Kibaara, 1989).

Changes in algal composition (Phytoplankton)

An examination of the diatom record of Lake Victoria in the last 17000 years outlines the historical abundance of phytoplankton in the lake (Kendall, 1969; Stager, 1982). The most significant group in this respect is the diatoms, which can show very drastic shifts in abundance due to changes in water quality. The diatoms were very rare between 14,070 BP to 13,050 BP. However at about 12,730 BP, the diatoms were slightly more abundant and diverse. This group of diatoms resembled those of Lake Tanganyika more than Lake Victoria, Lake Tanganyika being more saline than Lake Victoria at this time. These shifts in diatom abundance are thought to be linked more closely with changes in pH. The pH is thought to have been 9 to 9.5 in the lake. The implication of these changes also suggests that Lake Victoria changed from a closed to an open system about 10,000 BP.

The phytoplankton of Lake Victoria is presently dominated by the blue green algae, which form very widespread blooms in the lake during the rainy seasons (Ochumba & Kibaara, 1989). The implication of these changes in dominance is associated with increased nutrient levels in the lake (eutrophication), pollution from agricultural, municipal and industrial effluents.

Changes in species diversity

It is believed by the scientific community that fish stocks of Lake Victoria consisted of 500+ species (HEST, 1996). The changes, which have taken place in the basin, are thought to be partly responsible for the disappearance of some of these species. Predation by the Nile perch and the use of wrong fishing gears and methods are also thought to have contributed to the dramatic loss of fish biodiversity in Lake Victoria (Ochumba and Manyala, 1992).

The most affected group of fishes are the haplochromine cichlids which includes 316 known species and 28 new species making a total of 342 species (Kaufman, 1992; 1996; Kaufman and Ochumba, 1993). Out of this number, only 56 species have been found in the recent past in Lake Victoria and Lake Nabugabo (Table 2). The reasons for the absence of the other 282 species seem to be changes in the environment. In Tanzania, 412+ species of haplochromine cichlids have been collected in the past but only 226 of these have been described before (HEST, 1996).

Out of the species of haplochromine cichlids, which existed in Lake Victoria before the Nile perch invasion, 200 of them are thought to be extinct. However, new *species are still frequently encountered in Lake Victoria* such as the new species of haplochromis which was named in honor of the first president of Tanzania Mwalimu Julius Nyerere (*Haplochromis nyererei*) (Seehausen, 1997).

An alternative indication of changes in species diversity is through the use of trophic groups. Table 2 shows the distribution of haplochromine species among the trophic groups based on a study by Kaufman and Ochumba (1993). The authors conducted a preliminary biotic inventory utilising trophic groups in concert with studies of the lakes physical dynamics. The results reported offer "guidance for the conservation of indigenous species and ideas about how processes that regulate biodiversity might also be safeguarded." (Kaufman and Ochumna, 1993.

Table 2: Distribution of species richness by trophic groups and completeness of taxonomic comprehension for Lake Victoria haplochromines (Including Nabugabo (Uganda) and Lake Kanyaboli (Kenya) from Kaufman and Ochumba (1993).

Trophic Group	Known	Described	Undescribed	Found	New	Total
Detritovores/Phyto.	14	3	11	0	0	14
Phytoplanktivores	3	0	3	0	0	3
Epilithic Grazers	3	1	3	6	2	5
Epiphytic Grazers	12	5	7	3	2	14
Plant Eaters	2	2	0	2	0	2
PM Crushers	15	8	7	4	1	16
Oral shellers	14	8	6	9	6	20
Zooplanktivores	21	8	13	6	4	25
Insectivores	29	18	11	22	11	41
Prawn Eaters	13	11	2	0	0	13
Crab Eaters	1	0	1	0	0	1
Piscivores	109	42	67	9	5	114
Paedophages	24	8	16	1	0	24
Scale Eaters	1	1	0	0	0	1
Parasite Eaters	2	2	0	0	0	2
Others	53	6	47	0	1	54
TOTAL	316	123	194	62	31	349

Several small water bodies in the basin are thought to be *refugia* for some of the species, which can no longer be found in Lake Victoria. These small water bodies were stocked by the Department of Fisheries in the 1960s for various reasons including:

i) Sports fishery
ii) Encouraging inland people to eat fish
iii) Controlling of bilharzia snails and other disease vectors.

The catchment area also has several rivers which used to provide a rich fishery and livelihood to local communities. The riverine fishery has totally collapsed due to poor fish management. The riverine fisheries depend on some species migrating upstream to breed. Logically, the fish would be caught on their way back to the lake after they have bred. However, this was not the case and the riverine fishes were caught on their way upstream when still ripe and laden with eggs. There was no progeny and presently, there are a few remnant populations, which are incapable of supporting enough biomass for a commercially viable fishery.

Figure 2 shows some of the areas where some endemic fish species can still be found (Manyala, *unpublished*). Out of these *refugia* areas, Lake Kanyaboli which is situated in the North Western side of the Nyanza Gulf is considered to be one of the most important water bodies in the region in terms of fisheries conservation. This lake harbours reasonable quantities of the endemic cichlid *Oreochromis esculentus* (Maithya, 1998) and other haplochromine cichlids which have disappeared from Lake Victoria.

A preliminary survey of the southern zone of Lake Victoria revealed that remnant populations of *Oreochromis esculentus*, which has hitherto disappeared in many parts of Lake Victoria can still be found in some rivers and dams like lower Kuja River and the Gogo Reservoir (used for generation of electricity). The reservoir is heavily infested by crocodiles and hippos and this has probably contributed to the survival of this species in the reservoir.

LAKE KANYABOLI

Lake Kanyaboli and its environs

Lake Kanyaboli, with an area just over 10km^2 lies on the north eastern edge of Yala Swamp and was connected to the Yala River (Fig. 2) It is regarded as an important "satellite lake" of Lake Victoria and supports some rich species that are thought to be extinct in the main lake. Lake Kanyaboli is surrounded by a very rich wetland plant diversity. The swamp is inhabited by many types of birds of which the most common are: squacco heron, purple heron, white necked cormorant, egret, crested eagle, fish eagle, harrier hawk, grey headed kingfisher, swamp gonolek, black gonolek and crested crane. Many of these birds, like the gonolek and crested cranes are thought to breed in the swamp.

The common animals in the periphery of the swamp include waterbuck, bushbuck, sitatunga, reed buck, warthog and vervet monkey. Other wildlife animals found within the swamp are: crocodiles, hippos, hyenas, wild pigs, leopards, baboons, jackals, gazelles, impala, and porcupine.

Fisheries of Lake Kanyaboli

Despite the fact that Lake Kanyaboli is considered a "living museum", it has also experienced its own problems. Many indigenous fishing methods used in the past in Lake Kanyaboli have broken down or have been abandoned in favour of the more intensive and efficient techniques.

The major portion of the lake's catches were dominated by *Oreochromis esculentus*. Other species which were also common in the catches include several haplochromine cichlids which are no longer found in Lake Victoria. The foods eaten by *Oreochromis esculentus* consist mainly of phytoplankton. About 15 species occur regularly in the diet of the fish. The most preferred species are the diatoms and the green algae. The blue green algae are not utilized effectively by the different fish species.

From the above observations, it would seem that the diatoms formed an important component of the diet of *O. esculentus*, despite the fact that the densities of the same species are the water column. This suggests a positive selectivity and preference for diatoms as food and not the abundant blue green algae (Manyala *et al.*, 1998)

Table 3: Species occurrence in major water bodies in the southern zone of the Winam Gulf of Lake Victoria (Kenya) (+ indicates present, blank indicates absent).

Species	Sondu-Miriu below falls	Sondu-Miriu above falls	Kuja-Migori (Gogo reservoir)	Oluch River	Omboga dam	Oyombe dam	Kosiga dam	Silanga dam	Ndogna dam	Motcomdam (Ahero)	Rice paddies Ahero)	
O - O. niloticus	+		+	+	+	+		+	+	+		
O - O. variabilis		+		+	+		+	+	+		+	
O - O. leucostictus			+	+	+	+	+			+		+
T - T. zillii			+	+	+			+	+	+		
S - S. mystus		+		+	+							
St - S. victoriae		+		+	+							
St - S. afrofischeri		+		+	+							
B - B. altianalis	+	+	+	+			+	+	+			
BR - B. jacksonii	+	+	+	+		+						
BA - B. kerstenii		+	+	+	+							
LA- L. victorianus		+	+	+	+		+	+				
L- L..niloticus	+											
Br. sadleri	+	+										
M - M. grahami	+			+								
G -G. longibarbis		+			+							
PE -P. catostoma	+			+								
MO-M.kannume	+		+	+								
C - C. muriei		+										
CL -C. gariepinus	+	+	+	+	+	+	+	+		+	+	
MI-M. salmoides	+	+										
B - B. docmac		+	+									
P - P. aethiopicus		+							+			
Haplochromis spp.			+									
MA -M. frenatus	+											
B - A. edwardi	+											
AS- Astatereochromis			+									
X - Xenoclarias	+											
O -O. esculentus			+?									

KEY

O; Oreochromis
T; Tilapia
S; Schilbe
ST; Synodontis
B; Bagrus
BR; Brycinus
BA: Barbus
LA; Labeo
L; Lates
M: Marcusenius
G; Gnathonemus
PE; Petrocephalus
MO; Mormyrus
MI; Micropterus
P; Protopterus
AS: Astatoreochromis (Alluaudi)
MA: Mastacembelus
C: Ctenopoma
CL: Clarius
X:Xenoclarius

DISCUSSION

There is evidence that limnological processes of Lake Victoria have changed due to activities in the catchment area over the period of the transformation in the fishery. Current studies have identified substantial increases in chlorophyll concentration and primary production, as well as drastic changes in phytoplankton communities in both Lakes Victoria and Kanyaboli. There has also been a shift in the phytoplankton community towards dominance by blue green algae and an obvious decline in the pH of both lakes. The diatoms which used to form a significant component in the diet of *Oreochromis esculentus* are no longer abundant in Lake Victoria, but can still be found in Lake Kanyaboli in reasonable quantities. These plankton depend on silica for their growth and reproduction. There is indication that silica is not available in Lake Victoria in the quantities required to sustain diatoms growth.

Anoxic water has recently been found at shallower depths than previously reported in Lake Victoria suggesting a significant increase of the oxygen demand. Periodic fish kills and algal blooms further raise concern about the environment of Lake Victoria. These discoveries have major implications for fisheries management, biodiversity, conservation and human health.

These numerous ecological changes have prompted fish stock assessment in Lake Victoria from time to time using bottom trawls, catch assessment surveys on artisanal fishery and size-frequency analysis. It has been established that the fish stocks have changed drastically over time in species composition with marked decline in some endemic cichlids, especially the haplochromine species. The decline has been attributed to predation by Nile perch (Ogutu-Ohwayo, 1990a; 1990b), overfishing by destructive fishing methods (Whitehead, 1958; 1959), habitat degradation and pollution (Ochumba, 1984; Ochumba & Kibaara, 1989).

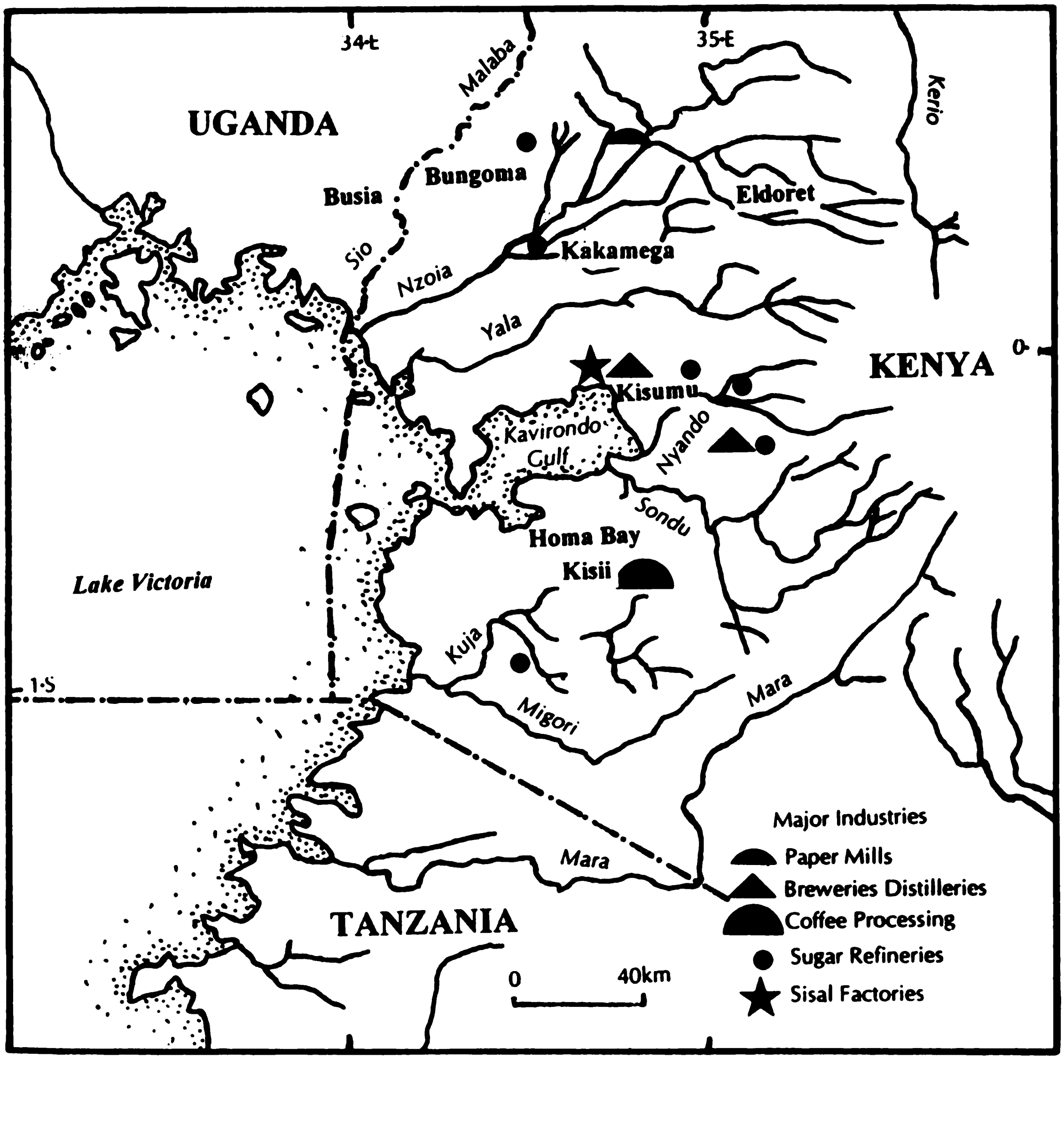
The number of fish species reported for Lake Victoria is about twice the number of all freshwater fish species of Europe (HEST, 1996). This level of fish diversity is important for several reasons including ecological balance, aesthetic values and academic purposes. Many of these haplochromine cichlids are brightly coloured and are popular aquarium fish. Many of these fishes have therefore found their way to America, Europe, Asia and many other regions of the world from trade in tropical aqaurium fish.

Separating the haplochromine cichlids into trophic groups has been useful in describing the use of resources in the environment by these fishes. The haplochromines were able to utilize all food resources available in Lake Victoria in the past but each group has a limited number of food categories. Before the upsurge of Nile perch in Lake Victoria, the endemic haplochromine cichlids surpassed in species, numbers, biomass and ecological diversity of all the families represented in Lake Victoria.

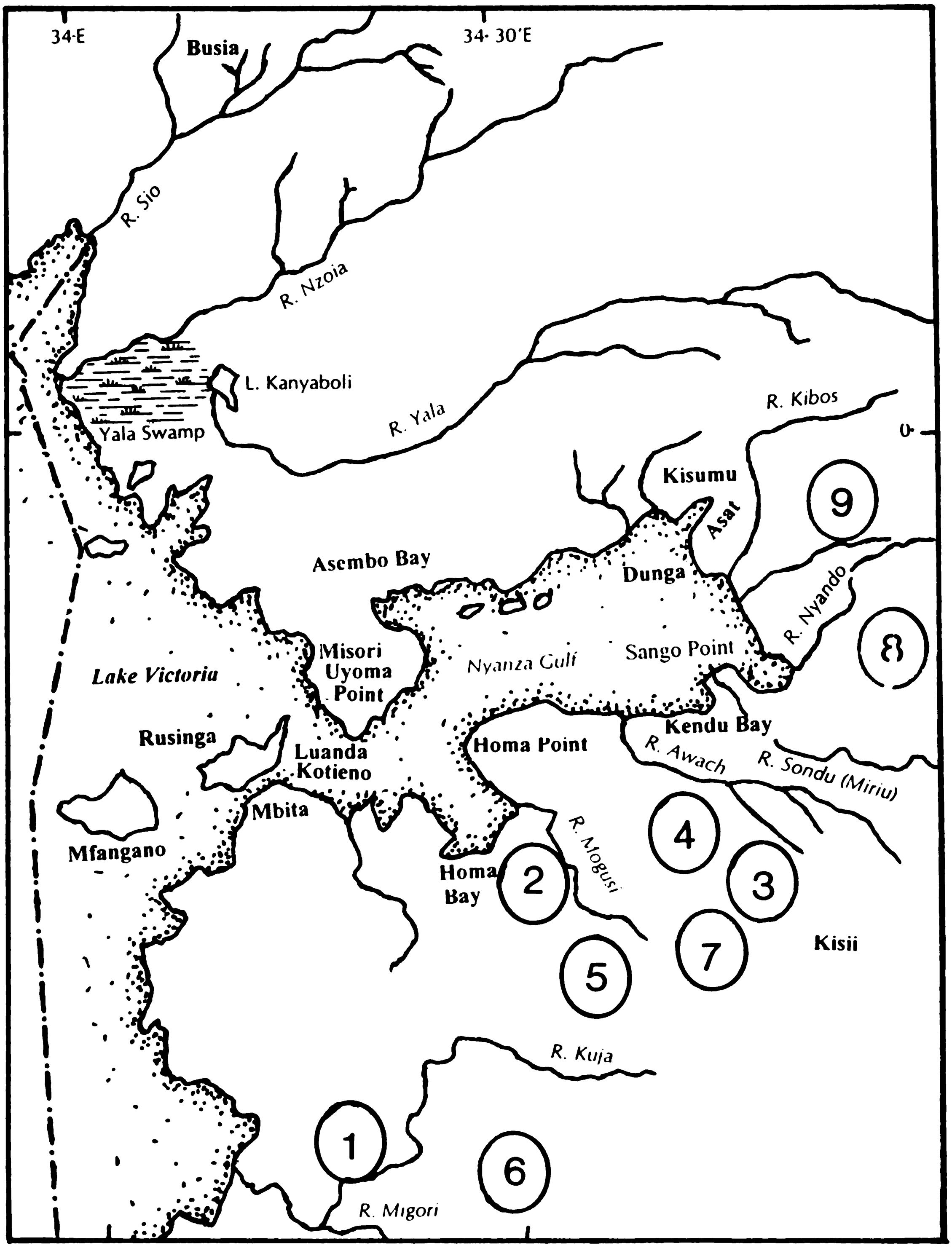
Whereas it is difficult to find evidence of the effect of Nile perch on fish biodiversity in Lake Victoria, a few observations indicate that there is still loss of fish biodiversity in the deep waters where there is no artisanal and trawl fishery. The loss of fish diversity in these areas can therefore only be attributed to Nile perch. In heavily fished areas of Lake Victoria, vulnerability to intensive artisanal and industrial fishing is probably responsible for decimating this group of fishes. Due to intensive fishing, predation pressure and alteration in the environment, the haplochromine cichlids have exhibited a declining body size in Lake Victoria, typical of predator-prey interactions.

The management of water quality in Lake Victoria poses complex socio-economic, industrial, legal, ecological and institutional questions:

1. What are the safe levels of nutrient (phosphate, silicon and nitrate) that can be assimilated by the lake to support a viable fishery ?
2. What levels of water quality will users accept in the lake ?
3. Will people grow accustomed to occasional algal blooms, fish deaths, waterborne diseases and aquatic weed growth ?
4. How much is the society willing to pay to control wastes and enhance the fishery, given the uncertainty of their impact on water quality environment ?



Map 1: Map of Lake Victoria showing the location of major agro-based industries



Map 2: Map of Kenyan portion of Lake Victoria showing the drainage position of the Sondu-Miriu River. Other sampling points are: 1. Kuja-Migori 2. Oluch 3. Omboga 4. Oyombe 5. Kosiga 6. Silanga 7. Ndonga 8. Motcom (Ahero) 9. Rice Paddies (Ahero)

Comments, Questions & Answers.

There has been no way of predicting the impact of water hyacinth on fish diversity. The narrow fringes have been good for fish diversity, and indeed all biodiversity. They encourage diversity (refuges, food sources, it is also a refuge, epecially for the smaller fish, and there has been an increase in population in this vicinity.

In Sudan, the diversity of invertebrates has been recorded as higher where there is water hyacinth compared to where it is absent.

In the early 1950s there were few tea and coffee estates in the catchment area. Since then, there has been an increase in demand and therefore in the production. However, people in the highlands do not always realise the impact of their activities on the lake. If they did – perhaps, they would be careful about reducing the pollution. Most pollution is from the Kenyan side. Factories involved in the pollution are beyond the fisheries sector, and there is the need therefore for other departments to be involved for effective control of pollution.

Q. Are there more spieces of cichlids in the L.Victoria than there used to be, or less ?

A. Less. Fishing practices, i.e fish are caught on their way upstream (demand for eggs) - thus contributing to their decline

Q. Are species of Barbus, migratory (anadromous) will they become extinct due to fishing practices ?

A.. However - the naming of fish spp. Is a difficult process, that is still being developed. Therefore, the increase in spp. Indicated does not mean that the number of spp. has increased, only the science has developed. Also, areas compared did not take the differences in impact into consideration

Q. To what extent are you involved with the other departments (eg. Kenya Bureau of Standards (KBS) - to provide required information.

A. Those involved in fish quality are working with the KBS, developing a standard for quality control.

Q. According to Bwathondi (TZ), serious survey on fish stocks that would provide quantitative information on the stocks have never been conducted, at least in the recent past. Why is this?

A. The last stock survey was carried out in the late 60s, early 70s. However, this is a very difficult undertaking. Currently, a comprehensive survey on the stocks is being carried out. It has taken this long, due to the expenses involved and the equipment required. Through the EU project - a regional survey has been carried out, and hopefully within a year or two, the results will provide information. However, with respect to diversity - this will not be sufficient, due to differing shoreline habitats that require more than the stock assessment. Fortunately, LVEMP has a component that focuses on fish biodiversity. However, there are other aspects of research that have been going on like the relationships of the Nile perch and other species, competitive advantages of some species over the others, etc.

Q. What is available now in terms of funding, and what would your requirement be to do a serious job?

A. Funding is available from LVEMP, LVFRP. Vessels for carrying out research are also available, however the equipment is still lacking.

Q. Is the diversity of small fish an indication of other biodiversity in the lake ?

A. Yes; eg. Tilapia esculentus that is now extinct used to feed on diatoms, but diatoms declined. Coupled with bad fishing methods - possibly affected it. But it is the food, and other biodiversity that is reflected in the diets of the fish species. Both water sampling and gut sampling are required to get a good idea.

Q. What happened to the diatoms ?

A. They were affected by the silica content of the water.

Comment: There are bays where the hyacinth collapsed. Research is being carried out to see what this means. Huge increase in life forms - invertebrates, fish species have been reported.

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5. LAKE VICTORIA ENVIRONMENT MANAGEMENT PROJECT: WETLAND MANAGEMENT COMPONENT

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Introduction

Wetlands in Uganda are known as swamps. According to local definition, a wetland is a vegetated area of land that is flooded either permanently or seasonally. Its wetness attracts specific plants and animals, and creates a unique ecosystem. Wetlands in Uganda include swamp forests, papyrus and grass swamps, upland bogs, shallow lakes and rivers. Wetlands cover about 13% of Uganda's land surface area. They have traditionally played an important role in rural communities through the provision of fish, water, and other materials for humans and livestock. Wetlands also play an important role in the regulation of the flow and purification of water as well as serving as refuge for many wildlife species.

Wetlands are recognized for playing an important role in buffering inputs from the basin catchment into lakes. The shoreline of Lake Victoria is extensively indented and covered with wetlands, which play an important role in the functioning of the lake. However, the extent to which they are able to perform this function is not fully understood and appreciated. It is therefore necessary to realise that the increase of nutrient loading effects caused by the activities of the increased human population i.e. agriculture and urbanization, are reduced due to the presence of wetlands that are shielding and protecting the environment of the lake. Natural wetlands are generally believed to provide "lake-friendly buffering" functions which is commonly referred to as the "filtering process of wetlands". Hence, the management of the catchment basin and its wetlands is important to maximize the long-term buffering/filtering functions.

The Lake Victoria Environmental Management Project (LVEMP) is supporting a component to investigate the buffering capacity of wetlands and assess their contribution to the overall conservation and sustainable utilisation of the Lake Victoria basin resources. This presentation outlines the progress since the inception of the project in 1997, and the achievements to date. The overall goal of the component which falls within the larger context of the LVEMP is:

to ensure provision of a balanced and adequate food supply, clean water, employment to the riparian communities through rational and sustainable utilisation of the resources of Lake Victoria.

Government Policy and legislation

Wetlands are governed by the National Wetlands Policy whose goal is to sustain the biophysical and socio-economic values of wetlands for present and future generations. One of the approaches to attaining this, is promoting the efficient use of wetlands as a natural resource, with the general aim of enhancing their overall economic production and maintaining their biodiversity and functions. It is therefore essential to understand the processes through which the wetlands perform their functions and consider the sustainability of the use of these resources so as to provide sustainable benefits to local communities while ensuring that the overall function of the wetlands are maintained.

In addition, wetlands are also protected under the following laws: the National Environment Statute (1995), which provides a frame work for the protection and regulation of wetland resource use, the Land Act (1998) which defines ownership and the Uganda Constitution (1995). The Local Government Act (1997) decentralises the management of wetlands to Districts. The National Wetlands Programme, which is the lead agency for the management of wetlands in Uganda, is executing the wetland component of LVEMP. This means that the wetland component works in close collaboration with districts and all the relevant authorities in developing management guidelines for wetlands in Uganda.

Progress of Project Implementation

The LVEMP wetland component consists of two sub components; Buffering Capacity Sub-Component and the Sustainable use of wetland resources pilot project.

Buffering capacity of Lake Victoria basin wetlands

The general objective of this component is to investigate the buffering processes and capacity of Lake Victoria wetlands and to devise management strategies to maintain long-term environmental protection of Lake Victoria.

The specific objectives:

- to undertake a rapid assessment of wetlands of the Lake Victoria basin leading to an inventory of the wetlands and assessment of their buffering capacities;

- to carry out an economic evaluation of buffering services provided to Lake Victoria by wetlands;

- to identify and quantify the nature and magnitude of threats to wetlands and propose mitigation measures;

- to formulate guidelines for wastewater management.

Sustainable Utilisation and Management of Wetland products

The second sub component, the Sustainable use of Wetland Products is a pilot project which is seeking to :

- determine the economic potential of L. Victoria basin wetland products and develop management strategies for their sustainable utilisation;
- demonstrate wise use of wetland resources within the lake basin;
- quantify the economic benefits from wetland products;
- develop management strategies for their sustainable utilisation;
- initiate pilot activities to demonstrate wise use of wetlands in the lake basin;
- train communities in wetland wise use practices.

Planned activities for Buffering Capacity

The activities, which were originally planned, included:

- rapid quantitative categorisation of individual Lake Victoria basin wetlands;
- regional conference to review knowledge on buffering processes of wetland systems;
- national technical workshops to discuss methodologies and prepare action plans for quantification of the buffering processes;
- stakeholder seminar to raise awareness on the value of wetlands and to mobilise local communities;
- simulation of current inputs(loads and seasonality) into individual wetland systems;
- an intensive 1 year field based programme of monitoring loads into priority wetlands;
- comparison of buffering capacity of individual wetland systems and prioritization ranking of lake basin wetlands in the provision of buffering services to Lake Victoria;
- within the priority wetlands implementation of scientific process-based quantitative assessment programme of buffering function of natural wetlands on quantity, quality and sedimentation loads into lake Victoria;
- simulation of the magnitude of change in buffering function associated with the threats to wetland resources;
- field based investigation of the fate of assimilated minerals and nutrients within wetlands, with estimates of the volume of the stored lake threatening pollutants.

Achievements for Buffering Capacity Sub-Components

- a technical committee, which is comprised of a team of multi-disciplinary scientists from various institutions was set up to provide technical guidance to the component;
- study sites established in Sango Bay, Napoleon Gulf, Murchison Bay and Berkeley Bay wetlands;
- literature review done and report prepared on works already carried out in the wetlands of Lake Victoria, in order to identify gaps;
- inception report outlining the strategy of approach to buffering capacity sampling written and presented;
- baseline data for the physico-chemical parameters collected and compiled;
- baseline data on the biotic parameters collected and compiled;
- ground truthing for Berkeley Bay, Napoleon Gulf and Mukono shoreline done;
- base maps prepared;
- stakeholders workshop to sensitise communities on the northern wetlands of Lake Victoria was conducted at Busia;
- terms of reference for two consultancies i.e. buffering capacity and cost benefit analysis of wetland resources prepared;
- two MSc students on training in Makerere University;
- threats to Nakivubo – Kinawataka wetlands identified and mitigation measures proposed;
- linkages with colleagues in Kenya and Tanzania established.

Pending activities for Buffering Capacity

- regional conference to review knowledge on buffering processes of wetland systems;
- national technical workshops to discuss methodologies and prepare action plans for quantification of the buffering processes;
- simulation of current inputs(loads and seasonality) into individual wetland systems;
- an intensive one year field based programme of monitoring loads into priority wetlands;
- simulation of the magnitude of change in buffering function associated with the threats to wetland resources.

Planned activities for Sustainable use Pilot Project

The original plans of the sub component included to

- survey the extent and intensity of the traditional method of wetland utilisation and the corresponding management strategies employed by various ethnic communities around Lake Victoria;
- estimation of production rates and the biomass standing crop of papyrus and other wetland macrophytes and their potential for sustainable harvesting. Economic feasibility of exploitation for mat-making, energy briquettes and soft board manufacture;
- evaluate the suitability of wetland soils for agricultural crop production and livestock grazing within the upper reaches of the rivers of Lake Victoria basin, including options for encompassing wetland modification;
- development of strategies for the rehabilitation of specific degraded wetlands producing sub-optimal products and the likely production returns following rehabilitation, e.g. Nakivubo Wetland;
- development of guidelines for wise use management practices that are compatible with the buffering capacity of individual wetlands;
- evolve strategies for community participation in the implementation of wise use of wetlands which are acceptable to Government, NGOs and other stakeholders;
- demonstration projects illustrating wise-use and management practices in sample wetlands in each of the riparian countries;
- train a core team of wetland specialists in wise-use concept through "tailor-made" short courses to work with grass root communities, administrators and policy makers;
- strengthening capacity of local NGOs and CBOs to undertake wise-use activities.

Achievements for Sustainable use Pilot Project

With the technical guidance of the Steering Committee scientists it was possible to carry out the following activities

- selection of pilot areas for project activities;
- marketing points of wetland products identified in Mukono and Rakai;
- Participatory Wetland Appraisals (PWA) and Knowledge Attitudes Practices (KAP) surveys carried out in Sango Bay;
- propagation trials of key wetland products i.e. rattan cane and phoenix palm in Luzira, Kifu, Gardeina and Bugolobi started;
- socio economic survey for Nakivubo Wetlands to survey the extent of traditional methods of wetlands utilisation done;
- one short term training on consultancy skills development undertaken;
- training needs assessment for Trainers of Trainers done;
- stakeholders workshop at Busia, September, 1998.

Pending Activities for Sustainable use Pilot Project

- estimation of production rates and the biomass standing crop of papyrus and other wetland macrophytes and their potential for sustainable harvesting. Economic feasibility of exploitation for mat-making, energy briquettes and soft board manufacture;
- evaluate the suitability of wetland soils for agricultural crop production and livestock grazing within the upper reaches of the rivers of Lake Victoria Basin, including options for encompassing wetland modifiaction;
- development of guidelines for wise use management practices that are compatible with the buffering capacity of individual wetlands;
- demonstration projects illustrating wise-use and management practices in sample wetlands in each of the riparian countries;
- train a core team of wetland specialists in wise-use concept through "tailor-made" short courses to work with grass root communities, administrators and policy makers;
- strengthening capacity of local NGOs and CBOs to undertake wise-use activities.

Constraints for the Component

Constraint	Proposed Remedy
· Activities were interrupted by lack of funds · There have been delays in procurement of equipment and services · Delay in procurement of consultants · Inadequate in-house capacity to implement activities · Inaccessibility of wetlands	· Alternative funding arrangement for prioritised activities · Modify procurement procedure, and procure equipment locally. · Procure consultants locally. · Set up a technical survey team · Increase budget to cater for aerial surveys, and include a risk allowance.

RESULTS:

The results are raw and have not been analysed yet. A program in Access is being worked out in order to have the results properly analysed. Data continues to be collected and entered into the spreadsheets. These spreadsheets can be accessed on request.

Questions & Answers

Could you please provide a definition of:
"Buffering Capacity"
"Rattan cane"
"Phoenix"

Q. It would appear that before the establishment of the LVEMP, there was no efforts in the recent past made to protect the wetlands?

A. Wetland issues are almost ten years old in Uganda. They started in 1986 when the government recognised the need for a wetlands policy. The LVEMP funding aspect of this initiative is only 2 years old. Management is very important, many still referring to wetlands as wastelands. Now Uganda is in the process of developing a law on wetlands.

Q. There was little highlight on the River Nile wetland. What has been done so far, as it is a part of the catchment area?

A. In Uganda the programme works with all areas that fall into the definition of wetlands. The Lake Victoria basin includes the catchment, and the lake. The River Nile is the outlet, and only activities within the Lake Victoria are mentioned.

Q. There was a mention of the intention to come up with a base map on the wetlands. The LVFO is also coming up with a resource map for Lake Victoria. How soon will this base map be completed? There is a need for a comprehensive inventory which would feed into the resource map. What is the involvement of the communities and the future of the wetlands programme ?

A. The inventory process has been hampered by various factors. If all goes well, before the end of the year, the inventory for the Northern part will be completed. Community involvement is one of the key areas. They have been involved in the various workshops, the wetland participatory appraisals, marketing of goods - assistance with the training to improve products. For the future, it is hoped that the Programme can become a department. This would mean that weltand issues would be handled the same way that forests are handled by a forest department. This gives it a higher profile because we feel that the benefits and services that wetlands provide are very important. The future of wetlands is very bright.

6. STATUS OF WATER HYACINTH IN TANZANIA

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Introduction:

Water hyacinth, *Eichhornia crassipes*, is a free-floating freshwater plant which produces very attractive flowers. Depending on the growth conditions, the plant can grow up to a metre in height and forms dense mats that are difficult to separate. The plant is indigenous to South America but it has now been reported in the tropics and sub-tropic areas of the world. Probably, its beauty and the appeal of its flower has greatly contributed to its international spread by man.

In its new habitat, water hyacinth did not draw the attention of environmentalists as a potential pest, during the few years following its introduction[1]. During this time the plant grew fast and covered large areas as a result of its dual method of reproduction, vegetatively and sexually and its fast rate of growth.

The alarming infestation of water hyacinth in Lake Victoria has caused great concern in Tanzania and Eastern Africa where the weed is viewed as an environmental disaster. Its excessive infestations are deleterious to water traffic, water quality and supply, fishing, wetland biodiversity, hydropower generation and human health. The control of the water hyacinth in the lake is one of the components of the Lake Victoria Environmental Management Project (LVEMP), which is a five year programme being implemented by the governments of Kenya, Uganda and Tanzania with financial assistance from the World Bank.

Water Hyacinth Distribution in Tanzania

Available information shows that water hyacinth has been present in Sigi and Pangani Rivers in north-eastern Tanzania since 1955 and 1959 respectively. This weed has been interfering with hydropower generation at Hale on Pangani river since 1964 (Aron 1994). The weed is also present in Msasani streams and in some ornamental ponds in Dar-es-Salaam. It was reported in Kagera river and in Lake Victoria in 1987 and 1988 respectively. By 1990, dense mats of the weed were reported interfering with fishing, water transport and supply in some of the lake.

Infestation in Lake Victoria

The whole shoreline in Tanzania is infested. It is also found on the shores of Ukerewe, Ukara, Rubondo and other islands. The heaviest infestations are found in Mwanza Gulf, Bauman Gulf, Emin Pasha Gulf, Mara Bay and Rubafu Bay. Infestation on the shoreline of Kagera region is rather low due to therocky and exposed nature of the coastline, which is not conducive to the establishment of water hyacinth. The lakeshore area permanently occupied by water hyacinth is currently estimated at 2000ha.

Water hyacinth enters ake Victoria from the Kagera river a short distance north of the Tanzania-Uganda border. Large quantities of water hyacinth drifting downstream are encountered at Kyaka bridge. This observation together with the presence of large quantities of the weed between the bridge and the river mouth indicates that most of the weed originates from infestations some distance upstream.

Impact of Water Hyacinth

Water hyacinth infestation in Tanzania water bodies is viewed as an environmental and socio-economic menace, which must be brought under control. The weed is affecting human activities in several ways most of which are detrimental although some are beneficial (water hyacinth absorbs heavy metals).

[1] Except IUCN which held awareness seminars in all three E.A capitals in 1992 to alert Governments to the potential damage to the environment -Eds

Below is an outline of some of the major effects of the weed on various areas:

- **Environment:**

  - Fish death due to anaerobic conditions from decomposing weed
  - Animal/plant communities - other water life, and changes in the fish community by eliminating some species at the expense of lung fish
  - Shade bottom growing vegetation - thus depriving some species of fish of food and spawning grounds
  - Water quality - change of pH.

- **Loss of Water:**

  - Reduction of water bodies by silting
  - Displacement - The volume of water displaced by water hyacinth means that the effective capacity of the lake is reduced. The high rate of biomass accumulation of water hyacinth in the long run will definitely cause water levels in the lake to fall and this will greatly affect hydroelectric production, navigation and other activities
  - Evapotranspiration: water hyacinth loses water rapidly through its leaves (about 3.5 times the rates of loss from open water).

- **Water supply**: The water pumps for domestic and industrial water supply are often blocked by mats of the weed interfering with water supply to the towns, villages and institutions around the lake.

- **Navigation**: Mats of floating plants of water hyacinth are difficult to penetrate with boats. At night the big boats find it difficult to sail as the radar cannot distinguish echoes from the weed and those from other objects such as rocks. This causes ships to be anchored till morning causing increased sailing time, excessive fuel consumption and overheating of the ship engines as a result of blocked water cooling system.

- **Fishing activities**: Access to fishing grounds and fish landing sites by local fishing communities becomes increasingly time consuming and in the worst cases impossible. Some landing sites have been abandoned resutling in the need to open new ones

- **Human health**: Thick mats of water hyacinth have been reported to increase breeding by vectors of human diseases including those responsible for transmission of malaria, filariasis and bilhazia.

- **Recreational facilities** The mats of water hyacinth are interfering with swimming, fishing and sports like yatching.

Alternative uses of water hyacinth:

The presence of water hyacinth infestation and its biomass has in some places necessitated consideration for its utilization.

A survey carried out around Mwanza and Mara regions revealed that the village communities around the lake utilize the weed in various ways. Some use it as mulch in vegetable production while some fish traders use the leaves as wrapping material to protect fish from the heat of the sun. Goats, cattle, ducks and pigs were observed to feed on water hyacinth leaves. In Misungwi district the weed is used in biogas production. Since water hyacinth was declared a noxious weed which must be contained and effectively controlled, the environmental cost of not dealing with it as a serious problem cannot be tolerated.

Water Hyacinth Control

The methods currently employed in Tanzania are manual removal, prevention of weed movement and use of biological control agents.

➢ **Manual removal prevention of weed movement and development**

While the manual removal and prevention of weed movement have complemented each other at Hale and Pangani Falls hydropower plants, manual removal of the weed has been extensively employed in Lake Victoria Tanzania side. Whenever mats of the weed are seen to interfere with fish landing sites, water sources, etc. communities around the lake have tried to remove it manually. This operation is unfortunately not well organised except in Mara and Mwanza regions where the regional and district authorities including the village level have organised the communities around the lake in the manual removal of the weed on a self help basis. It has been reported that, in Mara region, over 200 tons of the weed were removed from the landing beaches in one year.

In the other parts of the shore lines, where manual removal is not organised, fishermen occasionally employ casual labour to clear the landings sites as the need arises. Payment is often in kind (fish).

Equipment used in manual removal includes rakes, hoes, wheelbarrows and forks among others. Earlier assessment of manual removal revealed that the operation was carried out with bare hands. Proper tools including protective gear have been made available by LVEMP to communities involved in manual removal.

At the Hydropower plants on Pangani River, 200 litre drums are used as booms to protect the water intake from the floating weed. Experience at the power stations has shown that booms are more effective if they are used in conjunction with manual removal to clear the accumulated material.

Water hyacinth is observed to grow more luxuriously in sheltered shoreline where effluent from sewage, farms and factories enter the lake because of the high nutrient levels associated with effluents. The LVEMP have other project components working in collaboration with water hyacinth control to minimize or prevent the nutrients from reaching the lake through suitable water treatment systems, better land use practices, and catchment afforestation.

➢ **Biological Control**

Research into biological control of water hyacinth has shown that some natural enemies can effectively control the weed (Harley 1990). Among them are two weevil species, *Neochetina eichhorniae* Warner and *N. bruchi* Hustache which, together with a moth, *Samiodes albigutallis* (Warren) have been released to control water hyacinth in several African countries including Zimbabwe, Sudan, Benin and the Republic of South Africa.

The two weevil species *N. eichhorniae* and *N. bruchi* were imported into Tanzania in April, 1995. This was before the control of water hyacinth in Lake Victoria under LVEMP took off. The maintenance and rearing unit for the weevils was established at the National Biodiversity Control Centre, Kibaha, where great care is taken to ensure that the two insects do not go into a mixed population. Weevil multiplication at Kibaha turned out to be faster than expected because their life cycle duration was about one month shorter than that reported by Harley (1990) probably as influenced by environmental factors.

Harvesting of the biological control agents at the centre started in August, 1995 when 2000 weevils were available for release in Sigi and Pangani rivers. By June 1996, 9,460 weevils had been released in the two rivers and their establishment and impact on the weed has now been confirmed. Manual removal of the weed at Pangani Falls water intake has not been done for the last one year and the local community around the river have now been deprived of employment.

Release of *Neochetina* Weevils in Lake Victoria

During the period August, 1997 to March, 1999, a total of eight hundred and forty thousand (840,000) *Neochetina* weevils were released at twenty points around the lake and along Kagera river. More than half of the weevils came from Sigi and Pangani river where there are now millions of weevils, many of which will die as they exhaust their food, which also provides them with egg laying sites and refuge for the adult insects. Efforts are now being made to rescue the weevils by harvesting as many of them as possible for release in Lake Victoria.

The number of weevils so far released is small in comparison with the magnitude of the problem and the area that needs to be covered. To cope with this problem, the Water Hyacinth Control Component of the LVEMP is making use of all possible sources of Neochetina weevils. Together with Kibaha centre and Sigi and Pangani rivers, the component has established four weevil multiplication centres around the lake, with plans to build ten more. Weevil output from these centres was realized from December, 1998. Other sources of weevils are the immature insects in form of eggs and larvae generated in transit when the biocontrol agents are being transported from Kibaha or Pangani river to the lake.

The *Mobile Rearing Programme* is probably one of the quickest methods of infesting many water hyacinth plants within a short period of time. The method uses rearing equipment (essentially plastic buckets and basins) that are moved from one site to another along the shore line. In this method, the mated females are allowed to lay eggs in water hyacinth plants after which the insects are harvested from the plants and given more chance(s) to lay on other fresh plants. The plants with eggs (and larvae) in them are taken to shore and planted among water hyacinth plants there. Provided the weevils are 100% harvested from the plants, fresh weevil attack symptoms will be seen on the plants when adult insects emerge.

The biocontrol agents released in the lake up to December, 1997 have been confirmed established. Aided by water currents and waves, the infested plants have taken the biocontrol agents far from release points. For instance, the weevils released in Mwanza and Sengerema districts have spread as far as Kemondo Bay. When weevil population is sufficiently high around release sites, say 5 weevil per plant a strategy to distribute the plants with biological control agents on them will be worked out.

➤ Chemical Control

The use of chemicals (herbicides) may be necessary as an extreme measure for the rapid destruction of large masses of water hyacinth. The most commonly used herbicides in other countries have been 2,4-D and glyphosate. The two herbicides are easily available on the local market. However, there may be complications and limitations to use the herbicides in Lake Victoria.

The herbicide application methods may vary greatly from labour-intensive small scale spraying to advanced aerial spraying. In all these cases there are likely to be difficulties of access and accurate application to all parts of the area to be treated. If care is not taken, drift damage to crops can be considerable particularly with 2,4-D to areas with vegetables or other broad leafed crops like cotton.

The use of herbicides will rarely achieve a long-term solution as there will usually be re-infestation from missed or sheltered plants, re-infestation from up stream river Kagera or from seed. There will therefore be need for re-treatment which will increase the cost of the chemicals required and also there will be neec for continuous monitoring and management programme.

Although none of the herbicides commonly used for the control of water hyacinth elsewhere are known to have acute toxicity to fish or other aquatic animals, there are risks of deoxygenation resulting from the sudden availability of large masses of dead plant material for microbial breakdown. These risks can largely be avoided by using herbicides only on a portion of the lake at any one time.

Community involvement

From early 1990's a number of non-governmental organisations and lake shore communities including fishermen have involved themselves in water hyacinth control. In order to encourage and facilitate their continued participation, a water hyacinth control committee has been formed, the membership of which includes the three Regional Administrative Secretariats (RAS) of Lake zone Regions. The implementation of LVEMP has involved the communities in several activities particularly in the identification of suitable release sites and in releasing biological agents. Community participation is highly valued and expected to play a major role in the distribution of biological control agents around the lake.

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7. LAKE VICTORIA ENVIRONMENTAL MANAGEMENT PROGRAMME (LVEMP)

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Introduction

Lake Victoria Environmental Management Programme is a five-year project being funded by the World Bank. The project has several components being implemented by various institutions. The Fisheries Department in Kenya is implementing the Fisheries Management component, which is further, divided into sub-components as listed below:

- Establishment of Fish Levy Trust
- Strengthening of extension services
- Establishment of closed areas and strengthening of law enforcement
- Curbing post harvest losses and quality control
- Strengthening of statistical data collection and frame survey
- Training in communication skills for fisheries and fisherfolk
- Incorporation of the local communities in Fisheries Management (Micro-project sub-component)

Each sub component is headed by a Task Co-ordinator appointed by the Permanent Secretary. The Director of Fisheries is the overall component co-ordinator to oversee all the above listed sub components. The Task Co-ordinators are directly responsible for the implementation of their sub-component in collaboration with respective district fisheries offices of the riparian districts and other institutions.

Fish Levy Trust

This is expected to be a consultancy to explore existing methodologies for revenue collection and disbursement, including all additional possibilities for raising revenue. It will make recommendation for implementation of a system of collection of revenue from the fishing industry in support of fisheries and ecosystem management in the lake and its catchment.

In this connection an advertisement was placed in the daily newspaper on 22nd May 1998 for expression of interest.

Quality control and curbing post harvest losses

This programme aims at optimizing utilization of fishery products and reduce post harvest losses in the fishery of Lake Victoria. This is to be achieved through identification and training of fishermen on improved fish handling and processing techniques. It also aims at establishing a laboratory for bacteriological analysis of fish, fish products and water in Kisumu.

So far the following has been done:

- Two officers visited WRAP laboratories in Entebbe Uganda on 28th September to 2nd October 1998 to get first hand information on equipment needed
- Training of fishermen at various villages in Bondo, Busia and Homa bay districts
- Bill of quantities and estimates for quality control laboratory was prepared .
- Advertisement for interested contractors has been placed in the local daily.

Strengthening linkages between relevant institutions

This sub-component will serve the purpose of updating the other components with relevant local and international information. This may involve

- The production of a newsletter to promote better linkages between fisherfolk, researchers and fisheries managers

- Organization of workshops/seminars for research bodies, NGO's and other implementing government departments to minimize duplication of efforts

Strengthening statistical data collection

This sub-component is to update and improve the quality of data collected on the type of boats, fishing gears, number of fishermen and landings.

A number of activities has so.far taken place including:

- Training of supervisors for the frame survey held at Homa Bay in October 1998
- Lakewide Frame survey in January 1999.

Strengthening of law enforcement and closed areas

This component is meant to identify potential closed fishing areas for protection of breeding and nurturing areas for specified fish species. This is intended to improve recruitment of fish stocks in the lake and enhance sustainability of lake fisheries. It is also supposed to educate fisherfolk on the importance of sound and modern methods of managing the resources.

Activities:-

- Inventory of indigenous knowledge on breeding grounds/seasons was undertaken in Bondo, Rachuonyo, Homa-Bay, Kisumu and Suba districts
- Patrol operations to control use of illegal fishing methods have been undertaken in Busia, Bondo and Kisumu districts
- Survey on the effect of use of chemicals in fishing on the marketing of fish
- Survey on the effect of water hyacinth invasion on landing beaches and the emergency of new beaches.

Strengthening of extension services

This is supposed to revise the extension strategy to be used by the department and to create links between the extensionists and researchers. So far a baseline survey had been completed in Siaya and Busia districts, the Wakhungu demonstration fish ponds in Busia district have been identified for rehabilitation and a survey on extension methodologies and socio economic issues in aquaculture completed in Busia district.

Training in communication skills for fisheries management

The objective of this component is the assessment of training needs of frontline workers in the department and also the training of implementors and collaborators on the objectives of LVEMP.

Activities so far include:

- Training of frontline workers done in Kisumu on November 1998 involving Chiefs and field based fisheries staff
- Four Fisheries Officers have been sponsored to pursue the masters degree programme on fisheries management at Moi University
- Task Co-ordinators seminar organised by Moi University to assess training needs of the departments and their ability to meet them.

Incorporation of local communities in fisheries management (micro projects)

Its main objective is to provide grants to low income fishing communities to alleviate adverse effects that may occur due to the implementation of the LVEMP project such as the putting in place of regulations related to fishing net mesh sizes and closed areas. The grants will not exceed US$ 15000 and will be mainly for projects beneficial to the whole community such as:

- Community water supply either underground or piped
- Provision of sanitary facilities
- Upgrading of local roads

- Provision of health facilities.

As the projects to be funded are diverse and require different forms of expertise, a team with representation of both the technical and community leaders has been formed and is known as the Project Steering Committee. It is chaired by the District Commissioner

Fishermen have been sensitized through education visits on the conditions and terms of reference for the micro projects sub-component. Already, groups have been identified in Rachuonyo, Kisumu and Homa Bay districts and have been endorsed by the district micro project steering committee.

Activities include

- Sensitization of fishermen on the operation of this project was done in Kisumu, and other reparian districts
- Public barazas have been held at beaches to sensitize the fishing communities on participatory fisheries management. A total of 12 public barazas have been held
- Identification of deserving communities in Bondo, Busia and Kisumu district.

8. LAKE VICTORIA AS PART OF THE NILE RIVER BASIN

G.W. Howard,
IUCN EARO,
Nairobi

Introduction

The River Nile is the longest in the world with a channel distance of 6,800 km from its farthest source at the headwaters of the Kagera River in Rwanda, to its delta on the Mediterranean Sea in Egypt. The Nile Basin covers more than 3.2 million km^2 in ten countries[2] and has at least 140 million people within its boundaries which range from 4°S to 31°N and from 24° to 39°E. It is one of few large rivers in the world that flow from south to north and it passes from wet mountainous areas in Eastern Africa through one of the driest and hottest places in the world - the eastern Sahara Desert. Considerable water is "lost" during its passage from the wet uplands through the warm middle reaches and then into the dry lowlands of the basin. This is due to evaporation from the river's surface (and from its lakes and swamps), to evapotranspiration from the vegetation in its channels and wetlands, to usage by people for many reasons (domestic, rural, agricultural, irrigation, urban, industrial, hydropower) and to infiltration into the desert surroundings in its lower reaches. Thus the outflow in Egypt is a fraction of the waters that are added to it in its upper reaches – including that in the Lake Victoria Basin.

The mean annual flow of the Nile at Wadi Halfa where it enters Lake Nasser is 84×10^9 m^3 - which is 6% of the Zaire's flow and less than 4% of that of the Niger River. Nevertheless, this relatively low flow maintains the agriculture and economy of millions of people in Sudan and Ethiopia as well as those in the upper parts of the main Nile Basin. So the flow seen at Wadi Halfa is what is left after many people and ecosystems have "used" the water (extracted it, diverted it, drunk it). While this flow is small by global standards, it is, nevertheless, still five times the flow of the Rufiji River in Tanzania and 20 times the flow of the Tana in Kenya.

There are two main "sources" of the Nile River: the Ethiopian Highlands and the Lake Victoria Basin - both with quite high rainfall. Water also joins the Nile from western Ethiopia and southern Sudan.

The Ethiopian component enters the main stream as the Blue Nile and the Baro and Atbara Rivers - together making up 84% of the Nile River's flow. The Blue Nile (or Abbey Wenz) drains high rainfall areas in the western highlands of Ethiopia and has its own storage lake (similar, in a way, to Lake Victoria in the White Nile system) in the form of Lake Tana. Lake Tana covers an area of over 3,000 km^2 at 1,829 m.a.s.l. and is the second largest lake in the Nile Basin and the ninth largest lake in Africa.

The other 16% of the Nile's flow enters the main stream through the White Nile from the Sudd in southern Sudan which is fed by the Bahr el Jebel (upper White Nile), Bahr el Ghazal and several other streams. Lake Victoria is the main source of water for the Bahr el Jebel which also receives water from the Western Rift Valley lakes system through Lake Albert in western Uganda.

Lake Victoria contributes around 40% of the flow which makes up the White Nile where it joins the Blue Nile at Khartoum. Thus Lake Victoria is very important as a regulator of the White Nile's flow, as a reservoir for the flow of the White Nile and for supplying water to many ecosystems downstream in Uganda and Sudan – including that vast wetland, the Sudd.

<u>LAKE VICTORIA</u>

Lake Victoria is the largest freshwater lake in Africa and the second largest in the world (after Lake Superior in USA/Canada). Its dimensions are:

Area (average) – 68,800 km^2	Shoreline (average) – 3,500 km
Average depth – 40 m	Maximum depth – 84 m
Average volume – 2,750 billion m^3	

Lake Victoria's main inflowing rivers are the Kagera (from Rwanda/Burundi through Tanzania and Uganda - 45% of the river inflow), the Nzoia (from Kenya with 15%), the Mara (from Kenya through Tanzania, 10-15%) and the Sondu and Yala from Kenya. Very little surface flow to Lake Victoria originates in Uganda although the Mburo

[1] Rwanda, Burundi, Uganda, Tanzania, Kenya, D.R.Congo, Sudan, Ethiopia, Eritrea, Egypt- although some say there is a small part of the watershed within the Central African Republic

Lakes Complex drains eastwards into it. Most of the water that is collected by Lake Victoria comes from rainfall over it and most of the loss is from evaporation from the lake surface.

The annual outflow of Lake Victoria at Owen Falls (Victoria Nile) - 23.5 billion m^3 or less than 1% of its storage capacity (volume). By the time this amount of water has passed through Lake Kyoga, Lake Albert, the Albert Nile floodplains and the Sudd, it has reduced to an average of 15 million m^3 despite considerable inflows from smaller catchments on the way. This is due to evaporation and evapotranspiration as it passes through its channels and swamps in the lower, hotter areas of Uganda and Sudan. Nevertheless, Lake Victoria is regarded as a very important source of reliable and good quality water for the White Nile and so for the combined Nile as it leaves Khartoum and flows to Egypt.

RESPONSIBILITIES OF LAKE VICTORIA'S RIPARIANS TO THE NILE

How does the management of Lake Victoria and its catchment affect the rest of the Nile Basin - especially Sudan and Egypt? Kenya, Tanzania and Uganda (and to a certain extent Rwanda and Burundi) are responsible for the maintenance of water quality and water quality in Lake Victoria as a source of water for downstream people and ecosystems. This is a grave responsibility which is not often understood as once water leaves the lake its destination is mostly unknown to the people who use the lake and its catchment. Thus the various projects, programmes and institutions, as well as districts and communities, NGOs, etc. involved in utilisation of Lake Victoria and its catchment have a moral responsibility to treat the lake as a reservoir and source of water for millions of people and many complex ecosystem downstream.

What does this mean? It means that we should consider the following three parameters of water from the lake in our management of the basin and its waters – for others as well as for ourselves:

Water quality – meaning a need to reduce nutrients, pollutants, de-oxygenation, toxins, weeds, etc. and use sensible watershed management;

Water quantity – requiring that we manage water use, extractions, inflows, out-of-basin transfers and maintain the lake level for downstream reliability of flow;

Regularity/seasonality of flow – which ensures that the downstream users (people and ecosystems) receive water at the "right time", needs control of hydropower generation, new dam construction and inflows to the lake.

Who manages Lake Victoria for whom? Any management of the Lake Victoria waters, fisheries, watershed, etc., must take note of the downstream users as well as the riparian users and the people in its catchment. Imagine what would happen to Egypt if the Owen Falls outlet ceased to flow? So who should be in control of Lake Victoria's management?

Questions/comments

Comment: Seismic activity and the release of poisonous gases was reported earlier this year in Lake Albert with consequent deaths of fish and other organisms downstream - onto Sudan. Research, however, recorded a very large algal loom on Lake Albert which caused the fish kills. This was due to prolonged which disturbed the lake waters and brought nutrients to the surface.

Q. Sharing of the Nile/Victoria resource. No formal contract between the countries. Informal ? Egypt gives some sort of concession not to divert the flow of the Nile.

A. Egypt uses the waters of the Nile as its main supply but can contribute nothing to the other riparian states. Bargaining in the 1920s and 1930s resulted in an agreement to guarantee a certain amount of water will always reach Egypt. This is not always acceptable to the other countries as they may wish to use the water upstream for developments. Discussions continue and a Nile Basin Initiative has begun (with support form the World bank, UNDP and others) which hopes to find solutions acceptable to all riparian states and people.

9. IDENTIFYING ENVIRONMENTAL STORIES FROM A FIELD TRIP (INVESTIGATING THE ENVIRONMENT)

Margaret Gathoni Karembu
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Prior to the participants embarking on a field trip to some of the fish landing beaches close by, they were taken through a discussion on what to look for by the facilitator.

Identifying environmental stories from a field trip (investigating the environment)

Development of responsible environmental behaviours require a communication strategy that enhances the acquisition and subsequent application and transfer for a wide range of knowledge, values, attitudes and practical skills needed to participate in resolution of environmental problems as well as the maintenance of environmental quality. Balanced environmental reporting aims at answering fundamental questions about the interactions between the environment and socio-economic factors that are significant to policy decision making and the public.

These are:

1. What is happening?- Involves a highlight of the environmental conditions and trends.
2. Why is it happening? – Gives a description of the human and natural causes of these changes.
3. Are the changes significant? – Discusses the health, economic, social and ecological implications.
4. How could we respond? - Suggest solutions and the environmental implication of societal responses.

These questions are amply addressed with a consideration of environmental indicators as briefly discuses below:

Environmental Indicators (EI)

Measures that tell us about the status of an environmental concern in relation to a broad social goal such as:

Economic welfare;
Human health;
Social welfare and equity;
Ecological sustainability; and
Aesthetic appreciation.

An EI is defined by its relationship to people and their values. It indicates how well or poorly a society is doing to achieve the perceived goal.

NB. EI represent a powerful tool for communicating synoptic information on the state of the environment to policy decision-makers and the public. There is thus a need to understand the underlying analytical framework that provides a systematic cause-effect relationship linking the many variables/factors that determine the status of the environment. This helps policy makers and the public to see environmental problems as inter-connected and to design and implement appropriates intervention measures. One such framework is the Pressure-State-Impact-Response explained as follows:

Human activities exert pressure on the environment, such pressures induce changes to the state or conditions of the environment, to which society responds with policies and programs to prevent, mitigate, or repair environmental damage.

How to Use this framework during the fieldtrip (i.e what to look for):

Environmental pressures: includes both social pressures and natural fluctuation that disturb the environment from normal conditions.

There are two categories of social pressures:

Direct (proximate) e.g. discharge of raw sewage into a water body, emission of waste gases into the air, chemical application in farming, use of crop residues as fuelwood.

Indirect social pressures or underlying pressures, e.g. population fluctuations (increase or decrease) type of economic activities e.g cultivation on steep slopes, water catchments, trade, transportation, types of governance/political structures, technological development.

Natural Fluctuations –natural phenomena e.g. rainfall, drought, floods, soil types.

Note: pressures are the basic causes of environmental problems and are often the most economically efficient areas for attacking the problems.

Environmental States: Recognised as changes to environmental quality of three media, (air, water, land) or to the quantity and quality of natural resources e.g. condition of soils in terms of productivity trends, concentrations of disease vectors in water and in air, sanitation, housing conditions.

Note: National and international concentration standards for pollutant and residues do exist and there is need to communicate this as well, Technical information e.g. ppt, mml could be easily interpreted in terms the measures tha the public/local communicates are familiar with e.g 5 mls is equivalent to one teaspoon, a soda bottle op full. (See Annex 4)

Environmental impacts: These are the effects that changes in environmental conditions have on the society and resources, and include social and economic alterations e.g. health as a result of exposure to pollutants, increased or new exposures to pathogens; education e.g. drop-out rates, changes in food habits, loss of aesthetic, recreational and cultural amenities; economic structures e.g. food imports, high rates of unemployment; status of ecosystems (both aesthetic and diversity, productivity capacity).

Note: Ecological impact is difficult to quantify because it involves non-marketed goods and services that society takes for granted e.g. inhibited capacity of the environment to assimilate wastes, impact of extinction of species, climate fluctuations, ground water contamination.

Environmental Responses: This is to measure what society is doing to deal with environmental impacts. It corresponds to societal actions taken collectively or individually to prevent negative environmental problems, correct environmental damage or conserve natural resources. Societal responses include action strategies such as measures of public opinion, lobby groups, consumerism, legal redress, eco-management.

Note: There is a tendency to overlook mitigation measures (small or big) to overcome environmental pressures and impacts. Wise practices should form an integral part of an effective communication strategy. Empowering the public and decision-makers lies on their perceived knowledge about environmental action strategies and skills.

Field Trip

Participants then embarked on a field trip to Dunga Beach.

After which the facilitator took the journalists through a checklist which would assist them when they are writing their environmental stories.

CHECKLIST FOR ENVIRONMENTAL JOURNALIST

The purpose of the checklist is to promote the idea of editing one's work and ensuring that all the important elements have been addressed after one completes an article. These factors are:

What - The journalist needs to establish what has happened and to chronicle the events that have led to the action or happening. In environmental reporting, this is crucial because the scientific nature of some issues involves a series of events that lead to degradation or hazards at times and over a long period. The audience should be clear on what has taken place in the midst of various activities. It is important to identify an angle that makes news or for a fresh perspective since some environmental concerns are more long-term than immediate.

Where - The geographical location of an event presents a picture to the audience and they can place the location of the event. This location at times involves details, for example saying beetles are being used in Lake Victoria to control the water hyacinth maybe misleading since its only at specific locations that the beetles have been introduced.

Who - The personalities involved are important. These include those who have contributed to a certain event and, those who are charged with the responsibility of taking some action, and they fail to do so. The personalities interviewed also fall under this component, and the audience should be clear about all the people involved and their role/responsibilities.

When - The time/period that an even takes place is important and this covers the duration and the possible extension of the particular condition, e.g. fluctuations of the lake waters, introduction of emerging strategies of solving some of the lake region environmental problems.

Why - This is crucial component that it often lacking in news stories due to the time factor. The symptoms and causes of environmental phenomenon is very importance, since understanding this may enable the public to avoid such problems in future. The "why" element provides an analytical angle to the article.

How - This is related to the "why" factor and it is important for the public to understand how certain activities lead to others. In the scientific field, the process relies a lot on the question of how. For example the audience around the lake are very interested to know how they can control the hyacinth, get more fish of diverse varieties, etc. It is important to know your audience well so that you can be able to address their information needs.

Consequences - Issue-oriented and analytical writing of necessity includes a focus on the consequences of certain actions, events or happenings. In environmental reporting, the issue of consequence is critical because environmental degradation occurs over the long-term. Journalists should emphasise that some of the current impacts have been caused by actions undertaken years ago, and it is important that environmental impact studies be integral to all industrial and economic development.

Sources - Have all the relevant sources been contacted and rightly attributed? This is a question that the journalist must ask. The tendency to base a story or article on two perspectives should be avoided (remember the interdisciplinary nature of environmental issues); sometimes the significant element lies in a perspective which is not considered to be central to the issue e.g. social/traditional versus scientific. Sources should be credible and they should be of good standing in society to give the article the necessary authority and weight. Journalists should also avoid relying too much on government officials as sources.

Interest to the audience - This aspect should be of paramount importance for the journalist covering specialised topics like the environment, which can appear to be dry. The journalist has to endeavour to relate the story, article or issue to the ordinary citizen in order to demonstrate how they are affected or will be affected.

Context - Specialised topics like environment should be written within as complete a background as possible. Research findings should be explained in the context of the research process and the technical information should be provided. This helps the reader to understand the issue.

Explanations - Scientific and environmental information demands simplification and the journalist has to pay attention to detail and possible questions that the audience may have. The explanations should be meaningful to the audience so merely breaking-down the technical terms and information may not be enough. This is where use of analogies, metaphors, description, and comparisons can prove to be useful.

Demystifying technical jargon - Technical concepts, definitions, terms and information have made journalists shy away from covering specialised topics like the environment for a long time. One can imagine how complex these terms can be to a general audience seeing it for the first time. The writer should seek to ensure that the numbers are not confusing and that the reader will understand the implications of the numbers and relate to them. For example, a figure like *1ppm of a pollutant* means there is one gram of pollutant in a million grams (1 tonne) of the material tested, or one litre of pollutant in a million litres of water. (See examples of tiny parts Annex 4).

Active reporting - When a press release or report is sent to the media house, the journalist assigned to write the story should ensure that additional interviews are conducted and more background information is gathered. Armchair journalism should be avoided at all costs.
Recommended action - The nature of environmental journalism dictates that some action is suggested to the audience, particularly in terms of individual activities that could prevent environmental degradation, and how to avoid future occurrence. Proposed contact for further information and advice can be included. In the final analysis, the development of environmentally friendly behaviour and culture, as well as safeguarding the quality of the environment is what is important. This means going beyond awareness creation to motivation action.

Discussion/Comments

Keep up with your sources and contacts
Prepare yourself for an interview - a background of what you want and who the interviewee is. Establish support with technical people.
Don't forget photos and their captions - captions can be misleading or inaccurate
BUT photos should also " speak for themselves"

Environmental photojournalism is often shamed by the use of illustrations of personalities rather than the ecosystem. - politicians and administrators instead of the environment

Researchers/scientists don't copy reports to the press, BUT scientific information is protected in Kenya before it is published

Journalists should be invited to attend the full sessions of techncial workshops, and not just for the opening sessions

Q: How can the workshop organisers find the journalists ?
A. A network is one way of doing this where there are contacts of various journalists ?

Comment: There is a reluctance of technical and government people to talk in front of journalists in seminars for fear of being misquoted and the feeling that there is a lot of irresponsible journalism around.

Most journalists are responsible, however, it is not always possible to quote all ' authorities' in a workshop.
Media associations can recommend good journalists to cover workshops - this could ensure consistency. But is this practical - with all the workshops & the busy life of journalists?
Many journalists are art-oriented, not enough science or environment oriented journalists. This affects accuracy of reporting
Media managers don't understand the need for specialisation. Most EA journalists have to be generalists.

10. REUTERS IUCN MEDIA AWARDS

Susan Matindi
IUCN EARO
Nairobi, Kenya

The Reuters IUCN Media Awards were jointly established by the Reuters Foundation and IUCN the World Conservation Union. The Reuters Foundation was set up by Reuters, the global news and information group in 1982 as an educational trust to promote high standards in journalism through study and training. Since that time, over 1700 professional journalists have benefited from Reuters Foundation training programmes. The Foundation supports a global range of humanitarian causes recommended by Reuters employees around the world.

The Reuters IUCN Media awards have been set up to

- Recognise excellence in professional reporting on environmental and sustainable development issues in order to enhance public awareness

- Foster a dialogue between journalists and environmental and development experts that will encourage informative and high quality reporting based on sound scientific data.

The Awards will be presented annually and are open to practising journalists of the written press throughout the world. They will include international and regional prizes. Winners will be offered study or training opportunities organised by the Reuter Foundation.

Candidates for the awards may submit articles on environmental management, environmental degradation, nature conservation, sustainable use of natural resources, public and private investment, and social, economic and development issues relevant to the environment.

Entries will be evaluated on their potential to capture the interest of a wide readership especially key policy and decision makers. Articles providing new insights and bases for decisions on future action are encouraged. Particular attention will be given to the ability of journalists to demonstrate the relevant of environment-related issues to mainstream socio-political and economic matters.

Accuracy, clarity, imagination and impact will be key considerations in selection the award winning entries.

Up to date information on the Awards process can be found at your nearest IUCN office - IUCN EARO Nairobi or IUCN UCO in Kampala.

11. DEVELOPING A NETWORK

Margaret Gathoni Karembu
As Facilitator

A network is a technical concept used among anthropologists to describe and measure influence pattern in human relationships or an organisational strategy to serve the interest of different groups and their members.

In the environment field, the following types of environmental networks have been identified:

1. An Environmental advocacy network: comprises a group of people or institutions joining together to see that a public policy is enacted e.g. (the Karura Forest lobby group), lobbying against discharge of wastes by industries around the lake, lobbying group for the enforcement polluter-pays-principle of all activities detrimental to the lake environment and its environs

2. An environmental exchange network: comprises groups of people and institutions joining together to help one another. The purpose of such a network is to benefit each party in the networking through sharing of resources e.g. funds, information, office materials, mailing list (could be electronic or print)

3. Training network: creates opportunities for members of participating organisation to develop or expand their knowledge and skills.

Creating and sustaining an environmental network

A) **Facilitation**: There is need to have effective facilitators: Facilitators fosters networking by adopting attitude openness to learn with other people. Facilitators lead the group but are not necessarily the actors.

B) **Shared vision and mission**: This help to bind the members together. The values and goals make commitment to networking worth pursuing.

C) **Tangible benefits to members**: Networking is worthwhile only if it offers tangible, practical benefits to members, e.g. through capacity building as in training, exposure to new ideas and methods of doing things, making changes in term of uplifting the living standard of communities, or even material benefits.

D) **Guaranteed success**: An early success energises the networking process. Initial experiences of success encourages members and given them a sense of ownership and empowerment. It creates confidence in joint efforts and attracts new members.

E) **Trust**: Facilitators must never allow their personal interest and agenda to undermine the interest of the network effort as a whole or of any participating group or individual. They must communicate openly and frequently about all issues that are directly or potentially relevant to the network and its members.

F) **Continued maintenance**: A network requires continued maintenance. Facilitators must care for the network and spend time in network meetings, talking to individual representatives, and sending members appropriate written materials.

G) **Efficient communication tools**: Networking links members in order to share information. In this era of information superhighway, networks could benefit greatly if they have access to Internet since this will facilitate members in benefiting from advanced global environmental networks such as the Greenpeace and other international environmental organisations such as UNEP, UNDP, the World Bank, IUCN.

H) **Institutional leadership skills**: Environmental networks should strive to develop skills of successful institutional leadership for networking to be useful in achieving their goals and mission.

Developing a network for media on Lake Victoria

After a lot of discussions led by the Facilitator, the participants agreed on the formation of a network as follows:

Name: Media Network for Lake Victoria

Scope: Lake Victoria and it's drainage basin

Need for a communication network. Need to know who is doing what & where in order to avoid duplication, and finding the most effective means to communicate Lake Victoria issues.

Mission: *"To promote accurate reporting and exchange of information on the Lake Victoria Basin"*

OBJECTIVES:

1. Sensitise stakeholders about the issues affecting the Lake Victoria basin environment,
2. Stimulate action by stakeholders for the wise use of the environment of the Lake Victoria Basin,
3. Facilitate information exchange,
4. Improve Linkages between the NGOs, scientists, etc,
5. Enhance capacity of the Network Members in responsible and accurate reporting,
6. Strengthen regional collaboration in communicating issues of the Lake Victoria Environment,
7. Promote environmental journalism in Media Houses.

ACTIVITIES

Objective 1
Established databases,
An information centre? Regional Centre (more practical)
Establishment of focal points?

Objective 2
Organisation of media events
Updating activities

Objective 3
Sharing of information/contacts

Objective 4
Involving scientists/encouraging researchers to become members of the network

Objective 5
Training
Circulation of literature on available courses

Objective 6
Regional meetings/seminars

Membership
Practising journalists (print and electronic)
Scientists and Researchers
Associate Members
Institutions involved in environmental activities
Private sector

Benefits of Membership

Press Cards
Membership Cards
(debated)
Annual/Biannual conference whereby all members attend
National events/gathering
Development of Datasheets/Fact sheets. Resourced by any member of the network

Secretariat
It was proposed that JET be the secretariat. However, during the set up phase, IUCN would provide the Secretariat until the proposal is fully developed.

Way forward: Due to time constraints; suggested that IUCN is left responsible to form a task force to finalise the details. Those to be consulted on this were: JET for Tanzania, AfaJ for Kenya and James Tumisiime for Uganda.

Conclusion
Dr. Howard agreed that IUCN would assemble as many media products that come out of this meeting and see if they reflect what has been discussed. The last meeting produced about 20 different items, although not all of them were collected. Journalists were encouraged to cut out what has been published and to even send to IUCN for collation. These could be used as resource material. Articles could be delivered to to the IUCN offices in Nairobi or Kampala, or care of Dr. Jansen in Kisumu or through the OSIENALA offices. JET could be the contact point for Tanzania until an IUCN office is set up.
Kisumu - OSIENALA, KMFRI, Dr. Jansen
Dar - WWF

It was agreed that the next meeting, being the first one of the Network, be held in Uganda.

IUCN-EARO to write up a project document for the development of the network, and turn it into a proposal.

Meeting closed at 1100, Wednesday 28th April

ANNEXES

Annex 1. WORKSHOP PROGRAMME

Sunday, 25th April - travel to Kisumu

Day One, Monday, 26th April:

Introductions, Opening and Objectives

TEA/COFFEE

Assessment of the usefulness of the last meeting and its products - the publication of the proceedings and the media products

Conceptualising the Environment

LUNCH

Technical Updates and Discussions

1. Lake Victoria Fisheries Organisation - mandates and activities

2. Lake Victoria fish diversity - local and international significance

TEA/COFFEE

3. LVEMP Wetlands Programme - reports from all three countries

4. Lake Victoria in the context of the Nile Basin

Day Two Tuesday, 27th April

Half day field trip to important local sites on Lake Victoria

LUNCH

Interaction session (= training) on what has been seen and heard so far and how it could be reported

Day Three, Wednesday, 28th April:

Developing a network for Media on lake Victoria - ideas, structure, recommendations, etc.

TEA/COFFEE

Some examples of media releases produced during the first two days
Closing

LUNCH and then - Departure from Kisumu.

Annex 2. LIST OF PARTICIPANTS

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ANNEX 3: COMMON AUDIENCE TRAPS ON STATUS OF THE ENVIRONMENT

Gloom and doom pessimism: The belief that the world is headed for an environmental catastrophe, so we should enjoy life while we can.

Blind Faith in Experts and Leaders: The belief that someone is in charge who knows what to do and will do it without pressure and help from ordinary citizens (politics verses civil society).

Blind Technology Optimism: The belief that human ingenuity will always be able to come up with technology advancements that will solve our problems. This is the most seductive and dangerous of traps. It is something we would all like to believe.

Fatalism: The belief that whatever will be, will be, and we have no control over our actions and the future. Some politicians would like us trapped here to justify their egoistic deals.

Why-Bother-Syndrome: The belief that even if I do my share, nobody else will, so why waste my time and energy to make the environment better.

Extrapolation to infinity: The belief that if I cannot change the status of the environment quickly, then I won't try to change any of it. This rationalisation is reinforced by modern society's emphasis on instant gratification and quick results with as little effort as possible.

ANNEX 4: SOME TERMS DEFINED

Defination of "**Tiny Parts**"

- ppm means parts per million. For example, 1ppm of a pollutant means there is one gram of a pollutant in a milllion litres of water
- ppb means parts per billion
- ppt means parts per trillion
- ppq means parts per quadrillion

(Each one of these is 1,000 times smaller than the preceding factor.)

- ppmv – parts per million by volume
- ppmdv – [arts per million by dry volume
- dl –decilitre
- /1-micro equivalent per litre
- 1 milligram (mg) 1/1000 of a gram
- 1 millimetre 1/1000 of a metre
- 1 micrometre 1 millionth of a metre
- (1/10,000 of a mm)
- milligrams per kilogram ppm
- milligrams per litre ppm
- micrograms per litre ( ) ppb
- micrograms per gram ( ) ppb
- nanograms per litre ppt
- nanograms per gram ppt
- micrograms per kilogram ( )ppt
- picograms per litre ppq
- picograms per gram ppq

Some comparison to show how the relative size or amount of a pollutant in the environment
1 part per thousand of table salt makes water somewhat unpalatable

1 ppm * 1 second in 227 hours ot 11.5 days
* I minute in two years
* swimmers can detect chlorine in a pool at 1 pmm

1 ppb * 1 second in 32 years
* enough for a human nose to detect the smell of a rose
* fuel oil can be detected by a sensitive nose
* 80ppb of ozone in the air over eighth hours can cause health problems
* humans need a minimum of 1 ppb per day Vitamin B12 to suvive

1 ppt * 1 second in 32,000 years (320 centuries)
* I grain of salt in an Olympic size swimming pool
* 1 small gnat's wing in a 100 tonne whale
* the width of one hair in a belt around the world
* 20ppt is limit for 2,3,7,80TCDD dioxin in fish for human consumption

1 ppq * 1 second in 32,000,000 years
* 1/1000 if that small gnat's wing in a 100 tonne whale
* dioxin can be detected at 5ppq by sensitive equipment.

Source: Keating' M. Covering the Environment: A Handbook on Environmental Journalism

Terms Uded in Fish Diversity
BP - Before present
PH - A measure of a subtances' degree of acidity/alkalinity
BOD - Biochemical Oxygen Demand
Conductivity - a measure of total dissolved ions in a substance
Diatoms - organisms that make p the major portion of plankton and are amjor source of food for many small freshwater fauna

Terms Used in LVEMP/Uganda

"Buffering Capacity" is defined in the text but refers to the ability of wetlands to purify water flowing into the lake

"rattan Cane" is the stem of a spiny climbing swamp palm, Calamus, the Rattan, which are used for making furniture and other artefacts

"Phoenix" refers to the "Native Date palm", Phoenix Reclinata, which often grows in wetlands and which produces building and fencing poles as well as the "raphia" for weaving into baskets, mats and many other artefacts.

IUCN - Eastern African Regional Programme

IUCN established the Eastern Africa Regional Office (EARO) in Nairobi in 1986. EARO facilitates the implementation of the IUCN Programme in Sudan, Eritrea, Djibouti, Somalia, Kenya, Tanzania, Comoros, Seychelles, Uganda and Ethiopia. Through its technical group, established in the early 1990s, the IUCN Programme assists members and partners in the region with capacity building through the implementation of programmes and projects, networking, and technical advice. Specific areas of expertise include: protected areas, ecosystem management, biodiversity conservation, environmental planning and strategies, and support to environmental NGOs.

IUCN - Eastern Africa Regional Environmental NGO Programme

Since 1995, the IUCN NGO Programme has been working with environmental NGOs in the region to strengthen their capacity to carry out projects and activities in natural resource management. This assistance has been in the form of creating partnerships - capacity building through training, facilitation and support of networks. The NGO Programme has facilitated several forums between the governmental and non-governmental issues to discuss pertinent environmental sector.

This document was compiled by IUCN-The World Conservation Union, Eastern Africa Regional Office based on the contributions of the participants in a workshop on ***"Accurate report of the real issues of Lake Victoria's management" at Sunset Hotel, Kisumu, Kenya 26 – 28 April, 1999***. The findings, interpretations and conclusions in this publication are those of the authors and do not necessarily reflect those of IUCN or the partner organisations.

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