Proceedings of a Pan-African Stakeholder Policy Forum

Towards an Integrated Trans-boundary River Management Policy Development in Semi-Arid River Basins

11 – 14 March 2008
Arusha, Tanzania,

ABOUT THE STAKEHOLDER POLICY FORUM

The Integrated Trans-boundary River Management Policy Development (INTREPID) Stakeholders Forum was held at the Ngurdoto Mountain Lodge in Arusha, Tanzania from 11 – 14 March 2008.

The forum organized by the African Technology Policy Studies Network (ATPS) in collaboration with the Macaulay Land Use Research Institute (MLURI), Aberdeen, United Kingdom (UK) and the Tanzania National Parks (TANAPA) under the auspices of an European Commission funded specific support actions project Contract N0 FP6 – INCO-CT-2007-043784 INTREPID.

The objectives of forum were:

(i) to infill gaps in the interactive web-hosted database by accessing unpublished and stakeholder knowledge;

(ii) to encourage networking and collaboration with local stakeholders, non-governmental organizations (NGOs), and responsible authorities in the Mara River Basin;

(iii) to disseminate good practice in integrated water resources management (IWRM), Convention of Biological Diversity (CBD) and sustainable livelihood (SL) projects, management directives and policy initiatives in the Mara River;

(iv) to identify gaps in knowledge that need further research; and

(v) to document the findings from the forum in a policy brief, which will be distributed widely to encourage a more coordinated approach to managing water catchments, biodiversity and livelihoods in the Mara River Basin and elsewhere.

The stakeholder policy forum adopted a two-phased dynamic participatory process to encourage networking and collaboration with local stakeholders, NGOs, and responsible authorities in the Mara River Basin and elsewhere. These involved:

- plenary sessions for the presentation of overall project objectives, desired outputs and policy outcomes of the forum; understanding the concepts and sharing good practice in Africa and internationally; and interrogating the generic web-hosted database resource developed by the project. Each plenary session was followed by a short brainstorming session to fill gaps existing knowledge gaps and address questions arising from the presentations, and
- A series of facilitated participatory sessions to engage participants in synthesising the lessons learned and the potential conflicts between theory and practice, existing policies, projects and management initiatives, as well as the potentials for sustainable implementation of an integrated trans-boundary river management policy in the Mara river basin.

The forum was expected to lead to better understanding of the potential linkages, conflicts and complementarities amongst existing integrated water recourses management (IWRM), conservation of livelihoods (CBD) and sustainable livelihoods (SL) projects, management directives and policy initiatives in the Mara River Basin and implications for sustainable management of the catchment's water and biological resources for poverty alleviation in Kenya and Tanzania, and perhaps elsewhere.

INTREPID Stakeholders Forum

Editors: Dr Kevin Chika Urama, Senior Researcher, Macaulay Land Use Research Institute, Aberdeen, UK / Executive Director, African Technology Policy Studies Network (ATPS)

Mr. Grant Davidson, International Development Officer, Macaulay Land Use Research Institute, Aberdeen, UK (MLURI)

Dr Simon Langan, Senior Researcher, Macaulay Land Use Research Institute, Aberdeen, UK

Funding Source: EC Commission Specific Support Action Project
Contract N0 FP6 – INCO-CT-2007-043784 INTREPID

ABOUT THE COLLABORATING INSTITUTIONS

The African Technology Policy Studies Network (ATPS) is a multi-disciplinary network of researchers, private sector actors and policy makers promoting the generation, dissemination, use and mastery of science, technology and innovation (STI) for African development, environmental sustainability and global inclusion. ATPS intends to achieve its mandate through research, capacity building and training, science communication/dissemination and sensitization, participatory multi-stakeholder dialogue, knowledge brokerage, and policy advocacy. In collaboration with like minded institutions, ATPS provides platforms for regional and international research and knowledge sharing for the identification and prioritization, development, use and mastery of STI for sustainable social, economic and environmental development in Africa. The Network's Secretariat is based in Nairobi and it operates through national chapters in 23 African countries (including Anglophone, Lusophone and Francophone countries) with an expansion plan to cover the entire sub-Saharan Africa (SSA), by 2015. As an international organization, ATPS enjoys the privileges and diplomatic immunities accorded to similar international organizations in Kenya.

Furthermore, the ATPS reach is not limited to member countries. ATPS' main strength lies in its ability not only to generate knowledge, but to broker knowledge sharing across the continent and the rest of the world. ATPS has longstanding experience in policy research on innovation systems in water and environmental management, food security, environmental health, biotechnology, intellectual property rights and common pool resource-use conflicts in Africa, all of which are prerequisite for growth and poverty reduction. Current ATPS research programme on Water and Environment, 2004 – 2008 includes case studies on irrigation externalities, water pollution mitigation, alternative water purification and sustainable water supply technologies for improved livelihoods in ATPS member countries. Part of this programme, funded by the Royal Dutch government (Activity no: 10385-DCO0020791) were a series of knowledge sharing deliberative workshops between African researchers, relevant government institutions and responsible water management authorities and international researchers/institutions, regional research and training to promote trans-disciplinarity, etc. INTREPID was conceived as a follow-up project to address a key policy research gap identified under the auspices of the ATPS Programme on Water and Environmental management in Sub-Saharan Africa, namely the lack of understanding and coordination of the system wide dynamics in river basins.

The Macaulay Institute (MI) undertakes research, in the context of rural land use and resource management, with the objective of assessing the environmental, economic and social impacts of land use, and the consequences of changes resulting from factors and influences, such as policy, management, climate and pollution. The Institute has particular expertise in research support land use policy and rural livelihoods, biological diversity, and water catchment management, with a particular focus towards marginal and remote areas. It also has a long history of coordinating research projects, developing decision support tools to aid the formulation of land use policy and natural resource management. Macaulay staff are currently working on projects in Africa, South America, Central Asia, South and South-East Asia and China and most European Union (EU) countries. The Macaulay is very unique in that it promotes transdiciplinarity in practice through joint programmes being carried out by its different by fully integrated science groups: water catchment management, ecology, land use change, soils and socio-economics. The Macaulay Institute coordinated the INTREPID project administration.

Tanzania National Parks (TANAPA) is a pastoral organization under the Ministry of Natural Resources and Tourism in Tanzania. The mandate of TANAPA is to manage and regulate the use of areas designated as national parks to preserve the country's heritage that includes natural and cultural resources, both tangible and intangible resource values. These resources are: flora and fauna, wildlife habitats, natural processes, wilderness quality and scenery therein. The national parks are also intended to benefit human and provide enjoyment in such a way that will be left unimpaired for the future generations. TANAPA is the authorized government agency responsible for managing the national parks within the Mara-Serengeti ecosystem.

Table of Contents

List of Abbreviations and Acronyms

ATPS	African Technology Policy Studies Network
AMCON –	(Pr) African Ministerial council of water
ANEW	Africa CIU/Society Network in Water & Sanitation
AWRM	Active Water Resource Management
CBD	Conservation of Biological Diversity
COSTECH	Tanzania Commission for Science and Technology
CSO	Combined Sewer Overflows
DFID	Department for International Development
EAC	East Africa Community
ERM	Environmental Resources Management
EU	European Union
FAO	Food and Agricultural Organization
FZS	Frankfurt Zoological Society
GTZ	German Agency for Technical Cooperation
HWF	Hazardous Waste Facility
ICT	Information and Communication Technologies
ILRI	International Livestock Research Institute
IM	Integrated Management
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
KEWI	Kenya Water Institution
KWAHO	Kenya Water for Health Organisation
KWS	Kenya Wildlife Service
LGA	Local Government Authority
LVEMP	Lake Victoria Environmental Management
MDGs	Millennium Development Goals
MWEKA	College of African Wildlife Management
MWEDO	Musoma Water and Environment Development Organization
NAWAPO	National Water Policy
NBI	Nile Basin Initiative
NBO	Nile Basin Organization
NEMA	National Environmental Management Institute
NEMC	National Environment Management Council
NERA	National Environmental Research Agenda
NGOs	Non-governmental Organisations
NSGRP	National Strategy for growth and poverty reduction
PIDP	Participants integrated development programme
PMO-RALG	Regional Admin & Local government
PRSPs	Poverty Reduction Strategy Papers
SL	Sustainable Livelihoods
SNV	Netherlands Development Organization
SWMRG	Soil Water Management Research Group
TANAPA	Tanzanian National Parks Authority
Tanbif	Tanzania Biodiversity Information Facility
Tanzbif	Tanzania biodiversity Information facility
TAFIRI	Tanzania Fisheries Research Institute
TAWIRI	Tanzania's Wildlife Research Institute
UN	United Nations
UNEP	United Nations Environmental Programme
VICRES	Lake Victoria Research Programme
WRM	Water Resource Management
WRUAS	Water Resources Users Associations
WFD	Water Framework Directive
WVAS	Water Vulnerability Assessment
WWF	Worldwide Wildlife Fund

List of Figurers

List of Tables

1 BACKGROUND INFORMATION

INTREPID is funded under the auspices of the European Commission Specific Support Action (SSA) Project contract N0 FP6 – INCO-CT-2007-043784. A series of stakeholder workshops in Ethiopia, Nigeria and Kenya in 2004/05 carried out under the auspices of the ATPS Water and Environment programme, found that many water management, biodiversity conservation, poverty alleviation and other economic and environmental programmes in Africa have evolved independently but with often overlapping and/or conflicting responsibilities, goals and objectives. The role and contributions of IWRM to poverty reduction and national income growth through conserving biodiversity are poorly known. Most products and activities in this sector are not captured by traditional growth statistics. Studies, therefore, often downplay the significance of water resource management to poverty alleviation and economic growth, even though they are acknowledged to have tremendous potential for rural livelihoods, health and security in primary economies. Africa's development partners, funding agencies and non-governmental organisations have also hitherto focused on single aspects of these irretrievably interconnected catchment management challenges. A number of research projects, policy initiatives, management programmes, and innovative activities aimed at sustainable water supply, conservation of biodiversity and poverty alleviation have therefore evolved. However, these are uncoordinated due to lack of understanding of the inherent linkages between IWRM, SL and CBD. The result has been persistent intra- and trans-boundary conflicts; increasing poverty levels and, in turn, increasing degradation of natural resources and a decline in biological diversity.

INTREPID recognizes that to achieve the desired improvements in human livelihoods and economic growth in African economies, research projects, policies and programmes aimed at managing Africa's water resources and biological diversity should be designed to enhance environmental security, social security and economic growth. Specifically, within these three spheres, special attention is needed with respect to conservation of biological diversity, participatory democracy and growth in income per capita, respectively. All three objectives are closely interconnected and research programmes and management plans and policy initiatives focusing on individual aspects are likely to fail. The INTREPID project was therefore designed to provide a platform for inter-disciplinary, interregional and international collaboration and networking for the coordination of on-going research, policy development, management plans, and other innovative activities in the Mara river basin. The project was expected to draw on the experience gained in past projects and the work towards the implementation of the EU-Water Framework Directive (EU-WFD), the EU Water Initiative (EU-WI) and the African Water Vision (AWV).

Specifically the project will address the interlinked challenges in the Mara river basin, one of the most vulnerable and most studied trans-boundary river basins in semi-arid Africa, as a case study (see Figure 1). The Mara is among the most ecologically important river basins in sub-Saharan Africa. It is a trans-boundary river basin hosting most of the endangered wildlife species and some of the poorest populations in the sub-region. The institutional, geo-political, socio-economic, biophysical and global drivers of sustainable natural resource management in Kenya and Tanzania also present different types of challenges to trans-boundary and international coordination in river basin management.

Figure 1: The Mara River Basin

The Mara River catchment typifies the conflicts between wildlife tourism, biodiversity management and national income growth, where water availability is a major driver. It encompasses both the Masai Mara National Reserve (MMNR) in southern Kenya and the adjacent Serengeti National Park (SNP) in northern Tanzania, a World Heritage Site, UNESCO Biosphere Reserve and Conservation International Global Wilderness Area. The Serengeti - Mara Ecosystem encompasses some 25,000 km^2 and supports the last viable large-scale migration of grazing mammals on earth. Some 2 million wildebeest, zebras and gazelles move in a roughly circular route from the short-grass plains of the southern Serengeti to the dry season refuge of the Masai Mara. The migratory and resident

ungulates support one of the largest concentrations of predatory mammals and birds in the world. The SNP and MMNR are central to the economic development of Kenya and Tanzania respectively as they are the focus of the thriving wildlife tourism industry in each country. Water management is central to the sustainability of this ecosystem – the Mara river which rises on the Mau Escarpment in Kenya is a critical source of water for the Tanzanian Serengeti – and there are concerns about plans for water extraction for agriculture in Kenya. There is currently no integrated trans-boundary agreement between Kenya and Tanzania for the Mara river basin and different policies, ministries and programmes exist for singular management of biodiversity, the national park and water resources in both countries. More recently, the several ministries for the management of parts of the system were created by the Kenyan government, potentially complicating further the problems of achieving integrated management of ecosystems in the country.

The major outputs of the SSA will be the establishment of a web-hosted, interactive database resource for coordinating information on IWRM, CBD and SL in the Mara river basin. This will provide a system for knowledge sharing to strengthen inter-personal and institutional collaboration between projects, management programmes and responsible authorities for sustainable management of water, biodiversity and livelihoods within the Mara river basin. In addition, a synthesis of the outputs from this pan-African stakeholder policy forum will be published as a policy brief and made available to stakeholders at all levels. Together these outputs will provide the foundation for a conceptual framework for new research, improved policy initiatives and equitable partnerships between key stakeholders in the management of one of the most vulnerable river basins in the semi-arid regions of Africa. Dissemination of best practice in riparian catchment management will be continued via a web-based interactive database / information system, and follow-up projects and management initiatives to achieve the twin goals of conserving biodiversity and improving livelihoods in the region.

1.1. Relevance to the objectives of the INCO Specific Measures

INTREPID project has been designed to achieve the general objective of the international cooperation activities of the EU Framework Programme, by providing a platform for a mutually beneficial networking, collaboration and cooperation for equitable partnership between European and African research communities focusing on a subject of common interest. The advent of the EU Water Framework Directive (WFD) and the African Water Vision (AWV) has brought a new emphasis to the need for integration of the social, economic and ecological aspects of water management in both continents. INTREPID promotes joint partnerships in addressing the difficult but necessary co-ordination for the sustainable management of water, biodiversity and livelihoods. In relation to the specific objectives of the INCO programme, the project addressed the following areas:

1.1.1. Promoting inter-disciplinary, interregional and international networking and cooperation

INTREPID responded to this need by providing a platform for EU and African researchers, policy makers and relevant stakeholders to share good practice on how water catchments might be managed to achieve the twin goals of sustainable ecosystems and sustainable livelihoods. The project team and stakeholder policy forum participants comprised experts from diverse but complementary disciplines and policy backgrounds. It is expected that participants will continue to work together to encourage inter-disciplinary and inter-sectoral knowledge-sharing, an objective that has been identified as crucial to successful integration for sustainable management of river basins. The interactive database resource will also continue to promote knowledge networking and collaboration between existing research programmes, policy developments and responsible ministries in both Kenya and Tanzania. The output from the project will be used to provide a template for further research and other collaborative initiatives.

1.1.2. Opening up the cutting-edge research on the EU Water Framework Directive (WFD) to the world for trans-national technology transfer and sharing of good practice

The EU Water Framework Directive (WFD) provides an objective-based framework for integrating the ecological and socio-economic perspectives of the management of water resources to achieve the dual goals

of improving the ecological status of water catchments while ensuring sustainable livelihoods for EU member countries. Researchers, policy makers and water managers in the EU have therefore been developing protocols, tools, models, management options etc for the implementation of the WFD in many case-study basins across the EU, including those of the semi-arid regions of southern Europe. Most of these projects such as TWINBAS, TWINLATIN, BMW, ADVISOR, etc have identified some good practices, challenges and opportunities for integrating the ecological and socio-economic perspectives to the management of water resources in EU catchments. Similarly, many African Governments are in the process of developing policies for water, biodiversity, and livelihoods in response to the Africa Water Vision (2000), other global policy drivers, international agreements and pressures from development partners and donor agencies. Some of such policy drivers include the Millennium Development Goals (MDGs), the World Summit on Sustainable Development (2002), the 3rd World Water Forum in Kyoto (2003), the African Ministerial Council on Water and the programmes and actions articulated under the NEPAD framework. This policy environment has resulted in many innovative research programmes and development of management options in semi-arid river basins in Africa and in the EU. The INTREPID project provided a unique opportunity for the opening up and sharing of research, technology transfer and good practice between the EU and Africa, including between past and on-going EU-funded projects. Some of the EU research projects providing the criteria for evaluation of good practice include: TWINBAS, BMW, WEERD, NO-LIMP, ADVISOR, HARMONI-QUA in the EU and MAPOSDA, ZACPRO6.2, PCN, in Africa. The INTREPID Stakeholder policy forum provided a platform for knowledge sharing between researchers in some of these programmes.

1.1.3. Promote equitable and mutually beneficial research co-operation between Europe and Africa

Each of the INTREPID work-packages was carried out jointly to encourage knowledge exchange between the EU and African partners. The specific coordination activity, i.e. the stakeholder policy forum focused on promoting equitable partnerships between the European and African partners, drawing on the wealth of experiences in the implementation of the EU-WFD and Africa's response to the Africa Water Vision. We have already seen a number of memorandums of understanding developed between partner institutions, new project initiatives etc being developed by participants of the stakeholder policy forum.

1.1.4. Development of research or innovation strategies

A central goal of the INTREPID project was to promote collaboration and networking for the rational use of natural resources and associated ecosystems under the specific context (ecological, climatic, social and economic conditions) of developing countries, one of the main areas within the work plan of the INCO programme for developing countries. Three collaborative project initiatives have already emerged from the INTREPID project amongst wider consortia of institutions working on related subjects. The concept notes for two of the projects have received approval by respective donors while the third is under development for submission to the EU Framework VI programme. The project initiatives will focus on promoting sustainable management of the most vulnerable river basins in semi-arid ecosystems in Africa, taking into account the integrated water management on a river basin scale (recommended by the EU Water Initiative as well as Article 10 of the Convention on Biological Diversity (CBD)). It will also support the implementation of the provisions related to research and sustainable use included in the CBD work programmes. It is expected that these projects will foster integrated management of water catchments in semi-arid river basins, which is central to sustainable livelihoods and conservation of biological diversity in the developing countries.

1.1.5. Wider Societal and Policy Objectives

The INCO programme has several other overarching policy objectives which the INTREPID project also addresses. Specifically the project has helped the EU partners to strengthen / develop sustainable networks to promote equitable and strong scientific partnerships with researchers, policy makers and other key stakeholders in Africa. The ATPS is hosting a strategic programme planning workshop with selected partners in July 2008 to take forward ideas on how to strengthen these partnerships under the auspices of its future programmes. It is expected that these networks will continue to promote to poverty alleviation, conservation of biodiversity through integrated water management knowledge networking. This will

provide an essential platform for furthering the goals of the EU-ACP Forum for Africa, to discuss Science and Technology (S&T) cooperation activities and to take into consideration the commonly agreed priority research areas. INTREPID also fulfils the thematic focus of the INCO programme by focusing on one of the vulnerable semi-arid ecosystems most at risk of increased desertification, loss of keystone species and escalation of poverty – the Mara river basin.

Overall, the INTREPID project contributes to improved regional co-operation strategies, the understanding of the linkages (conflicts, synergies, etc) between IWRM, SL, and CBD in semi-arid regions of Africa. Participation in the forum includes relevant development organisations, government agencies, NGOs and stakeholder groups. The participants of the INTREPID Stakeholder Policy Forum are listed in Annex 1[1].

[1] It has to be noted here that due to the post election violence in Kenya, the stakeholder workshop venue was moved to Tanzania and this affected the number of participants. Some of the invited participants declined participant due to travel restrictions at the time.

2 BACKGROUND TO THE STAKEHOLDER POLICY FORUM

A strong relationship between science and society can solve many of the real world problems. Livelihoods in semi-arid areas depend on a biological resource base underpinned by access to water. Increasing human populations and water stress comes with pressures to harness water resources for 'higher economic value' uses, instead of an integrated approach, which includes provisions for ecosystem conservation and livelihood sustainability. Nowhere is this lack of integration more prevalent than in the semi-arid regions of Africa.

The linkages between integrated water resource management (IWRM), sustainable livelihoods (SL) and Convention of Biological Diversity (CBD) are not well known. River basin management, biodiversity conservation, and livelihood programmes in Africa have evolved independently, with often overlapping and/or conflicting goals and responsibilities. The result has been persistent intra and trans-boundary conflicts; leading to increasing poverty and declines in biological diversity. However, this is not the ideal scenario as these issues do not belong in conflicting worlds. As Franklin[2] stated, "the lack of clear integration may prove counterproductive for science policy especially in a field, such as biodiversity where environmental, economic and societal aspects are closely interlinked".

The African Technology Policy Studies Network (ATPS) and its partners including the Macaulay Land Use Research Institute, UK (MLURI) and the Tanzania National Parks (TANAPA) co-hosted a stakeholder policy forum to address this disparity. The forum recognized that IWRM, CBD and SL are irretrievably interconnected and that water management and policy initiatives focusing on individual aspects are likely to fail. The meeting aimed to address this gap by initiating and promoting inter-disciplinary and international collaboration to integrate sustainable water resource management, biodiversity conservation and livelihoods using the Mara River Basin as a case study. The forum provided a platform for policy makers, practitioners and researchers selected from Europe and Africa to consolidate expertise on African IWRM systems and draw on experiences from the implementation of the EU-Water Framework Directive (WFD) and Africa Water Vision 2000 to promote and reinforce the vital synergies between IWRM, CBD and SL.

Presentations and discussions focused on reviewing projects and policy initiatives in the Mara River Basin system in Kenya and Tanzania with the aim of identifying the potential linkages, conflicts and complementarities amongst them. It is envisaged that the principles and outcomes from the conference and workshop will provide an integrated framework for future policy development and research covering other vulnerable river basins throughout the semi-arid regions of Africa.

[2] A. Franklin (2005) 'Linking Science and Policy for Biodiversity', Hydrobiologia (2005) 542:15–17

3 STAKEHOLDER POLICY FORUM OPENING SESSION

The opening session of the stakeholder policy forum was chaired by Dr Sam Ekstrand of the IVL Swedish Environmental Research Institute. He noted that the session would concentrate on welcoming remarks from the conference organizers. The speakers were Dr Urama (Project Coordinator), Mr Davidson (Project Administrator), Mr Lejora (on the behalf of TANAPA) and Dr Pereira (of the EU Joint Research Council, Italy).

From Left, Mr Inyasi Lejora, TANAPA, Dr Kevin Urama, Project Coordinator, INTREPID, and Mr Grant Davidson, Macaulay Institute, Aberdeen

3.1 Remarks by Dr Kevin Urama, Project Coordinator

Dr Urama noted that every year, about one million wildebeest undertake their magnificent pilgrimage in an event, which has been described as "one of the most awe inspiring sights on earth" and "spectacular marvel of mother nature". This annual migration was recently named the *seventh new wonder of the world* by a panel of multidisciplinary experts and has since become the pinnacle of East African Tourism. The migration is based in the Mara-Serengeti plains.

According to Dr Urama, on the surface, there seems to be a mutually beneficial co-existence in the Mara-Serengeti ecosystem. The big cats get abundant prey from the wildebeests, the crocodiles in the Mara River get an easy meal during the great migration, the tourists have an unforgettable experience and the tourism based industries reap handsome dividends. This seventh wonder is, however, the nightmare for the indigenous communities living within and next to the river basin making a living from the common pool recourses shared with the wild life. The common pool resource use conflicts that ensue are both subtle and vicious, exacerbating poverty and endangering the sustainability of the water resources on which both sustainable human welfare and biodiversity depends. In some cases, the human-wildlife conflicts observed in the Mara are even lethal! This has been confirmed by conservation experts who observed that some of the poorest rural communities in the world live in close proximity to national parks and reserves.

A report on *Human-Wildlife Conflicts in Kenya*[3] indicates that about 200 people have been killed by wildlife in the last seven years and a larger number of people have been injured and maimed. Experts agree that

[3] http:/www.panda.org/about_wwf/where_we_work/Africa/publications/index.cfm

these conflicts are exacerbated when human beings and animals compete for farmland, water, and other basic resources for livelihood. A number of projects, policy initiatives and management programs have been implemented over the years to conserve the wondrous works of nature in the Mara basin. What is not clear, however, is why the conflicts continue, the Mara ecosystem continues to be depleted and poverty in the region deepens. Dr Urama noted that the Mara region typifies the potential for conflicts between wildlife tourism, water management and rural development that the INTREPID project aims to address.

He said that experience has shown that river basin management, biodiversity conservation, and livelihood programmes in the region, as well as in many African countries have evolved independently. Separate Government Ministries are responsible for parts of the system; separate NGOs addressing separate aspects of the system, and separate disciplinary scientists testing different scientific hypotheses/asking different scientific questions to understand the dynamics of the parts of the ecosystem. In some countries, separate Government Ministries exist for the Environment, Wildlife, Rural development, Management of Semi-Arid Areas, etc. Different NGOs exist for conservation of biological diversity with many focusing on keystone species, for example, big cats, elephants, rhinos, etc with only a fleeting attention paid to the system as a whole. Yet, experience shows that projects and policy initiatives, which focus solely on water management, biodiversity conservation or sustainable livelihoods are likely to fail. Such non-holistic approaches, Dr Urama said, would result in persistent intra and trans-boundary conflicts, which subsequently lead to an increase in poverty, continued decline in biological diversity and degradation of the of the ecosystem. He concluded his opening remarks by noting that all parts of the ecosystem are inextricably linked and partial approaches to the management of the ecosystem would therefore lead to partial results. He encouraged participants to think laterally during the policy dialogue during the forum, noting that "until we think outside the silos of our disciplinary and institutional boundaries, achieving sustainable integrated management of the Mara ecosystem may remain a mirage". The INTREPID stakeholder forum, he said, has brought together delegates from different disciplinary and institutional backgrounds to address the linkages and potential synergies in the Mara system through trans-disciplinary, inter-regional and international knowledge sharing and networking. He welcomed all participants to the forum and expressed satisfaction at the diversity of delegates from the Great Lakes region, especially Kenya, Tanzania, and Uganda; as well as delegates from the SADC and ECOWAS regions of Africa and international experts from Europe. He encouraged participants to share their experiences and develop new Networks for taking some of the ideas that will emerge from the forum forward in new projects, initiatives and policies for integrated management of river basins elsewhere. He noted that the INTREPID partners are interested in taking forward a regional project initiative to develop integrated management frameworks for the Mara, the Okavango and the Chad basins.

3.2 Remarks by Mr. Grant Davidson, Project Administrator

Mr Davidson explained that the Macaulay Institute (MI) is an interdisciplinary research institute primarily funded by the Scottish government and other donors. He noted that the staff of the Macaulay institute has worked on integrated river basin management, sustainable livelihoods and biodiversity conservation projects in many countries and continents. He introduced the INTREPID project team members from the Macaulay, Dr Simon Thirgood who brings with him several year of experience in biodiversity conservation in the Serengeti ecosystems; Dr Simon Langan who brings with him several years of experience in integrated water resources management in the United Kingdom, Dr Kevin Urama who brings with him several years of experience in integrated management of economic, ecological and social systems for sustainable natural resources management and poverty alleviation. He noted that Dr Urama has worked mainly in the area of the ecological economics of water and biodiversity management in both Africa and in Europe and is currently the Executive Director of the ATPS, on leave from the Macaulay Institute. Dr Grant who has also worked on integrated water resources management in Europe and in Asia said that, as the Administrator of the INTREPID project, he was delighted by the response to the invitation by the diverse stakeholders present at the workshop and hoped for fruitful deliberations during the forum.

He noted that the INTREPID project is a specific support action project designed to foster knowledge sharing and collaboration. He noted that the project proposal was submitted to the European Union (EU)

in 2006 and commenced work on 01 April 2007. He stressed the issues discussed by Dr Urama, which he said would be even more important today especially as the impact of climate change on fragile ecosystems, such as the Mara are on the rise. He added that the INTREPID project had completed a review of the ongoing projects, policies and management initiatives in the Mara basin and the development of a database resource on which the information will be hosted. The database will provide a web-hosted resource which stakeholders could access and update regularly with information on ongoing projects, management and policy initiatives. The aim, Mr. Grant said, is to foster proper coordination between projects, management programs, and policies for future integrated management of the basin. Dr Grant noted that INTREPID project is in its final stages and the stakeholder forum is designed to give stakeholders a chance to contribute to the process through a review of the INTREPID database to in-fill existing gaps, encourage networking and collaboration amongst the key actors in the basin, share good practice, identify knowledge gaps for future projects and management initiatives, and document the findings in a policy brief for dissemination to the wider stakeholders in Africa and Europe. He noted that while the INTREPID project would end in June 2008, there is need for participants to take forward the ideas that would emerge from the forum in new projects.

3.3 Remarks by Mr Inyasi Lejora, TANAPA

Mr Lejora conveyed an apology from Dr Emmanuel Gereta, former Director of Parks, Tanzania National Parks Authority (TANAPA).

He expressed his appreciation for the timeliness of the forum because water and biodiversity management remain important issue in Africa, especially in complex ecosystems such as the Mara. He said that it is important to have a broad picture of managing the ecosystem resources so that they are not lost through conflicts. The speaker confirmed that the Bastian River has dried up and that TANAPA has observed significant degradation in the Mara basin. The populations of some key stone species are declining and the welfare of the adjacent communities is not improving either.

Mr Lejora noted that TANAPA is a parastatal of the Government of Tanzania, which was formed in 1959 to oversee areas that had been gazetted as national parks. Initially there was only one park but currently there are 14 parks due to the growing need to manage the system. He added that TANAPA's core business is wildlife conservation but it also promotes tourism. The relevance of INTREPID to TANAPA's mandate can therefore not be over emphasized as dealing with poachers remains a challenge.

He invited the participants to visit the various parks in Tanzania. However, he said that the rhinos have been wiped out by poachers at the Manyara Park, but some may be found at the Ngorongoro and Serengeti parks.

3.4 Remarks by Dr Angela Pereira, European Commission Joint Research Council, Italy

Dr Pereira said that INTREPID project is funded under the Commission of the European Communities Research Directorate-General's programme on Integrating and Strengthening the European Research Area Specific Support Action INCO programme. She explained that INTREPID project was amongst a number of other projects financed under framework programme 6, and noted that the EC's Program 7 is now ongoing too.

The INCO progamme aims to enhance international cooperation to open up the EU research to the world through mutual synergies that are

beneficial to the European member states and INCO[4] target countries. The programme runs through several thematic areas to support the implementation of the communities' foreign policy and development of policy. The programme aims to honor some global commitments like the fight against poverty, the EU water initiative and the millennium development goals (MDGs).

Dr Pereira stressed that the INTREPID project is ambitious and noted that it will be helpful if the forum could identify the key linkages and synergies amongst existing projects, management programs and policy initiatives in the three areas which the project is focusing on: biodiversity conservation, integrated water management, and rural livelihoods. She note that these are inextricably linked. Sustainable management initiatives must therefore take these inter-linkages into account. She welcomed the interdisciplinary participatory methodological approach adopted for the forum and expressed enthusiasm that the forum would remain dynamic and participatory to ensure valuable outcomes. She ended her opening remarks by noting that she would return to the concepts of "integrated management", "integrated water resources management", their inter-linkages with relevant policies on biodiversity conservation, and livelihoods improvement in Europe and how these have been implemented under the EU Water Framework Directive (EU-WFD). She noted that while sound policies exist, interpretation and implementation by member stakes remains challenging. She therefore looked forward to learning from the diverse expertise of the participants and their longstanding experiences in managing the Mara and other basins in semi-arid areas of Africa.

[4] EU's International S&T Cooperation Programme

4 CONFERENCE PLENARY PRESENTATIONS

The plenary sessions involved presentations designed to introduce the underpinning concepts of the intrepid project and share the existing knowledge resources garnered by participants who have been working on different research programmes and projects under the auspices of the EU-framework programmes, and other research and water and environmental management programmes in Africa (Figure 2).

Cross sections of Participants during the plenary session of the INTREPID Forum

4.1 Plenary Session I: Good practice in managing water, biodiversity and livelihoods: Some example policies and projects

Prof Francis Mutua of the University of Nairobi chaired the session. Dr Urama, Dr Pereira, Dr Thirgood, Ms Pound of Dialogue Matters and Prof Mutua presented papers. An overview of their presentations follows.

4.1.1 Integrated Trans-boundary River Management Policy Development, EC Commission Specific Support Action Project: An introduction

By Dr Kevin Urama,
Project Coordinator, MLURI/ATPS

Dr Urama's presentation focused on the INTREPID project that is funded by the European Commission (EC) under the Contract N0 FP6 – INCO-CT-2007-043784 INTREPID. Dr Urama introduced the project goals, specific objectives and rationale as well as the expected outcomes and deliverables. He noted that the project which is being funded by the EC, addresses the specific INCO objectives on rational use of natural resources, managing arid and semi-arid ecosystems, and sustainable integrated water resources management (IWRM) at river basin scale. He noted that the INTREPID project was designed to promote and support inter-disciplinary networking and collaboration to develop strategic policy initiatives for the sustainable and integrated management of water resources, biodiversity and livelihoods in the Mara river basin of Kenya and Tanzania.

Dr Urama explained that the activities of human beings and the wildlife have significant effects on the

quality and quantity of water resources on which the biodiversity and human livelihoods depend. He noted that in spite of the inextricable linkages, management initiatives, research projects and policy initiatives for managing water, biodiversity and livelihoods has hitherto evolved independently. Dr Urama blamed the lack of success in sustainable management of the ecosystem on the apparent ad hoc approach to ecosystem management in disregard to this inherent coexistence and synergies amongst the components of the system. This approach, he said would lead to what he described as "the vicious cycle of natural resource degradation and human impoverishment" (see Figure 2)

Figure 2: Vicious Cycle of Natural Resources Degradation and Human Improvement

Dr Urama explained that this forms the conceptual basis for the INTREPID project. Designed to better understand the inter-linkages, conflicts and synergies in the system, the INTREPID project believes that to achieve sustainable human and ecological wellbeing, an integrated approach to policy measures on economic growth, environmental security and social security is required. He noted that while integrated water resources management (IWRM), conservation of biodiversity (CBD) and poverty alleviation have been buzzwords in the past decade, little has been achieved in semi-arid ecosystems as different Ministries, Development Partners and Researchers take sectoral approaches to managing ecosystems. While projects on IWRM emphasis the hydrology of the basin system with tokenistic interest in human welfare, the ecologists and conservationists mainly focus on conservation and/or protection of selected keystone species in the basin ecosystems. The experts and responsible ministries for community development and social welfare, on the other hand, often remain interested in the functional/economic value of wildlife, forest ecosystems and water resources in the basins. A number of projects and initiatives may therefore proceed on sector defined goals and objectives with little attention given to the domino effects on other sectors and/or ecosystem components. Dr Urama noted that a holistic innovation systems approach to managing ecosystems is necessary.

To address this problem, the INTREPID project seeks to:

- Develop a generic web-hosted interactive database resource and information system for policy makers, researchers and practitioners; and
- Promote interregional and international networking, knowledge sharing and collaboration between researchers, policy makers and practitioners working on IWRM, CBD and SL in the Mara catchment and in other vulnerable river basins in Africa.

He explained that the pan-African stakeholder policy forum is designed to review the database resource and

to identify the gaps and linkages between research projects, policies and management initiatives going on in the Mara basin. He explained that the participants from Europe have been invited to share knowledge on cutting-edge research on the EU Water Framework Directive (EU-WFD) and the EU Water Initiative, while other experts from other semi-arid Basins in Africa have been invited to share experiences in the implementation of the African Water Vision in their countries.

The presenter encouraged the participants to think laterally during the policy dialogue and not be constrained by "disciplinary silos". He explained that rather than trying to replicate the disciplinary science research and sector based management and policy initiatives which has gone on for decades in the Mara, INTREPID hopes to improve regional understanding of the linkages (conflicts, synergies, etc) between IWRM, SL and CBD in semi-arid regions in Africa. It is hoped that the forum would come up with innovative ideas on how to take a holistic systems approach to river basin management forward, both in the Mara and elsewhere. He noted that the deliberations at the forum would be synthesized in a policy brief which would be disseminated widely in Africa and beyond with a view to fostering new thinking on how trans-boundary river basins in semi arid ecosystems are managed. He also hoped that a number of policy gaps would be identified and taken forward in new project proposals by a consortium of participants at the forum and/or key actors who should be involved in the management of the Mara and other basins in semi-arid regions, such as the Chad. He stressed that promoting equitable and mutually beneficial research co-operation amongst European and African institutions and stakeholders is one of the goals of the INTREPID project. He added that at the policy level, INTREPID aims to promote international cooperation in integrated river basin management policy development. Finally, the project is expected to develop research and/or innovation strategies for rational use of water resources for poverty alleviation and conservation of biodiversity in semi-arid regions in Africa and elsewhere.

He concluded his presentation with a list of expected deliverables of the project:

- A web-hosted framework for an interactive database,
- Comprehensive inventory of existing knowledge, policies and management initiatives, to populate the interactive database,
- Stakeholder policy forum and report,
- Policy brief on sustainable integrated management of water, biodiversity and livelihoods, and
- Final dissemination plan.

He encouraged the participants to interrogate the database recourse which will be presented at the forum and ensure that the interface is user-friendly and the content is comprehensive.

4.1.2 Is IWRM a Template for Integrated Management of Water, Biodiversity and Livelihoods?

By Dr Angela G. Pereira
European Commission Joint Research Council, Italy

Dr Pereira explained the integrated water resource management (IWRM) concept as used under the EU-WFD. She explained in detail, how the IWRM principles are embedded in the EU-WFD and the EU Water Initiative. She clarified that while the EU water initiative and the EU-WFD has effectively mainstreamed the discourse on IWRM principles and factors surrounding this concept, these EU legislations could not possibly be regarded as a templates for integrated management (IM) of water, biodiversity and livelihoods. Dr Pereira stated that the 2002 Global Water Partnership defined IWRM as a process, which promotes the coordinated development and management of water, land and related resources, to maximize the resultant economic and social welfare equitably without compromising the sustainability of vital ecosystems. She further explained that, on the other hand, the four *Dublin-Rio* principles – water is a finite and vulnerable resource, its development and management should be based on a participatory approach, women should be allowed to play a central part, and water has an economic and social value in all its uses. According to Dr Pereira the EU-WFD and the European Union Water Initiative (EU WI) share the principles of IWRM under the water framework directive of EC 2000/60, which established a framework for the community action in water policy. The EU WI was launched at the 2002 World Summit in Johannesburg, South Africa.

She explained that both initiatives share in the global water partnership, 2002, which promotes the coordinated development and management of water, land and related resources, in order to maximize the

resultant economic and social welfare in equitable manner without compromising the sustainability of vital ecosystems. The concept of "integration" in IWRM is all encompassing, requiring that: (i) different management goals in water management such as equity, economic efficiency and ecological sustainability should be integrated; (ii) all water resources (freshwater, coastal zones, surface water, groundwater, etc) should be treated as a system, (iii) all management initiative, including water resources, land resources should be treated as mutually dependent; and all externalities of resource use including social, economic, and ecological effects of water uses and water policies should be factored into the analyses, through both qualitative and quantitative criterion. In this spirit, the EU-WFD (EC 2000/60) established a framework for the European Community Action in the field of water policy. This Directive obliges member states to manage water resources at river basin district scales, report on existing pressures, impacts and water uses as well as develop monitoring programmes and develop river basin management plans by the year 2015.

Under the auspices of the EU-WFD, water is not a commercial product, but a heritage that must be protected, defended and treated as such. She explained that the EU-WFD, however, encourages public participation in river basin management as well as the use of economic tools such as cost recovery, polluter pays principle, economic analysis of water uses etc. On the other hand, she explained that the EU-WI was launched at the World Summit 2002 in Johannesburg to promote partnership and co-coordinated action among EU co-operating programmes in developing countries for poverty reduction.

She explained that while both the EU-WFD and the EU-WI both helped to mainstream the concepts of integration, they are nebulous, not definable and not yet fully operational. However, as evolving concepts, they have served to impose institutional changes in the member states but its real impacts are still uncertain. Quoting, the UN Report (2005), Dr Pereira said that "the currency of pledges from the international community is by now so defeated by non-delivery that it [IWRM] is widely perceived as worthless". She explained that the IWRM has remained difficult to operationalize and the economic instruments used in the implementation planning has hardly worked well. She also explained that the political will of member states are important, and advised the INTREPID partners to be aware of and engage constructively with the political processes in their countries to ensure that policy recommendations can be implemented.

In conclusion, Dr Pereira noted that the application of IWRM under the EU-WFD and the EU-WI could not be regarded a panaceas for integrated management of water, livelihoods and biodiversity. She noted that: IWRM ought to be relevant to improvement of community livelihoods through a number of facets: empowering the poor through the integration of all stakeholders in the planning and decisions making (Principle II: participatory approach); reducing poverty through improved water and sanitation; and promoting economic growth, etc. However, the current implementation of the concept under the EU-WFD and the EU-WI do not put improving livelihoods of people at the centre. Quoting Merry et al. (2005), Dr Pereira noted that it is not usual to find "water for people use" as a central objective of the new IWRM policies. She added that institutional support to enforcing social responsibility for negative downstream impacts or off-site externalities arising from water uses are still weak in many countries. Dr Pereira said that the same is the case for IWRM and biodiversity conservation under the EU-WFD and the EU-WI. She explained that both initiatives do not take a "truly" holistic natural resources management view. They both make references to "land" but "forest resources management" and "biodiversity management" are not explicitly required. She explained that while many clauses in the EU-WFD such as "water for nature" and "ecological sustainability" suggest that IWRM may be addressing biodiversity, these important components of integrated management are left to multiple interpretations. The EU-WFD also proposes the use of tools such as strategic impact assessment, risk assessment, etc which are relevant to biodiversity conservation. She concluded that the EU-WFD does have does implicitly have some provisions for biodiversity conservation in Articles 4.1 (c) and article 6 and also contributes towards other international obligations on biodiversity conservation, especially in marine environments. However, the Directive has no explicit provisions for biodiversity conservation.

Dr Pereira, therefore concluded her presentation by commending the EU-WFD and the EU-WI as useful tools which have helped take forward the integrated management of water in Europe. However, "regarding livelihoods and biodiversity, it needs certainly some reflection before it becomes a "template". She noted that IWRM and IM are evolving concepts and encouraged the forum to adopt a freely participatory approach to exploring them in the contexts of the Mara river basin and the stated objectives of the INTREPID project.

4.1.3 Is IWRM under the African Water Vision 2000 a Template for Integrated Management of Water, Biodiversity and Livelihoods?

By Prof Francis Mutua
University of Nairobi

Prof Mutua presented some fundamental facts about water resources in Africa and drew some parallels with regard to African Water Vision and actual implementation in Africa countries. He explained that goals become unachievable if the implementation strategy is impractical. Prof Mutua noted that while the African Water Vision has laudable goals and objectives and use the rhetoric of integrated water resources management as its sister Visions and Directives in Europe, implementation has been a major challenge. Most of Africa's largest rivers are severely fragmented by dams, diversions and canals, leading to the degradation of ecosystem. Rapid urbanization is still increasing urban solid waste generation and dumping in rivers. About 3 million people across the continent still die annually as a result of water-related diseases. Water quality is declining in most regions of the continent, and the knock-on effects on aquatic life have been immense. Prof Mutua explained that in the past 20 years, countries like Niger lost more than 80% of their freshwater wetlands, more than 600 lakes in Africa shrunk dramatically over the past decades, drained by deforestation, pollution and unsustainable farming. Prof Mutua decried the existence of Visions and Directives on water management, biodiversity conservation and poverty alleviation in the face of continued degradation in water resources, decline in biological diversity and deepening of poverty in the continent. He referred to the previous presentation by Dr Pereira, and said that he could not agree more with her conclusion that IWRM is a good idea but the problem is in the interpretation of the concept and actual implementation.

Prof Mutua stated that while Africa ranks second in water resources, the continent is plagued by a myriad of problems, such as water pollution and water poverty (see Table 1). He explained that lack of integrated water management is the major problem, which causes the continent to fall short of its huge potential. The rapid population increase in Africa has led to the demand increased for water and few countries will be able to cope.

Table 1: Renewable Water Resources and Water Availability by Continents

Continent	Area, km^2	10^6Population $x10^6$	Water resources, Km^3/yr		Potential water availability $x10^3 m^3/yr$
			Mean	Spatial Cv	per capita
Europe	10.46	685	2900	0.08	4.23
North America	24.3	453	7890	0.06	17.4
Africa	30.1	708	4050	0.10	5.72
Asia	43.5	3445	13510	0.06	3.92
South America	17.9	315	12030	0.07	38.2
Australia and Oceania	8.95	28.7	2404	0.10	83.7
The World	135	5633	42785	0.02	7.60

Prof Mutua further explained that the continent faces many natural challenges amongst which are: multiplicity of trans-boundary river basins, high spatial variability of available water resources, and extreme spatial and temporal variability of climatic conditions and rainfall patterns, desertification and

shrinking of some water bodies. He explained that in spite of these natural threats, confused policy frameworks and uncoordinated sector based approaches to managing water catchments in the continent persist. The net effect is that the increased threats from climate change and natural hazards are only responded to in ad hoc manners. Africa's vulnerability to food insecurity, political instability, resource use conflicts, and declining resource quality is therefore expected to deepen in the coming decade, unless urgent actions are taken. Prof Mutua applauded the INTREPID initiative to bring an assortment of stakeholders together to brainstorm on policy options for integrated management of the Mara, and hoped that this will provide a template for integrated management of similar trans-boundary basins in other regions. He noted that the time is now or never. Using Figure 3 below, Prof Mutua explained that Africa's climate variability is already increasing, and valued ecosystems such as the Kilimanjaro which provides significant tourism incomes to Kenya and Tanzania is feeling the impacts (Figure 3).

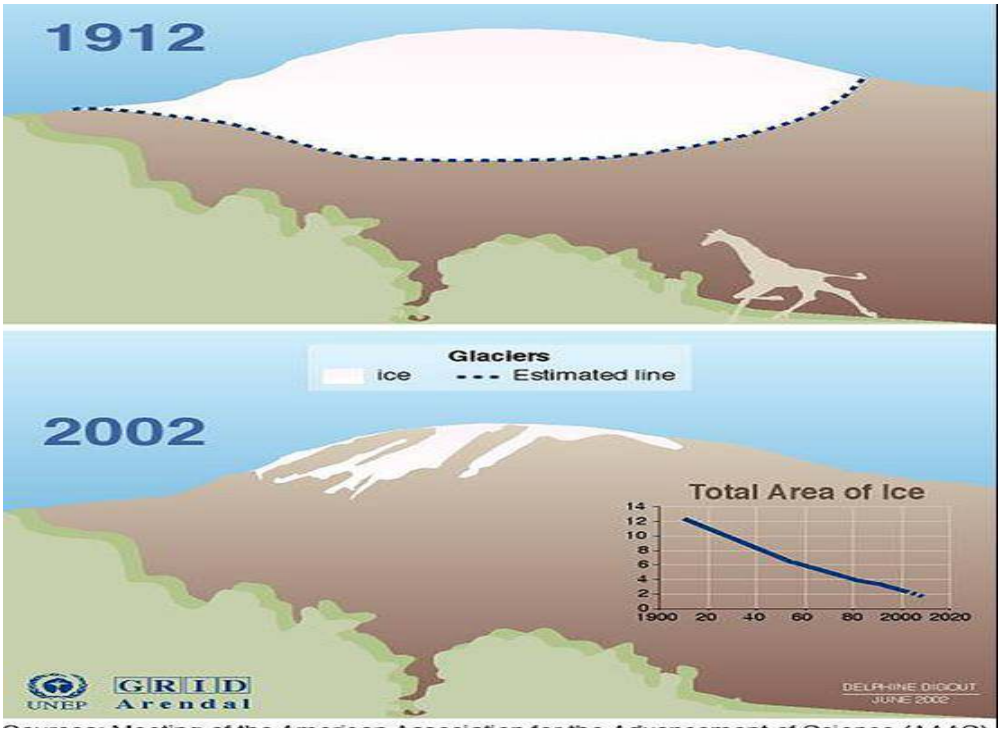


Figure 3: The Melting Snow of Kilimanjaro, 1912 – 2002, Source: Meeting of the American Association for the Advancement of Science (AAAS), February 2001: Earthobservatory.nasangov (cited by Mutua, **2008**)[5]

Prof Mutua presented a number of empirical evidence showing that water scarcity is growing, water bodies are shrinking, the frequency and intensity of droughts are increasing, and vulnerability to flood events are on the increase. He provided evidence to illustrate the effects on Lake Chad, which he explained is disappearing (Figure 4)

[5] Mutua, F. (2008). Integrated Water Resources Management and the Africa Water Vision, Presentation at the INTREPID Stakeholder Policy Forum, Arusha, Tanzania, 11 – 14 March 2008.

Figure 4: The Disappearance of Lake Chad (Cited in Mutua, 2008)[6].

Prof Mutua stressed that there is need to take a more integrated response to these phenomena as no action would have sever implications for livelihoods of both the wildlife and the human beings. Homing in on the Mara river basin, Prof Mutua explained that the flood and draught events in Kenya have been on the rise and at the same time farmers suffer frequent draught events (Figure 5).

Figure 5: Flood and Drought Vulnerability in Kenya (Source, Mutua 2008)[7]

Prof Mutua's presentation provided a clear exposition on the rationale for integrated management of water resources for sustainable livelihoods for both humans and the wildlife in semi-arid river basins. He explained that significant natural threats to access to water for agriculture and other uses are increasing. There are also human related threats, which include pollution; environmental degradation and deforestation; population pressure, poverty, poor technologies and over-reliance on rain-fed systems; inappropriate governance and institutional arrangements among others. He concluded that the abundance of water in Africa was not in question but rather managing it to attain the desired goals. He concluded that while the African Water Vision is a step in the right direction, implementation of the concept of integrated water resources management still remains a mirage. He commended the INTREPID framework which provides a useful lens that could inform an integrated river management policy development in theory and in practice. He recommended the Drivers, Pressures, State, Impact and Response (DPSIR) framework as a useful tool for developing sustainable polices and management techniques for the Mara.

[6] Mutua, F. (2008). Integrated Water Resources Management and the Africa Water Vision, Presentation at the INTREPID Stakeholder Policy Forum, Arusha, Tanzania, 11 – 14 March 2008.

[7] Mutua, F. (2008). Integrated Water Resources Management and the Africa Water Vision, Presentation at the INTREPID Stakeholder Policy Forum, Arusha, Tanzania, 11 – 14 March 2008.

4.1.4 Biodiversity, Financing and Livelihoods in the Serengeti Ecosystem by Dr Simon Thirgood, Macaulay Institute, Aberdeen, UK

By Dr Simon Thirgood
Macaulay Institute, Aberdeen, UK

Dr Thirgood noted that INTREPID project selected the Mara ecosystem for the inception study as the Mara-Serengeti system provides unique characteristics which typify the conflicts between biodiversity, water management and human livelihoods. He provided seven reasons why the Serengeti ecosystem is special. Some of these reasons include the fact that (i) the ecosystem is home to the biggest most rich and unique wildlife migration in the world; (ii) is home to many endangered species, Cheetahs, rhinos and wild dogs,(iii) home to many migratory and resident ungulates that support up to 10,000 predators, (iv) is an important and endemic bird area with 500 species of birds including 5 Tanzanian endemics. He explained that the ecosystems exist in multiple stable states where fire, rainfall and keystone species drive the ecosystem dynamics. The ecosystems also provides endless plains for predator-prey interactions and hosts the Mara and Grumeti river systems which sustain the livelihoods of plants, animals and humans in the ecosystem. Dr Thirgood, an experienced expert in wildlife conservation, concluded his description of the Mara-Serengeti ecosystem in three words: "a living laboratory".

Dr Thirgood explained that even though the Serengeti is drained by Mgalageti, Grumeti and Mara rivers, the Mara river system is the only permanently flowing water body in the basin, and is hence critical to the sustainability and persistence of the ecosystem, including the great migration. He explained that this presents the conflicts between human livelihoods and wildlife as the Mara river remains the source of water for the rural communities west of the Serengeti as well. The Mara supports US$17 million worth of crops in Tarime, Musoma and Serengeti districts alone. He explained that the area witnessed about 150,000 visitors and tourist revenue of US$7 million in 2004 alone. According to Dr Thirgood, the multiplier effects of tourism in the ecosystem provided 12% of Tanzania's Gross Domestic Product (US$75 million in 2001 and this is projected to rise to 25% of GDP by 2010). Dr Thirgood added that the Ngorongoro Conservation Area (NCA) within the ecosystem also provided US$8 million income from gate fees 2004. Of this revenue, US$6 million went into NCA expenditure budget while US$500, 000 was spent on community development projects. He explained that, in addition, the Masawa Game Reserve (GR) generates about US$250,000 per annum in hunting fees but the multiplier effects on the economy is unclear.

Despite the impressive income generation potentials through wildlife tourism in the system, Dr Thirgood noted that impacts on livelihoods of the rural communities are unclear due to institutional complexities and other political and social factors. He explained that many conservation ecologists are not experts in livelihoods but noted that the concept of community based ecotourism is now gaining wide acceptance amongst conservation ecologists. He noted that fundamental to the existing human-wildlife conflicts in the Mara-Serengeti ecosystem is the differential returns of arable agriculture, livestock and wildlife conservation. He explained that land areas with high rainfall patterns and high soil fertility are increasingly converted to arable agriculture thereby displacing wildlife. Adjacent communities do receive economic benefits from conservation areas through employment with the National Park Authorities and associated conservation initiatives. He noted that significant donor funding has been committed to community projects in the past. Some communities, such as the Ololosokwan village earned US$55,000 through creation of conservation "buffer zones", thus demonstrating the inherent potentials for improving livelihoods through wildlife conservation.

He concluded that there is need to understand the costs and benefits of conservation parks to park-adjacent communities. Elephant crop raiding and carnivore-livestock conflicts remains a challenge, mitigation measures are now in place through zoning, early warning systems, use of unpalatable crops, etc. He noted that, overall impact on adjacent communities may be low, but sever. He noted that pilot programs on wildlife management areas which seek to devolve governance of hunting and ecotourism to community based authorized associations, are ongoing in the Mara basin. However, the progress in implementation has been slow and more equitable benefit sharing mechanisms needs to be developed to generate community support for conservation.

In his concluding remarks, the presenter noted that the Serengeti is internationally recognized for biodiversity conservation and ecotourism. While ecotourism generates significant incomes for the Treasury, the adjacent communities bear most of the costs but receive few of the benefits. He noted that much is now known regarding the ecology of the Mara system and much work has been carried out on wildlife conservation in the system. However, more work is required in the areas of enhancing community livelihoods to ensure success of the conservation efforts. The full costs and benefits to adjacent communities of conservation initiatives in the basin are still unclear. He hoped that INTREPID will provide signposts for future integrated management of the system.

4.1.5 Ecosystems Approach and Convention on Biological Diversity

By Diana Pound
Dialogue Matters

Ms Pound presented the final paper of the session. She pointed out that environmental management is plagued by problems, such as interdependencies, complexity, uncertainty, as well as controversies and multiple perspectives regarding how it should be managed. She noted that the solution is to manage ecosystems as whole systems instead of being fixated on parts (sectors) of the system. She noted that the latter only serve to produce short-term benefits at long term costs.

She therefore described environmental management decision making as dealing with a can of worms, adding that an integrated management approach was needed to ensure that holistic solutions are found (Figure 6).

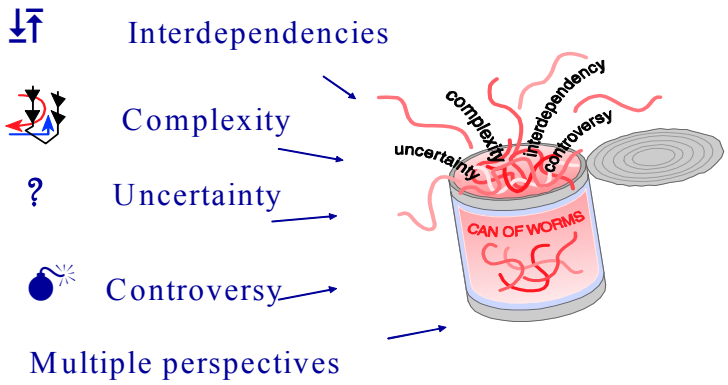


Figure 6: Problems associated with environmental management

She added that taking sector based and/or single disciplinary approaches to managing ecosystems would lead to a number of paradoxes. Using a proverbial elephant story, she explained that each sector-based and/or single disciplinary approaches to managing ecosystem resources is likened to a team of blind empiricists who describe different parts of the elephant from through their individual senses to touch and limited perspectives (Figure 7).

While each description is correct within the individual's sense of touch, each of the descriptions are far from a true description of the elephant. Insisting on sector-based solution may therefore continue to generate disciplinary debates which would in no way enable us to understand and/or manage ecosystems as a whole system.

Ms Pound defined the ecosystem approach as "a strategy for the integrated management of land, water and living resources that promotes biodiversity conservation and sustainable use in an equitable way". According to Ms Pound, this approach consists of the twelve principles and five points of operational guidance.

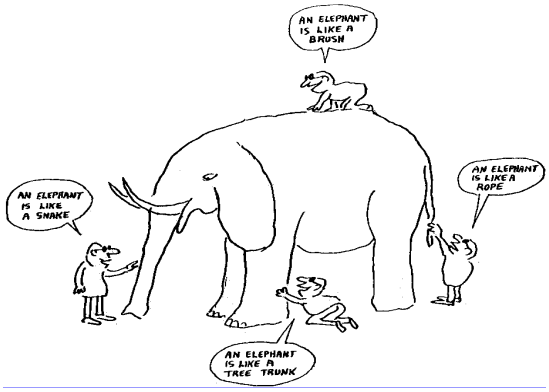


Figure 7: Limitations of Disciplinary Empiricism in Integrated Environmental Planning and Management

The principles often referred to as the Malawi principles are:

1. The objectives of management of land, water and living resources are a matter of societal choice.
2. Management should be decentralized to the lowest appropriate level.
3. Ecosystems managers should consider the effects of their activities on adjacent and other ecosystems.
4. Need to understand and manage the ecosystem in an economic context.
5. Conservation of ecosystem structure and function to provide ecosystem services should be priority.
6. Ecosystem must be managed within the limits of their functioning.
7. The approach should be taken at the appropriate spatial and temporal scales.
8. Process and objectives for ecosystem management should be set for the long term.
9. Management must recognize that change is inevitable.
10. Seek the appropriate balance between integration, conservation and use of biodiversity.
11. Decision-making should consider all forms of relevant information (scientific, indigenous and local).
12. It should involve all relevant sectors of society and scientific disciplines.

The five operational guidance principles include:

1. Focus on the relationship and processes within the ecosystem
2. Enhance benefit sharing
3. Use adaptive management practices
4. Carry out management actions at the scale appropriate to the issue, with decentralisation to the lowest level appropriate
5. Ensure inter-sectoral co-operation.

She noted that these guiding principles aim to achieve the conservation of biodiversity, sustainable use of its components and fair and equitable sharing of benefits. The presenter added her voice to earlier presentations regarding the good will in the concepts on integrated water resources management as deployed in many water and environmental management Visions and Directives both in Africa and the European Union, while actual implementation has remained problematic.

In her conclusion, Ms Pound said that the ecosystems approach has been adopted by the Convention on Biodiversity (CBD) and endorsed by the 2002 world summit on sustainable development. However, the challenges of better understanding how the ecosystem functions, better integration and understanding of human activities, use and management and better decision making processes still remain. She commended the INTREPID framework, noting that the participatory framework it has adopted would lead to better policy formulation for proper integrated management in the Mara and elsewhere.

4.2 Facilitated Session 1

The plenary presentations were followed by participatory sessions facilitated by Ms Pound, Dialogue Matters, UK and Ms Deepa Pullanikatil, Lerotholi Polytechnics, Lesotho. These sessions were designed to engage participants in different types of participatory processes in order to address pertinent issues arising form the presentations and from the indigenous knowledge of the participants on potential risks, challenges and benefits of integrated trans-boundary water management, linkages between biodiversity conservation, water management and sustainable livelihoods in general, and the likely effects of not adopting an integrated management approach in semi-arid river basins, both in theory and in practice.

The facilitated sessions were guided by a number of questions which were addressed through different participatory techniques, including brainstorming exercises, use of posted notes, group discussions, etc (Figure 8a).

Participants Brainstorm on lessons learned from Plenary Sessions

Participants address perceived linkages between IWRM, CBD, SL and associated advantages

The discussion was recorded on flip charts and "post-it" notes. Following the workshop these have been typed word for word and then sorted – like with like- to aid understanding. Summarized below are some of the key outcomes based on an emergent analyses. These are presented in accordance with the questions addressed by the forum.

4.2.1. Framing the Session

The facilitators encouraged participants to think about Integrated Management of Water, Biodiversity and Livelihoods in general, taking into account what they have learned from the plenary presentations and what they know while addressing the following questions. All responses were regarded as legitimate and recorded by the individual as the ideas occurred. Matters requiring plenary discussions were parked in a "Parking Place" and addressed in the subsequent plenary session accordingly.

4.2.1.1. What are the risks and challenges of integrated management (including trans-boundary issues)?

Overall, the forum concluded that even though integrated trans-boundary river management policy development is seen as crucial to sustainable management of ecosystems, there are still numerous risks and challenges that may hinder successful implementation of such policies in many developing countries. These include:

- Language and cultural differences including differences in terminologies of integrated water resources management (IWRM) and integrated management (IM) across countries and disciplines and differences in culture between communities sharing a river basin.
- Political instability and lack of political will to implement integrated trans-boundary river management policies.
- Existing bilateral agreements and political structures that may exclude other countries within the basin.
- Bilateral mistrust between governments, local communities and concerned stakeholders.
- Conflicts of interest amongst key stakeholders: existing ministries and responsible institutions, local

communities, donor agencies, research scientists, existing opportunities, etc.

- Lack of harmonized policies leading to conflicts in implementation and cross sectoral competition, e.g. between land, water, wildlife, agriculture, forestry and environment ministries, associated research institutions, NGO, etc.
- National sovereignty and confidentiality issues in reaching bilateral agreements between neighboring states.
- Lack of adequate information, scientific data and technical skills required for decision making.
- Lack of defined roles of associated ministries and responsible authorities.
- Unwillingness to change fuelled by academic controversies regarding the efficacy of IWRM.
- Lack of appropriate governance and institutional structures.
- Economic trade-offs between short term and long term economic benefits from the ecosystem, and
- Lack of community participation in decision making, etc.

4.2.1.2. What are the likely benefits of integrated trans-boundary management of water, livelihoods and biodiversity?

The group was unanimous in recognizing the likely benefits of integrated trans-boundary management of water, livelihoods and biodiversity. Some of the recorded potential benefits include:

- Reduced human-wildlife and water conflicts as well as conflicts between nations sharing trans-boundary basins, and amongst alternative uses of the ecosystem resources.
- Better inter-sectoral communication and cooperation through stakeholder involvement and harmonization of policies.
- Joined up governance leading to collective management and better accountability and collective responsibility for sustainable management of ecosystem resources.
- Increased water supply, better water quality and agricultural productivity and better opportunities for sustainable economic growth.
- Promotion of sound water management practices for sustainable development.
- Sustainable and equitable sharing of ecosystem benefits through efficient pricing and marketing of ecosystem resources.
- Enhanced synergies and complementarities between sectors.
- Better economies of scale and investment opportunities for poverty alleviation,
- Cost effective and sound conservation of biodiversity, water resources and enhancement of livelihoods, and
- Enhanced and sound science base for policy making.

4.2.1.3. What will happen without integrated management?

On the other hand, the participants opined that without integrated management:

- Communities will be compelled to develop coping strategies and new innovations which may have positive or negative multiplier effects.
- The richer sectors of the community will embark upon water harvesting and storage technologies possibly at the detriment of the poorer sector of the community.
- Conflicts may increase and enhance natural resource degradation, poverty and hunger.
- There will be incentives for over abstraction leading to catchment degradation and increased threats to livelihoods of adjacent communities.
- There will also be duplication of similar projects, government ministries, and management initiatives, leading to uncoordinated, isolated small solutions that may achieve very little. The inefficiency costs and associated conflicts between users due to conflicting policies and depleting resources will occur.
- Some participants opined that the situation will become chaotic and water prices may rise, and resources may be managed in haphazard ways, and
- Environmental degradation will continue and future generations will suffer.

4.2.1.4. What are the likely constraints to implementing integrated management of water, biodiversity and livelihoods in river basins including trans-boundary issues?

Amongst the likely factors that may constrain the implementation of integrated management or water, biodiversity and livelihoods in trans-boundary river basins, the forum identified, funding constraints, lack of human and financial capacities and requisite skills, "box planning" institutional syndrome which precludes consultation and collaboration, unfavourable government legislation and top-bottom approaches to policy making, data, information and knowledge gaps, difficulties in securing stakeholder agreements, socio-cultural issues, common pool resource characteristics of natural resources and lack of good examples to follow.

4.2.1.5. What are the alternative ways of achieving good management?

The forum also deliberated on alternative ways of achieving good management of trans-boundary river basins in the absence of integrated trans-boundary policies. Amongst the innovative ways suggested by the forum includes:

- Coordinated community empowerment and sensitization to ensure that the affected communities are the champions of sustainable management of water, biodiversity and livelihoods instead of secondary beneficiaries from National Park's multiplier effects.
- Decentralized decision making to deploy community/grassroots driven approaches instead of top-down conservations techniques.
- Political will to support genuine pro-poor resource management approaches.
- Selective resources management and innovative research to develop tested and proven alternative water resources management technologies and approaches that favour rural livelihoods.
- Good governance including good legal frameworks with adequate incentives for sustainable resources management and disincentives for resource degradation.
- Strategic management approaches which takes into consideration specific types of beneficiaries and local knowledge,
- Management by cost-benefit trade-offs, negotiated settlements, use of indigenous knowledge and targeted regional development planning.
- Harmonization of IWRM policies in associated countries, and
- Information sharing and showcasing success stories.

4.3 Plenary Session II: Experiences and Evidence from the Field

This session was chaired by Dr Inyasi Lejora of TANAPA. There were three presenters: Prof Erkstand of IVL Swedish Environmental Research Institute, Dr Musonda of WWF and Dr Said of the International Livestock Research Institute (ILRI). The following is an overview of their presentations.

4.3.1 Some examples of good practice: IWRM in Africa, Europe and Latin America – TWINBAS & TWINLATIN

By Prof Sam Erkstand
IVL Swedish Environmental Research Institute, Sweden

The presentation introduced the TWINBAS and TWINLATIN projects on IWRM in Africa, Europe and Latin America. The general objectives for both projects were to:

- Develop and adapt IWRM knowledge and methods to enable implementation for a harmonized IWRM approach;
- Enable and perform assessment of climate change effects on the hydrological regime, flooding risks, water availability and water quality; and
- Propose remedial actions based on scientific data, and on thorough economic cost-effectiveness analyses.

TWINLATIN covers the Latin-American river basins, while TWINBAS covered the Nura in Kazakhstan, Okavango in Botswana, Angola, Namibia and Biobio in Chile. The European river basins of Norrstrom in Sweden and the Thames in the UK were also part of the two studies. The same concept outline was developed and applied in TWINBAS and TWINLATIN. There was public participation and stakeholder involvement through a bi-national commission; arranging bus travels to joint seminars; presentation of scientifically based, objective status for water availability and water quality; and discussing problems and solutions (Figure 8).

Dr Erkstand noted that the main tasks of the TWINBAS project was hydrological monitoring calibrated to monitoring stations and calculation of future rainfall and temperature time series from a downscaled regional climate model. He explained that the results of the models were used to drive hydrological scenario modeling in the catchments. He noted that in the Okavango delta, the study also examimed total economics values in terms of complementary and rational use of land in the catchment with specific emphasis on agricultural land and protection of natural resources. There was no explicit link to livelihoods and biodiversity conservation as in the INTREPID project.

Figure 8: Sample participatory activities of the TWINLATIN Project (Source, Erkstand, 2008)[8]

Amongst the recommendations deriving from the TWINLATIN and TWINBAS projects, include the need to: (i) resolve national fragmentation of mandates and move toward one river basin management authority; (ii) form bi-national Commission or Committee with delegates from the countries sharing common trans-boundary river basins, (iii) create a joint knowledge base including monitoring and data sharing, (iv) initiate joint modeling of pollution pressures and water consumption patterns, (v) use scientific data as pillars for policy decision making, (vi) jointly develop approaches to economic analyses of water uses and the ecological values of water resources, and finally (vii) encourage ambitious stakeholder engagement in research and river basin management programs.

Dr Erkstand therefore commended the attempt by the INTREPID project to address the inter linkages between water, biodiversity and livelihoods, pointing out that an integrated management approach is absolutely required. He applauded the participatory approach adopted in the Stakeholder forum and looked forward to the results and to future projects with the project team.

[8] Erkstand, S. (2008). IWRM is Africa, Europe and Latin America –TWINBAS and TWINLATIN, A presentation at the INTREPID Stakeholder Policy Forum, Arusha, Tanzania, 11 – 14 March 2008.

4.3.2 Biodiversity and sustainable livelihoods: Making the vital link through integrated water resources management. Case of the Mara River Basin in Kenya

By Dr Musonda Mumba
WWF-EARO, Kenya

The presenter gave a general overview of the Mara River Basin project under the auspices of WWF Freshwater programme. Evidence from this study shows that rivers are running dry and there is need to manage catchments for holistic ecosystem services. A critical question in this study is "what are the cumulative basin-wide effects of the full set of interventions?"

In answering the question, Dr Mumba noted that the cumulative vested interests of all stakeholders need to inform operational management of water catchments. She explained that IWRM provides a framework for managing the river basin's downstream and upstream effects in a holistic manner. She also noted that the overall objective for the Mara River Basin is to foster an integrated water resources management (IWRM) in the Lake Victoria region. Dr Mumba explained that some of the challenges in this study were weak enforcements of supportive legislative frameworks. Generally the study aims to contribute to policy and practice.

Dr Mumba explained to achieve the objectives of IWRM, WWF has adopted a nested approach to water governance within the rive basin (Figure 9),

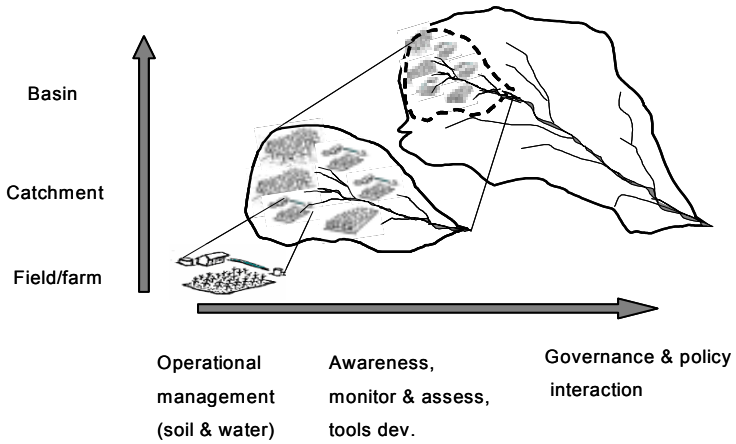


Figure 9: Nested Approach to Water Governance in River Basins (Source: Mumba, 2008)[9]

The nested approach integrates the operational management of soil and water resources with awareness creation, monitoring and assessment tools development, as well as governance and policy interaction at the horizontal scale. It also integrated from field/farm scales to the basin scales to ensure robust and holistic management initiatives.

Dr Mumba told the participants that WWF creates the vital linkages through conducting surveys and studies with different organizations around the Enapuipui and Mara swamps with the aim to understand the upstream-downstream impacts of management options in the catchment and vice versa (Figure 10).

[9] Mumba, M. 92008). Biodiversity and Sustainable Livelihoods: Making the Vital Link through Integrated Water Resources Management, A presentation at the INTREPID Stakeholder Policy Forum, Arusha, Tanzania, 11 – 14 March 2008.

Figure 10: Linking Upstream-Downstream Effects in River Basins Governance (Source: Mumba, 2008)

She explained that deforestation upstream would, for instance affect biodiversity, water quality and livelihoods downstream, and until these impacts and feedback are factored into the analyses, management options are likely to achieve little. She explained data collection and information dissemination has been done through various channels which include provision of environmental action plans, maps and stakeholder dialogue/capacity building initiatives. She also said that community engagement through Community Based Organisations (CBOs) and sharing of best practice by and with local farmers are necessary. There has also been policy engagement at national and regional levels.

From the findings of the study, the presenter concluded that the way forward requires more synergies with private sector and civil society groups; capacity building on integrated management approaches for research scientists, government officials, non-governmental organisations; local to global integration by understanding the upstream-downstream dynamics, etc. For example, it is important that the local communities understand the importance of protection of the species to sustainable agricultural productivity, the effects of deforestation on livelihoods downstream, the effects of water pollution upstream on human, livestock and wildlife health, the effects of poverty downstream on poaching activities, logging, etc. The list of inter-linkages, she said, are inexhaustible, but the fact remains that understanding them is critical to successful management of water ecosystems.

In conclusion, Dr Mumba noted that sustainable management of the Mara river basin, as well as other river basins elsewhere requires holistic integration of wildlife resources, their habitats, livelihoods of adjacent local communities, government ministries and associated markets (Figure 11).

Figure 11: Conceptualizing and Integrated Management Framework (Source: Mumba, 2008, Ibid)

This framework would ensure protection of priority species such as zebras, wildebeest, leopard, buffalo, elephants and their habitats; restoring natural ecological processes in the Mara River, promoting sustainable agriculture, land-use and livelihoods for local communities, scaling up integrated river basin management across the Mara River Basin, and developing market based strategies towards sustainable tourism and crop production within the Mara. She commended the INTREPID project for initiating the idea of developing an integrated management framework for managing the Mara, noting that this is now long overdue.

4.3.3 Integrating Water Resource Management, Sustainable livelihoods and Conservation of Biological Diversity in the Mara River basin

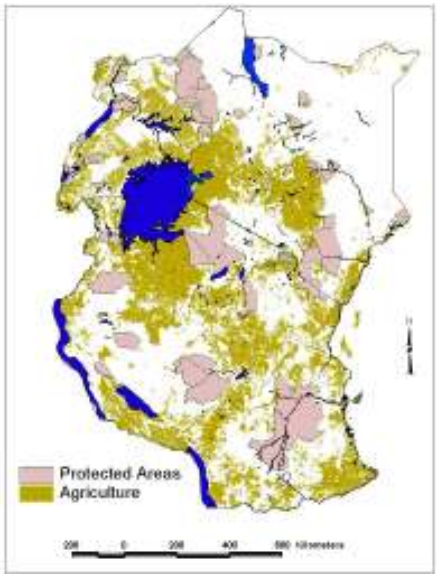
By Dr Mohammed Said
ILRI

Dr Said, noted that the presentation was based on 20 years research by a team of experts based at the International Livestock Research Institute (ILRI) and other collaborating institutions. Anchored in the Millennium Development Goals, Dr Said noted that human demand for ecosystem services is growing quickly globally. He noted that while there is need to increase food production to serve the growing populations, one third of the world's current population is subject to water scarcity, wood fuel is the only source of fuel for one third of the world's population, and demand for wood will double in the next 50 years. Estimated biodiversity loss is now 100 – 1000 times faster than before and this is projected to

increase by 10 folds by the end of the 21st century. Dr Said, decried the fact that, despite the knowledge of the increasing human demand for ecosystem services and diminishing or endangered supply, science is not being effectively brought to bear on these challenges. Dr Said noted that reducing poverty and reversing environmental degradation remains the greatest global challenge. The challenge may continue to increase unless innovative techniques for managing important ecosystems such as the Mara river basin are pursued decisively. He added that existing mechanisms for linking science to policy are highly sectoral whereas the major problems today, such as the depletion of the Mara ecosystem, are multisectoral. Dr Said noted that these issues need to be solved if the scarcity of food and water; the doubling on the demand for timber; and the continuing loss of biodiversity are to be addressed effectively. He commended the INTREPID framework noting that new data sources, methodologies, scientific models and approaches to managing ecosystems are therefore needed urgently.

Dr Said noted the East Africa region houses most of Africa's large mammals. Most of these are found in national parks and protected areas which are now being encircled by agriculture especially in high agriculture potential areas (Figure 12).

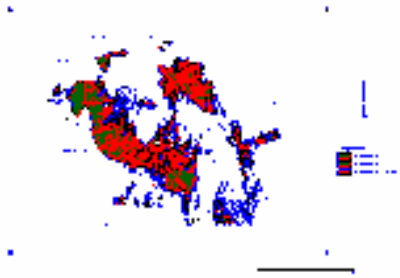
He summarised the findings of the research carried out in Kenya as follows: (i) we found a significant increase in the areas under cultivation; (ii) there are definite changes in land use demonstrated by encroachment of agriculture into the parks and expansion of settlements. According to the presenter, empirical evidence the Mara confirms that over a 17 year period, the spatial distribution of some species has shifted significantly.



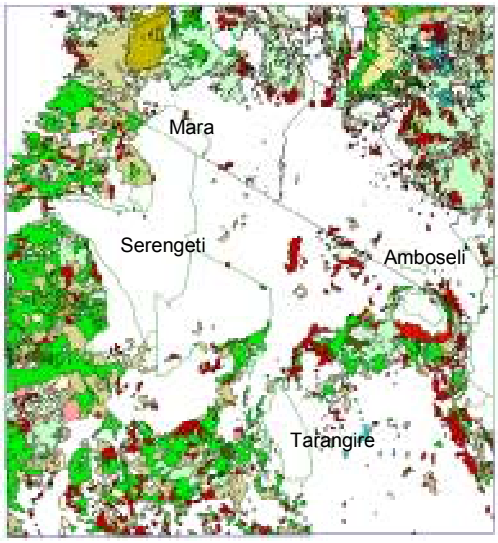
There is large decline in livestock populations in lower rainfall bands and large increases in rainfall bands > 800 mm. There is marked increases in agriculture in higher rainfall and also marginal areas.

In specific reference to the Serengeti-Mara ecosystem, Dr Said noted that there have been 08% and 04% change in land cover over a 20 year period in the Kenya and Tanzania borders, respectively (see Fig 13a) and arable cropping has increased significantly (Figure 13b). The wildebeest migratory patterns have also changed significantly. Large destruction of forests is already having huge impacts on the distribution of wildlife, livestock and human livelihoods.

Figure 12: Patterns of Arable Agriculture and Cultivation in Kenya (Source: Said, 2008)[10]



[10] Said, M. (2008). "Integrated Water resources Management, Sustainable Livelihoods, and Conservation of Biological Diversity in the Mara River Basin". Presentation at the INTREPID Stakeholder Policy Forum, Arusha, Tanzania, 11 – 14 March 2008.



Cropping Area: Red = 10-20%, Tan = 40%, Green = 60%, Light blue = 80-100%

Figure 13a: Encroachment of Agriculture to National Parks in Kenya and Tanzania[11]

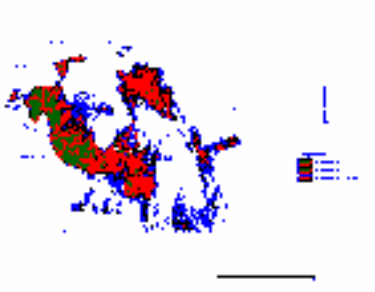


Figure 13b: Changes in Mau Forest cover, 1980 - 2001[12]

Dr Said also warned that the number of human settlements in Koyiaki and Lemek after land tenure changes has more than doubled in the last 20 years (Figure 14a). He noted that the resident wildebeest population has declined significantly, from about 150,000 to 40,000 in the last 25 years (figure 14b).

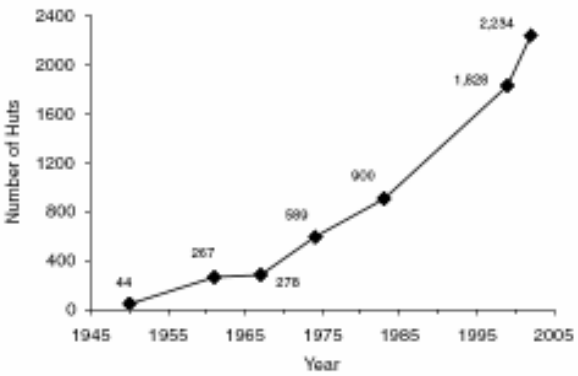


Figure 14a: Expansion of Settlements in Koyiaki and Lemek [13]

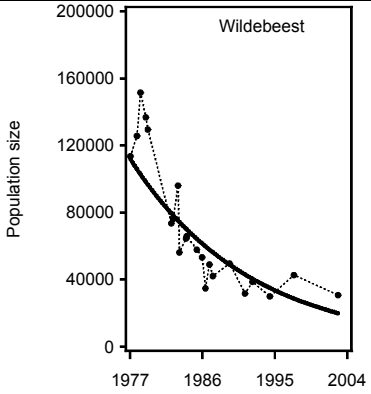


Figure 14b: Population Trends of resident Wildebeests[14]

In general, Dr Said noted that twelve out of the fourteen large grazing species in the catchment showed a declining population trend. The largest yearly decline was observed in populations of the buffalo (11%), warthog (9%), eland (7%), waterbuck (7%), topi (7%), resident wildebeest (7%), giraffe (6%). The actual trends are presented in Figure 16.

[11] Source: Africover, FAO 2002, cited in Said, M. (2008). "Integrated Water resources Management, Sustainable Livelihoods, and Conservation of Biological Diversity in the Mara River Basin". Presentation at the INTREPID Stakeholder Policy Forum, Arusha, Tanzania, 11 – 14 March 2008

[12] Kenya Forest Working Group, Cited in Said, (2008) Ibid.

[13] Source: Lamprey and Reid, 2004; Kaelo 2006

[14] Source: Serneels and Lambin, 2001; Said et al. in prep, cited in Said 2008.

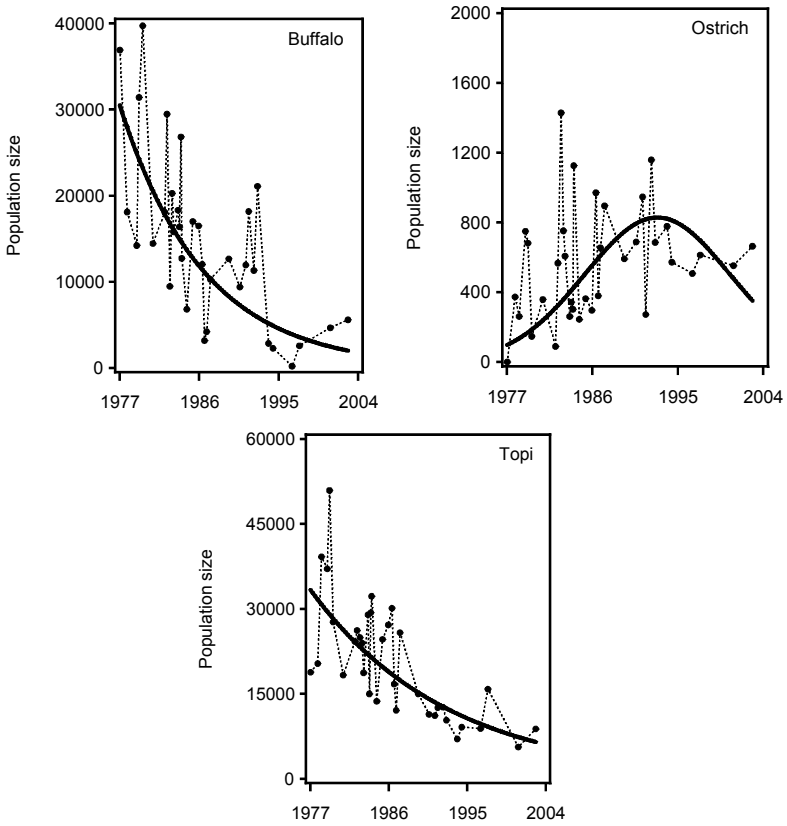


Figure 15: Population Trends of Selected Species in the Mara Basin (Source, Said, 2008)

Considering the economic trade-offs involved, Dr Said concluded that wildlife cannot complete with agriculture in the Mara region as returns to local communities from agricultural land uses significantly outweigh returns wildlife conservation. He warned that in 20 years, if the current trends persist the scenario would not be promising:

- Farms will border the Mara Game reserves on at least two sides and the Maasai way of life, and the Maasai livestock, will remain only as a remnant.
- Resident wildlife populations will crash as the majority of their territory, the buffer zone, is no longer available.
- With the important dry season territory no longer accessible to wildlife, the Serengeti-Mara migration will also decline steeply, particularly during droughts.
- Water conflicts will be more as we clear the forests and its impacts on local climate can be significant.

He capped the detailed analyses of the potential conflicts and complementarities that exist between wildlife conservation and human livelihood in the Mara river basin with a number of recommendations:

- For wildlife to compete with agriculture or livestock production there is need to increase wildlife rents. The wildlife industry need to pay significantly more to land owners to keep land free from agriculture and other development needs.
- The local communities need to be part of the conservation industry – they are partly the custodian of the wildlife outside the parks.
- Information should be made available and accessible to all stakeholders.
- There must be equitable sharing of wildlife revenue amongst the community and other stakeholders. Effective pricing and valuation tools therefore need to be developed to enhance effective payments of ecosystem services.
- Adjacent communities must be regarded as equal partners in the conservation of biodiversity.
- There is need to have integrated management and land use plans for some of these critical biodiversity areas.

Dr Said concluded that for ecologists to work effectively with policy makers there was need to move towards purposeful ecological policy research. There was also need to develop workable policies, which effectively influence the ecological issue of interest. Dr Said ended his presentation with three key questions which he said would help participants move toward more integrated management of river ecosystems:

1. Who cares? Who loses? Does anybody win? Are the negative effects big enough to capture the attention of policymakers?
2. So what? Is it a policy problem?
3. What can be done? Do we know enough to act? Will it work? What are the risks? What will it cost?

He noted that for a sustainable integrated trans-boundary river management policy development, the political contexts, the scientific evidence, and the inextricable linkages in the ecosystem must be taken into account with the livelihood of the local communities at the centre. Finally, he acknowledged the Department of Resource Surveys and Remote Sensing (DRSRS) – aerial censuses; World Wildlife Fund (WWF) – ground counts; International Livestock Research Institute (ILRI) – ground counts and boma mapping, University of Louvain Le Neuve and University College of London (Land use change and socio-economic), and some collaborators who contributed to the research embodied in his presentation: Wilbur Ottichilo, Norton-Griffiths, Richard Lamprey, Holly Dublin.

4.4 Facilitated Session II

The plenary presentations on experiences elsewhere were followed by participatory sessions facilitated by Ms Pound, Dialogue Matters, UK and Ms Deepa Pullanikatil, Lerotholi Polytechnics, Lesotho. These sessions were designed to engage participants in different types of participatory processes in order to address pertinent issues for the development of an integrated trans-boundary river management policy based on matters arising form the presentations and from the indigenous knowledge of the participants on potential linkages between biodiversity conservation, water management and sustainable livelihoods in the Mara basin, both in theory and in practice.

Participants engage in different participatory sessions to identify linkages and complementarities amongst water, biodiversity and livelihoods, existing institutions, policies and potential constraints to integrated trans-boundary management in the Mara River basin.

The facilitators encouraged participants to focus on the Mara basin while they address a number of leading questions posed by the forum. The questions were designed to unravel: the current situation in the Mara, including the key management and policy issues and conflicts of interest in the Mara, available empirical evidence, and project information, current management initiatives which are working well now, existing success stories and lessons learned, current socio-economic and environmental trends and opportunities for integrated trans-boundary management policy to address, existing negative trends that integrated trans-boundary management policy framework would mitigate, new opportunities that an integrated management framework might harness, who is doing what in the Mara, existing knowledge gaps, constraining and promoting factors, factors that might lead to failure of an integrated trans-boundary management framework, etc. The facilitated sessions were concluded by an exercise in which participants were encouraged to draw diagrams to map the interconnectedness between existing institutions for managing water, wildlife and livelihoods in the Mara basin, the linkages between different human uses and the natural environment in the Mara.

The specific list of questions addressed in the participatory sessions and the sequence of addressing them can be found in the workshop program (see Annex 1). Summarized below are some of the outcomes of the deliberations and facilitated sessions:

4.4.1 The Current Situation in the Mara – Key Issues and Conflicts of Interest

The outcome of the session confirmed that while the Mara hosts one of the seven wonders of the world due to the spectacular migration of large animals between Kenya and Tanzania, it also hosts greatest challenges for sustainable management of the conflicts between wildlife and human beings as both compete for water and other natural resources of the Mara river basin. Amongst a large list of current issues affecting the sustainability and integrated trans-boundary management of the basin reported by the forum includes:

- Deforestation due to increased logging, demand for fuel wood and increased human settlements.
- Displacement of neighbouring communities into the Mara area due to land tenure issues between Pastoralist and landowners.
- Increasing soil degradation and depletion of water resources due to indiscriminate waste disposal, build up of sediments in rivers, nutrient enrichment, and in some cases, eutrophication of the rivers in the catchment.
- Land use change due to encroachment, land excision for political expediency and corruption.
- Displacement of wild life out of the Mara with some going into extinction. Some species are already lost.
- Increasing human population and associated conflicts in water uses amongst user – leading to unsustainable abstraction for human uses including agriculture, industry, and domestic, uses.
- Climate change induced invasions by alien species.
- Change in life style by local communities from pastoral to sedentary uses,
- Inadequate enforcement of existing laws and regulations, and
- Lack of commitments by the Kenyan and Tanzanian Governments to develop a trans-boundary management policy.

4.4.2 What management is working well now?

The forum felt that management initiatives in the Mara are moving in the right direction and there is evidence of increase in Stakeholders partnerships with the National Park Authorities, some community based projects have started, and some governmental and non-governmental organizations are paying strong attention to and/or working on the Mara. For example, the work being done by the WWF-EARO, ATPS, the Nile Basin Initiative (NBI), Water Resources Users Association (WRUA), East African Community (EAC), Volta Basin Water Reform Process (VBWRP), current changes to existing registration in Kenya and Tanzania, TANAPA's - General Management Plan in the Serengeti, wider engagement with the private sector and local community, all point to interest in integrated management of the Mara across the borders.

It was noted that a number of initiatives have been taken by the East African Community such as Maasai Mara Reserve Group (under Preparation), the Nile Basin Initiative, etc. Other examples of efforts being made by African governments include the Volta Basin Management System in West Africa and Okavango River Basin Project. All these are good steps in the right direction but implementation still remain weak.

The forum noted that donor agencies have been driving most of the management initiatives to date, adding that until national governments get involved and committed, management priorities may be misguided.

4.4.3 What are the Success Stories and What can we learn from these?

The outcome of this session showed that there many success stories in managing different parts of the ecosystem: biodiversity, water, and livelihoods, in that order. While many of the participants described their research programmes/projects, management initiatives and other interventions as "success stories", critical analyses of the contents of the programs and management initiatives show that they are hardly examples of integrated management of water, biodiversity and livelihoods in the Basin. In our analyses, most of the programmes either focused on water management or biodiversity conservation with sustainable livelihoods coming in as a multiplier effects of conservation projects, for example through tourist incomes, employment in national parks, or compensation payments for crops destroyed by large animals, etc. Only three of the research programmes described at the forum included poverty alleviation as an explicit programme goal. These are the ATPS Water and Environment Programme; the WWF Freshwater Programme and the ILRI programme on sustainable livestock management. While the first two targets more of water and livelihoods management for sustainable biodiversity conservation, the later targets livestock management for sustainable livelihoods, but at the same time adopts a system wide approach in the analyses.

In follow-up participatory sessions, the participants were asked to locate on three inter-locking vein diagrams, the policies or project initiatives they were aware of that are relevant to the Mara and that address IWRM, CBD, SL or any combination of the three (Figure 16)

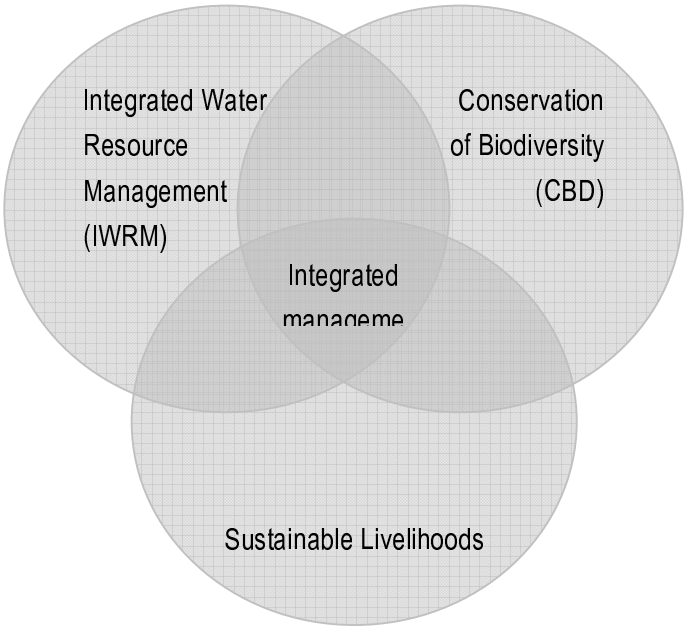


Figure 16: Existing Projects and Management Programmes in the Mara River Basin

The outcomes of this exercise are listed below:

4.4.3.1 Integrated Management Projects, Programmes and policies in the Mara

- TANAPA Outreach Community programme
- African Technology Policy Studies Network (ATPS) Water and Environment Programme
- WMA initiative
- Serengeti Ecosystem Management Project (EU/TANAPA/F2S)
- Losing ground in the Mara Policy Brief (ILRI) m.said@cgiar.org
- Reducing poverty through enhanced biodiversity (ILRI) Reto-O-Reto project m.said@cgiar.org

- Scc-Vi-Agro project
- Flood Management in lake basin NBCBN-RE otienodulo@yahoo.co.uk
- NAWAPO
- Bomet water supply and sewerage along Nyangores River
- Hunting for sustainability MI/TAWIRI/FZS/EU funding
- KEWI (Kenya Water Institute)- studies on integrated water resource management. kewi@accesskenya.co.ke
- WWF- Mara River Basin Management Initiative. mmumba@wwfearpo.org
- National Strategy for growth and poverty reduction (NSGRP)or Mkukuta in Kiswahili. amapinduzi@hotmail.com
- National Environmental Research Agenda (NERA) amapinduzi@hotmail.com
- EISP- Tanzania: Environment Management Act Implementation n.hepworth@uea.ac.ke
- Vickres. fmutua@unobi.ac.ke
- Nile Basin Initiative
- Interactions between settlements, Wildlife &Livestock (ILRI) Project. m.said@cgiar.org
- Kenya Water Institute. Water Policy Development. kewi@accesskenya.co.ke
- Environment Policy. hgideon@costch.or.tz
- Lake Victoria Environmental Management (LVEMP)
- Vision 2025 Tz. jwakaba@yahoo.com
- Establishment of Tanzania biodiversity Information facility(Tanzbif) 2007
- Pangani River Basin Support Programme (IUCN,SNV) rglotabach@snuworld.org)
- Capacity dev support WAMI/RUVU Basin. rglotabach@snuworld.org)
- Initiatives: Central Environmental Information System. amapinduzi@hotmail.com
- EMA implementation
- Egerton wetland project. Nancy.githaiga.majinaufanisi.org

4.4.3.2 Integrated Water Resources Management (IWRM) Projects, Programmes and Policies in the Mara

- Sources of policies – Institute of Resource Assessment –University of Dar-e-salaam
- Ministry of Water and Irrigation (website)
- Friend-Nile (UNESCO-DHP)- Flow regimes and drivers for catchments of lake Victoria. Contact Prof Mutua, fmutua@uonbi.ac.ke
- Applied training project of the Nile basin initiative. Prof Mutua co-ordinator. , fmutua@uonbi.ac.ke
- NELSAP- Mara river project
- IWRM – Capacity building program. otienodulo@yahoo.co.uk
- National Strategy for implementation of water policy. mujwahuz@udsm.ac.tz
- AMCON – (Pr) African Ministerial council of water
- AMCON ground water initiative kimemiam@gmail.com
- NAWAPO: national water policy. wkasanga@hotmail.com
- Water policy. Hgidieon@costech.or.tz
- National irrigation master plan
- Water resource users community project cycle (WDC). matseshe@wstfkenya.org

4.4.3.3 Conservation of Biodiversity – Projects, Management programmes and Policies in the Mara

- ENSDA/Kenya. Md.ensda@clubinternetk.com
- National Bio-diversity action plan (NEMA Kenya (ambusus2000@yahoo.co.uk)
- Various policies eg wildlife policy, fisheries policy, agriculture policy, tourism master plan. jwakibora@yahoo.com
- WRM policy: Hsosoveke@wwftz.org

4.4.3.4 Sustainable Livelihoods (SL) Projects, Management Programmes and Policies in the Mara

- KEWI (Kenya Water Institute) Indigenous water technologies)
- Regional DFID livelihood vulnerability programme. See RLVP website

As can be seen in the lists above, many participants located their projects or management programmes under "Integrated Management" of water livelihoods and biodiversity, which may be regarded as good practice! The forum did not try to unpick the postings of the projects by the participants under IM, IWRM, CBD, SL or any combinations of the three, as these would require detailed analyses of all the projects and programmes listed by the participants. Instead, the exercise highlighted the desire by many participants to engage in integrated trans-boundary management of the Mara, and perhaps a lack of understanding of the meanings and differences between the concepts of "Integrated Management (IM)", and "Integrated Water Resources Management (IWRM)".

A short brainstorming session revealed that different disciplines define "Integrated Water Resources management (IWRM) and "Integrated Management (IM) of ecosystems interchangeably. The outcome of the brainstorming exercise showed that participants regard IWRM as a subject under integrated resources management (IRM). In effect, IM was regarded as a more holistic concept which would include analyses of how management initiatives affects human being, animals and wildlife, their natural habitats, culture, economic poverty/livelihoods, industrial development, ecosystems and their functions, health and general land use planning. It was noted that IWRM would also include all these aspects but with a central focus on managing "water as the substrate of life". The definition of the two concepts therefore depends of the focus, goals, objectives and subject of the management activity. The forum identified this confusion in the definition of these concepts as a major constraint to actual implementation of the many visions and directives which seek to champion the use of these concepts in the management of natural ecosystems in the past decade. The forum therefore decided to hold an electronic focus group meeting to further brainstorm on the two concepts to clarify what they mean in theory and in practice. Dr Pereira of the EU Joint Research Council offered to lead the focus group via a knowledge board developed by the JRC.

4.4.4 What can we learn from Projects, Policies and Programmes that went less well

In addressing the question, the forum noted that the among the hallmarks of failed projects, policies and management initiatives in the Mara are (i) lack of adequate information and stakeholder participation, (ii) Inadequate coordination of projects and management programmes, (iii) Donor dominance in deciding which projects, policies or programme initiatives are carried out, (iv) No transparency in project implementation and accounting and (v) Lack of proper communication among stakeholders. The forum also identified bureaucracy and corruption as major causes of failure. One of the participants noted that "projects, policies and management initiatives should be designed to work with nature rather than for humans or for Donors interest".

4.4.5 What are the positive socio economic and environmental trends that integrated management would need to strengthen and enhance?

Among the positive trends and opportunities identified by participants include:

- Renewed active involvement of local communities in management of water, land and wildlife in the Mara.
- Increased international interest in integrated management.
- Poverty alleviation in the light of PRSPs and MDGs.
- Increased interest in community empowerment programmes.
- Renewed interest in traditional adaptive management mechanisms.
- Protection of land degradation by crops farming.
- Harmonization of policies and implementation, and
- Rehabilitation of (destroyed) habitats.

4.4.6 What are the negative trends that integrated management would need to mitigate?

Amongst the negative trends that integrated management needs to mitigate identified by the forum includes:

- Increasing desertification.
- Increasing loss of bio-diversity.
- Sectoral approach to management leading to myopic solutions.
- Inconsistent policies and laws leading to conflicts in implementation.
- Duplication of research due to donor interests and lack of information dissemination on past and on-going projects in the Mara.
- Increasing human – wildlife resource use conflicts increasingly spiraling into inter-community conflicts in the region due to land use laws, etc.
- Increasing land degradation due to intensified agriculture in marginal lands. This has led to significant soil erosion and decline in soil quality in the region.
- Neglect of indigenous knowledge systems.
- Lack of incentives for sustainable resource management due to market failures and inadequate pricing of ecosystem services, and
- Management without plan. The forum noted that most of the management initiatives have been donor driven and sometime are initiatives by individuals. There has therefore been no system wide management plan which takes into account the relevant inter-linkages amongst the components of the system.

It was noted that for integrated trans-boundary river management policies to succeed, it must be based on a national innovation systems (NIS) framework which takes into account scientific and indigenous knowledge of the inextricable links amongst all the parts of the system.

4.4.7 What new opportunities could integrated management harness?

The forum noted that despite the challenges ahead, there are new initiatives in the East African community which could be harnessed for the development of the integrated trans-boundary river management policy for the Mara River. Amongst the new initiatives that could be of benefit to the development of the trans-boundary policy identified by the forum includes:

- The initiatives by the East African Communities to develop regional bodies.
- The Nile Basin initiative which is to become Nile Basin Organization for water resources development in the region.
- The common languages across the border (Swahili and English) which fosters communication among stakeholders.
- Ongoing collaborative IWRM research initiatives in the region, including (i) the Lake Victoria Research Programme (VICRES), the ATPS Water and Environment Programme (ATPS-WEP), the WWF-EARO Freshwater programme, etc.
- The growing information and communication technology (ICT) facilities in the region which would foster information sharing, e.g. through the INTREPD web-hosted interactive Database resource.
- The increasing size of the Kenyan and Tanzanian economies and the comparative economies of scale which may help government support to integrated trans-boundary policy development.
- Emerging technologies and success stories.
- Increasing interest in integrated resources management which will encourage specialization in trans-disciplinary science and foster knowledge exchange between disciplines.
- Growing interest in applied researches which will focus on society, technology and innovation.
- Formation of Water Resources Users Associations (WRUAS) and Water Stakeholder Forums (WSF).
- Greater access to funding especially from UN system and bilateral systems.
- Increased interest in public participation and good governance, and
- Increased interest in gender integration in water management.

4.4.8 Who is doing what?

The forum further examined who is doing what in the Mara river basin with the aim to identify responsible authorities and stakeholder who need to engage in the development of the integrated trans-boundary policy, going forward.

4.4.8.1 Organisations Involved in the Management of the Mara, their Responsibilities and Activities

Table 2: List of Institutions who need to be engaged in the development of the trans-boundary policy

Organization	Responsibilities	Activities
College of African Wildlife Management - MWEKA	Training of PA managers	Long and shorter training
National Environment Management Council (NEMC)	Environmental Management	Awareness Compliance & Enforcement Research EIA reviews
Tanzania Fisheries Research Institute (AFIRI)	Fisheries	Fisheries
Ministry of Water Irrigation	Policy formulation	Oversight
Tanzania Wildlife Research Institute (TAWIRI)	Co-ordinate wildlife	Research
Division of wildlife	Policy formulation	Oversight
Regional Admin & Local government (PMO-RALG)	Policy in local government Advocacy Community mobilization/training	Oversight
The International Livestock research Institute (ILRI)	1. Research interaction between settlements wildlife livestock 2. Impacts if climate on large herbivore (livestock & wildlife) 3. Impacts of climate on vegetation and vegetation climate 4. Working with community to start conservation schemes and use payment for ecosystem services.	1. Modeling population dynamics 2. Climate prediction models
Nile Basin Initiative (NBI) fmutua@uonbi.ac.ke	1. Promotion of IWRM principles in the Nile Basin 2. Conflicts to cooperation	1. Capacity building 2. Cooperative framework 3. Policy development (national and regional) 4. Database on IWRM
ANEW (Africa CIU/Society Network in Water & Sanitation)	Create a platform for Combined Sewer Overflows (CSOs) to dialogue issues of water and sanitation	1.Voice of CSO's at AMCOW (African Ministerial Council on Water) 2. Capacity building
Kenya Water Partnership	Capacity building Coordinating water	SH (Public, private, public and CSO's) IWRM plan in ministry of water.
Water services trust fund	Financial assistance for water and sanitation facilities development	1. Fund rural water and sanitation projects 2. Fund water uses associations.
Nile IWRM- Net	Capacity building in the Nile basin countries	Short training for all stakeholders (policy)
National Environmental Management Authority (NEMA)	Coordination of environmental issues	1. Enforcement 2. Development of regulations

HWF	1.Capacity building 2. Action research	
FZS	Support to PA management	Across all departments.
KEWI (Kenya Water Institution) Kewi@accesskenya.co.ke or rapospat@yahoo.com	Applied water research training, community outreach programmes and consulting	Research 1. Indigenous water technology/knowledge systems 2. Challenges and opportunities in implementing IWRM 3. Water geographic information systems (GIS) information, hydrological modeling 4. Rainwater harvesting
Narok & Transmara county councils with funding from AWF	Preparation of an ecosystem management plan	1. Resource base inventories 2. Stakeholder consultations 3. Situation 4. Management plan write-up
Ewaso Nyiro south development authority	Co-ordination of all development activities in the Mara basin in Kenya	Coordinating the development of a regional tourism plan
MWEDO- (Musoma Water and Environment Development Org)	Local community capacity building	Training in organisation and business enterprise
Soil Water Management Research Group (SWMRG) contact: swmrg@yahoo.co.uk	1. Research 2. Training (local & Regional) 3. Capacity building (local & regional)	Conduct Training – short courses, undergraduates and post graduate
Lake Victoria basin water office lvbwo@yahoo.com	Basin water resources management	1. Issue water rights 2. Check pollution 3. Water discharge permits
TANAPA tanapa@habitat.co.tz	Wildlife conservation and resources monitoring	1. Protection of resources 2. Resources monitoring 3. Climate and water monitoring 4. Extension services
WWF	1. IWRM support 2. Information generation and sharing 3. Capacity building 4. Trans-boundary IWRM initiative	1. Baseline studies 2. Setting up water vulnerability assessment (WVAS) 3. Training of committees and partners 4. Facilitation of T/IWRM
Water services regulatory board of Kenya	1. Licensing of water services boards 2. Review of water and sewerage tariffs 3. Development of guidelines on: - Conservation and water demand management - Water quality - Operation rules - SPA (service provision ag) - Minimum service levels 4. Production of sector report. 5. Monitoring and evaluation of water services performance	
Water aid Tanzania	Advocacy	Water point mapping
SNV Tanzania and Kenya	Capacity building	Support local government authority (LGAs)
Kenya Water for Health	Community mobilization / training	Mobilization and training

Organisation (KWAHO)		

4.4.8.2 Who else would need to be involved?

Next, the forum considered who else needs to be involved the development of the integrated policy framework. The outcomes of the exercise are listed in Table 3.

Table 3: List of Institutions who need to be engaged in the development of the trans-boundary policy

ORGANIZATIONS	RESPONSIBILITIES	ACTIVITIES
Lake Victoria Basin District Councils	Mobilize Communities	
Lake Victoria Local Government Authorities	Economic Development Around Lake Victoria	
Water Resources Management and Authority (Kenya)	(i) Management and control of water resource use (ii) Set guidelines on water usage	(i) Monitoring (ii) Assessment (iii) Permit Issuance
Nile Basin Initiate	Management of Nile Catchment	Policy on resource management
International Communities e.g. Donors, World Bank and FAO	Funding	
National Governments/Parliaments	Funding, Legislation, Enforcement	
Pan-African Institutions (NEPAD, AU, ATPS, etc)	Policy advocacy and technical support	
Media (television, radio and newspapers)	Awareness creation	

4.4.8.3 Existing Knowledge and Knowledge Gaps in the Mara

The forum also examined the knowledge requirements, knowledge gaps and the constraining and promoting factors for developing the trans-boundary river management policy in the Mara basin. The questions addressed and the outcomes are discussed briefly below:

4.4.8.4 What information is needed for integrated management? Who has information that could answer this question?

Table 4: Information requirements and information sources

Info Needs	Who has info
Water use data	1. World bank 2. GTZ 3. Water Point Mapping (Water Aid) 4. JICA (Kenya) 5. Ministry of water & Irrigation (Kenya)
Policy Positions Country specific	1. Ministry of water and irrigation 2. Ministry of natural resources and tourism (Tanzania) 3. Ministry of Environment and natural resources (Kenya) 4. National bureau of statistics 5. Kenya bureau of statistics
Policy protocols	National Governments/Parliaments
Rainfall data	1. Tanzania Met Agency 2. Kenya Met Dept

Biodiversity Action Plan	WWF-EARO (Kenya)
Land Ownership	Ministry of Land (Kenya)
Water Abstraction Data	1. Ministry of water and irrigation 2. Water Resources Management Authority (Kenya)
Financial flow from donors	Relevant donor organizations
Staff resources from donors that are working in the IWRM, CBD and SL areas	Relevant donor organizations
Human health statistics linked to ecosystem	Ministry of health
Wildlife statistics	1. TAWIRI/TANAPA (Tanzania) 2. Kenya Wildlife Services 3. Regional Remote Sensing (Nairobi)
Ecological processes within ecosystem	1. TAWIRI/TANAPA 2. KWS
Land use data	1. Land use planning commission(Tanzania) 2. Ministry of agriculture (Kenya) 3. Survey & Mapping division (Kenya) 4. Institute of resource assessment
Data from flow gauges from strategic sites	1. Ministry of water and irrigation(Tanzania) 2. LVB Water office (Tanzania) 3. Ministry of water & Irrigation(Kenya) 4. LV South catchment authority(Kenya)
Data from water quality stations	Same as above
Social economic data	1. WWF – Narok office (Kenya) Musoma (Tanzania) 2. National bureau of statistics (Tanzania)
	3. Kenya Wildlife Service 4. Kenya Bureau of Statistics
Ground water data	Ministry of Water & Irrigation (Tanzania & Kenya)
Vegetation cover	2. FAO (Africover) 3. Institute of Resource Assessment (Tanzania) 4. Ministry of land (Tanzania)
Forest Cover	1. Kenya Forest Working Group 2. UNEP 3. Department of Resource Surveys and remote sensing (Kenya) 4. Kenya Wildlife Services 5. Ministry of Natural Resources (forest division) (Tanzania)

4.4.8.5 What are the known gaps in knowledge?

The forum also addressed the known gaps in knowledge, i.e. what we know we don't know which is required for the development of the integrated trans-boundary river basin management policy for the Mara basin (e.g. technical knowledge, research topics/questions, institutional frameworks and responsibilities, human uses and effects, etc). The forum opined that there is insufficient knowledge in the following pertinent subjects/policy issues which are pre-requisites for successful development of an integrated trans-boundary management framework for the Mara:

- Wetland status: More research is required to have a bird's eye view of the status of all wetlands within the basin.
- Indigenous knowledge systems: A lot of tacit knowledge held by different knowledge communities have been hitherto excluded from the analyses. There is need to map what knowledge exists in these difference knowledge communities including the orthodox science and indigenous knowledge communities in the basin. Both knowledge systems need to be harnessed properly.
- Financial flow information within each country (government level): Most conservation projects are funded by international donors and there is hardly any coordination of efforts at project,

programme or national levels. As system of sharing information on resources available for research and management of the system is required. The INTREPID Database recourse may fill this gap.

- Joint methodological protocols for data collection and analysis: There is need to develop joint harmonized methodologies and protocols for data collection across projects and across the borders to ensure comparability of data.
- Links between water, biodiversity and livelihoods: Little is known about the inextricable linkages between parts of the system. There is need to develop a systems wide methodology and frameworks to better understand these linkages, the strengths of the linkages and the associated actors: humans, wildlife, plants and animals.
- Linkages between existing Acts, Legislations and Directives on water, biodiversity and livelihoods: A study is needed to examine the existing Acts, Legislations and Directives on these interrelated issues at the national and international levels in order to synthesize the conflicts and synergies amongst them.
- Information on livelihoods in park adjacent communities: A study is required to map the livelihoods in park adjacent communities, how these are linked to activities in the Parks and alternative livelihood sources in the basin.
- Multiplier effects of tourism and hunting: A study is required to unpack the multiplier effects of wildlife tourism and hunting at the national, regional and community levels.
- The true economic value of the ecosystem services provided by the Mara river basin and value based management options: There is need to conduct environmental valuation surveys to establish the economic and non-economic value of ecosystems services in the Mara and their implications for economic growth in Kenya and Tanzania. This study should include economic and environmental value trade-off analyses.
- Potential buy-in by national governments and local communities – A study to understand the current mid-sets, attitudes and propensities to adopt an integrated trans-boundary river management policy for the Mara River need to be carried out in tandem with the economic valuation surveys. This is necessary to inform appropriate economic and non-economic incentives for sustainable implementation of the policy once developed.
- Extended Cost-benefits and associated resource requirement (not financial) required by governments to implement the policy: An extended cost benefit analyses is required
- Baseline data on species checklist to document type of species, population trends, and interactions is required.
- Human health statistics linked to ecosystem changes, and

As shown in the list above, there is still much work ahead for a sustainable integrated trans-boundary river management policy to be developed for the Mara River. There are still significant knowledge and institutional gaps that need to be addressed.

4.4.9 Promoting and Constraining Factors

4.4.9.1 What are the factors that lead to success in integrated management?

Amongst the factors that would promote sustainable implementation of the integrated policy framework when developed identified by the forum include:

- Mutual trust among parties involved.
- Promoting good leadership and adaptive management strategies.
- Engaging that local champions to lead the initiative.
- Futuristic vision/thinking to prioritize long term to short term benefits.
- Adopting an integrated ecosystems approach through inter-disciplinary research and holistic management frameworks.
- Stakeholder/Community involvement to promote wide representation of interest groups and sectors and encourage local ownership. This includes active involvement of local communities, science experts and governments in the design and implementation of the policy, and identification of community needs from initial stages to the implementation process.
- Political commitment and cooperation of national governments.
- Recognizing indigenous technology and knowledge systems and tapping into local expertise.

- Promoting accountability and transparency in decision making, project initiatives and benefits accrued.
- Encouraging common vision/ collaboration, cross ministry collaboration, buy-in at all levels of planning and implementation, and common goals, targets and objectives and data base.
- Proper planning and evidence based need driven policy initiatives.
- Equitable benefit sharing arrangements including clear incentive systems that creates a win-win scenario.
- Capacity building for implementation staff.
- Harmonization of existing policies.
- Adequate funding, and
- Proper information sharing to build a clear understanding of the issues, associated factors, and consensus on the way forward.

In conclusion, the forum summarized the factors that would promote successful implementation of integrated trans-boundary management in the Mara in what they termed "the success factors". These include: community involvement, proper planning, adequate resources, integrated systems approach, good leadership, political cooperation, proper communication and stakeholder engagement, and policy harmonization, skill development, financial discipline, good governance and transparency in decision making.

4.4.9.2 What are the factors that lead to failure in integrated management?

The facilitated session on factors that may lead to failure in the implementation of an integrated management framework in the Mara generated a long list of factors, including:

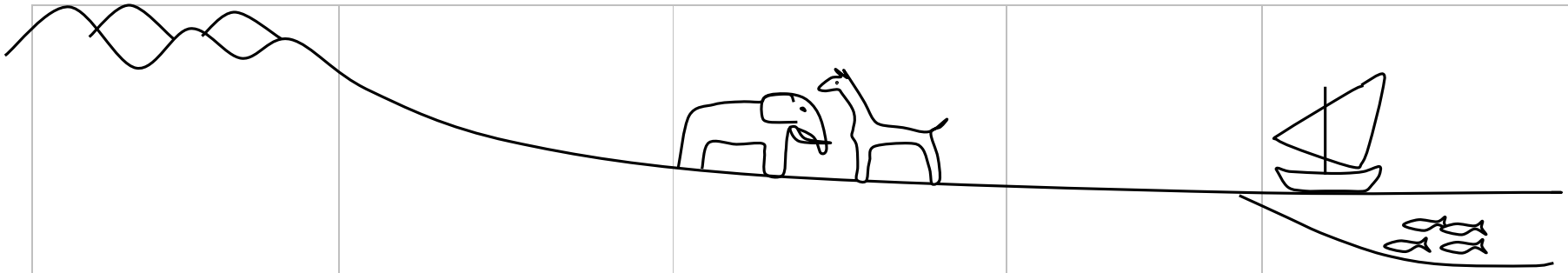
- Lack of effective institutions and administrative structures.
- Donor driven initiatives leading to unsustainable programmes once the donors funding ceases to flow.
- Competition from development partners funding among organizations/institutions leading to lack of coordination and duplication of projects and inefficient use of resources.
- Lack of tangible community benefits in integrated management.
- Top-bottom approach in designing integrated management.
- Unclear benefits to the local community and lack of clear incentives for communities to participate.
- Lack of skilled manpower on IWRM.
- Lack of collective vision.
- Entrenched positions / differing positions of way forward that persists even when consensus has been formed.
- Absence and inconsistencies in policy formulation and implementation.
- Poor collaboration between various responsible institutions.
- Lack of serious involvement of local communities and knowledge resources in setting the project utilities and especially in considering their economic concerns.
- Inappropriate technology.
- Lack of effective communication links.
- Fragment approaches due to sectorism, and no integrated thinking and training.
- Power dynamics and power dominance between countries and affected communities.
- Natural disasters.
- Inadequate knowledge and awareness of the concepts by all stakeholders.
- Cultural, religious and ethnic differences between and within countries and communities.
- Non-participatory approach to policy (excluding local communities in designing and implementation of projects and inequality between different players.
- Lack of financial resources to support integrated management due to restricted donor funding limited to specific components such as water or biodiversity only, and
- Uncoordinated interventions and sectoral planning/ implementation

4.4.9.3 Mapping Linkages – Water, Biodiversity and Livelihoods in the Mara River Basin

The group drawing exercises generated a number of conceptual models of the interactions between biodiversity conservation, human uses of the ecosystem and water quality and quantity in the basin. These conceptual models will be useful in taking forward the integrated management policy development idea by a new project consortium which has been put together to take forward the initiative in selected vulnerable river basins in Africa.

4.4.9.4 Cause Effect Relationships in the Mara River – Upstream-Downstream Effects

One of the conceptual models on the upstream-downstream effects of human and wildlife competition for ecosystem services provided by the Mara River basin is presented below (Figure 17). As expected, the figure shows many human and wildlife activities upstream having degrading effects on land and water resources downstream, and vice versa. This exercise helped participants to appreciate the collective responsibility of humans and the wildlife for the degradation being experienced in the Mara basin. The forum later synthesized the linkages in Figure 18.



1. Upstream	**2.**	**3.**	**4.**	**5. Downstream**
Deforestation for farming (±)	• Loss of biodiversity (flora fauna) (-) • Soil loss and erosion (-) • Wetlands destruction (-) • High sediments (-)	• Intensification of land use generates revenue (±) • Causes siltation and reduced flows (-) • Agrochemicals cause pollution (-)	• Pollution (-) • Deforestation (-) • Agro-pastoralism (±)	• Intensification of land use (-) • Water Pollution (-) • Sediments (-) • Loss of soil nutrients (-)
Illegal Logging(±)	• Loss of biodiversity (flora fauna) (-) • High sediments (-) • Soil loss and erosion (-) • Wetlands destruction (-)	• Reduced tree cover and biodiversity (-) • Deforestation (-) • Drought – Wildlife mortality (-) • Vulnerability to climate effects (-)	• Deforestation (-) • Flooding (-)	• Water harvesting (±)
Poor land use husbandry (-)	• Land degradation and pollution of water (-)	• Water pollution causes bad water quality into rivers (-) • Drought (-)		• Eutrophication (-) • Loss of nutrients (-)
Resettlement of landless (±)	• Settlements and urban development (-) • Water abstraction for power (Tenwek Hospital) and domestic use (-) • Loss of biodiversity (flora and fauna) (-) • Land degradation and water pollution (-)	• Reduced fishing results in increased bush meat hunting (-) • Water extraction reduces river flows (±) • Overgrazing (-) • Poor urban planning (-) • Lack of specialization and benefits from economies of scale (-) • Water pollution – bad water quality/sewerage into river (-0	• Human settlements (-) • Mining (±) • Pollution (-) • Fishing (+) • Agro-pastoralism (+) • Waste problems (-) • Deforestation (-)	• Conflicts among fishermen (-) • Species reduction/extinction (-) • Mining cause pollution (-)

Figure 17: mapping upstream –Downstream effects in the Mara River basin

Figure 18a Linkages amongst Water Quality and Quantity, Biodiversity and Livelihoods in the Mara

In the diagram above, the forum depicts the resources harvesting games and associated conflicts amongst the stakeholders: human beings and the wildlife in the Mara river basin. While the Fishermen complain that their fishing nets are "empty again", the farmer complains that the soil is all polluted. The lucky fisherman was disappointed that he/she caught only two small fish after fishing a whole day, but his unlucky counterpart who caught no fish announced his resolve to go hunting. On the other hand, the polluted water was too mucky for the fishes to see and their gills are getting blocked.

Figure 18b: Linkages amongst Water Quality and Quantity, Biodiversity and Livelihoods in the Mara

In the diagram above, the lucky man who had been allocated and/or grabbed land in the Mau forest soon discovered that he had more problems to deal with as new settlers arrived the Mau forest in search for fertile land (middle left). He soon discovered that he had to form a land defense force to defend his territory with bows and arrows! On the other hand, new settlers perceive the trees uphill as a nuisance and fell as many as is required in order to set up their own homesteads (top left). The buffering functions of the forestland are impaired as more trees are felled leading to pollution of water bodies on which the livelihoods of the communities living downstream depends for their agriculture and domestic uses. In turn, the big cats, displaced from their habitats fend for themselves downstream by preying on livestock (bottom centre). The owner who had gone fishing would soon face the dilemma of not only catching no fish, but also loosing the livestock which he has been saving for the market in exchange for other household needs! The crises in the farms soon translates to high food and energy prices for city dwellers who in turn decides on violent demonstration to protest the rising food and energy prices (Centre right). In the meantime, the tourist who has had a nice safari holiday flees to the airport as it was becoming too dangerous to remain in the catchment.

This vicious cycle typifies the resource use conflict scenario in the Mara river catchment as well as in other semi-arid catchments where an innovative integrated trans-boundary river management policy is missing.

4.5 Summary of Lessons Learned from the Forum

The facilitated sessions was concluded by a plenary brainstorming session to document the lessons learned. Among a long list of lessons learned documented by the forum participants include the following:

- There was a unanimous consensus that integrated trans-boundary management approach is the best way to manage the Mara River basin and other trans-boundary basins elsewhere.
- Information on the ecological state and degradation of the Mara Basin exists but no economic value

has been adduced to it. There is need to attach economic value to environmental resources and services provided by the Mara so as to sell to policy makers.

- There is an increasing interest in integrated management across sectors and the need to develop a more integrated approach than has been achieved to date, is now widely acknowledged.
- Trans-boundary participation and collaboration of all actors is crucial to sustainable implementation of integrated trans-boundary management plans.
- The Mara ecosystem is deteriorating rapidly. There is need to involve all interest groups to reverse the trend. Efforts applied in mitigating degradation of Mara do not seem to have a turn-around effect. Some rhinos and other species are already nearing extinction in some of the National Parks.
- To reverse the trends, we need to think laterally, and apply systems approaches rather than sector based approaches.
- Projects need to be designed to work with nature rather than to work for man.
- IM is a complex approach that needs careful preparation before its applied in real situations especially in trans-boundary situations.
- There is need for better links between scientists and policy makers, humans and nature, and better understanding of the interconnections between policy and practice in IWRM.
- There is urgent need for scientists to communicate effectively to policy/decision makers and rural communities for management changes through science journalism, non-scientific publications, policy briefs, and training. As one of the participants aptly put it, "scientists still live in their ivory towers while the responsible actors live in huts".
- Intersectoral collaboration is key to the success of IM.
- Sharing of information on IWRM from Europe, Africa, Latin America and specifically Mara River Basin is needed.
- The practical application of IM in the Mara will be an eye opener to the rest of the region.
- The concepts of IWRM and IM need to be refined to avoid confusion among stakeholders.
- Ecosystem approach should be adopted in all IWRM and IM initiatives.
- IWRM is not so inclusive after all and the need to have biodiversity and livelihoods clearly addressed is important.
- IWRM and IM are evolving concepts and we are yet to document a successful case study in Mara region.
- The challenges to implement IWRM and IM are big. A lot more has to be done in forms of capacity building at various sectoral levels.
- More participatory stakeholder forums are required for interactive learning, good planning and facilitation of management initiatives.
- There is apparent under representation of rural development/ poverty alleviation projects in the Mara.
- The regional initiatives to implement IWRM in the Mara are encouraging, but more needs to be done in actual implementation and to upscale to IM.
- The likely effects of global climate change at high attitudes exacerbate the urgent need for an integrated management framework in the Mara.
- Many institutions and initiatives exist for the management of the Mara but they generally fail to achieve desired results due to of lack of implementation and no political will.
- There is urgent need to create economic incentives for stakeholders to encourage integrated management of the Mara.

In conclusion, the forum recommended that there is urgent need for an integrated management framework to avoid catastrophe and disasters in the Mara – a major natural sanctuary in the region. The African Water Vision should be translated into practice.

5 PLENARY SESSION III: INTRODUCTION AND REVIEW OF THE INTREPID WEB-HOSTED INTERACTIVE DATABASE INVENTORY

Mr. Grant presented the INTREPID database for review by the forum. The generic framework for the interactive database resource and information system is currently hosted on the Macaulay Institute's website http://www.macaulay.ac.uk/intrepid and the ATPS website: http://wwwatpsnet.org but will be provided on the websites of all project partners in due course. The web interface (platform) for hosting the template has been designed to ensure that it can be easily accessed by project partners, policy makers, researchers and the wider public. It currently provides detailed information on over 120 existing research, policies and management initiatives aimed at integrated water resource management (IWRM), conservation of biodiversity (CBD) and sustainable livelihoods (SL) relevant to the Mara river basin.

The generic framework is presented in Figure 21 below:

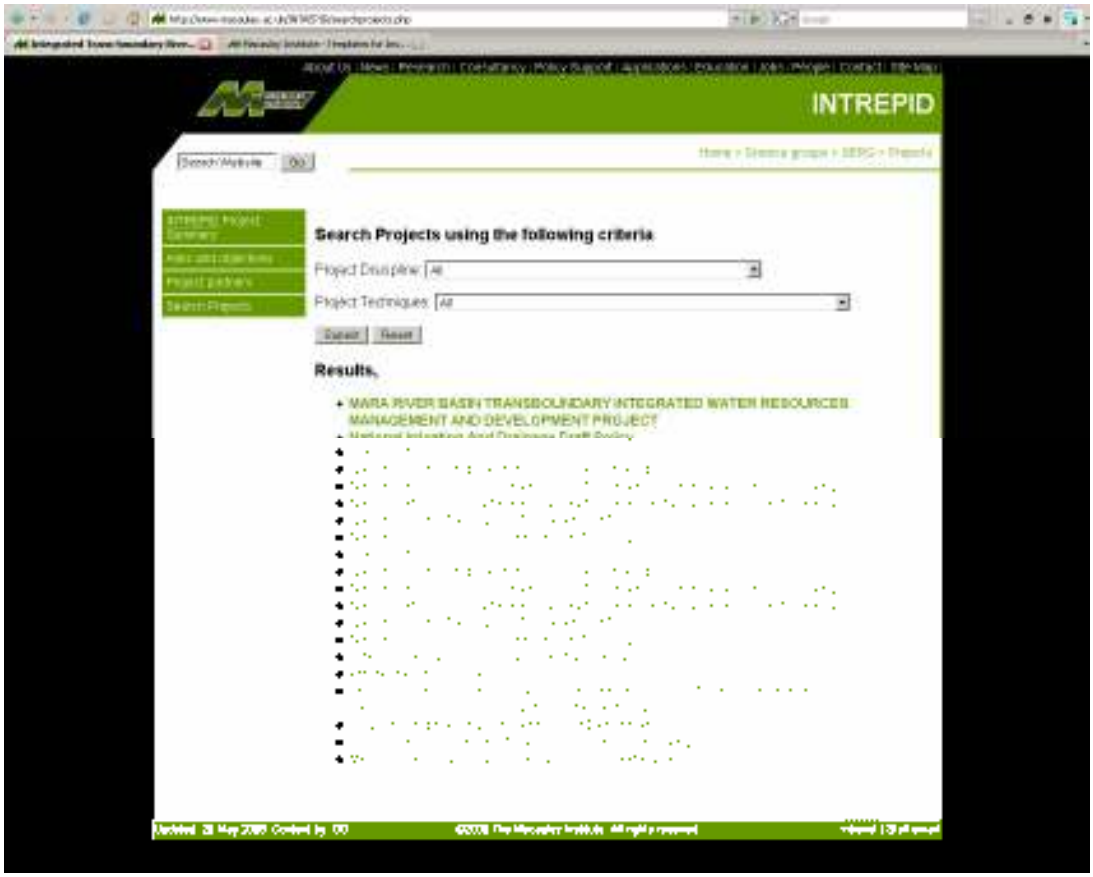


Figure 19: Screen capture of INTREPID platform

The platform (Fig 19) provides a simple search facility to interrogate the inventory and results displayed as an alphabetized hyperlink list. Each result link can be opened up in a separate page and the following details of each entry provided:

- Unique ID code
- Title
- Relevant Sector (IWRM, CBD, SL)
- Scale (National, Trans-boundary)
- Start Date
- End Date
- Website Address
- Organizations involved
- Funding body

- Objective
- Characteristics
- Brief Abstract
- Key Words
- Main Study Techniques (Research projects only)
- Location
- Potential conflicts between sectors
- Potential Synergies between sectors
- Other Relevant information
- Project Leader Title
- Project Leader Name
- Lead Project Organization name
- Contact Email
- Contact Phone Number

Users of the website can enter missing data for existing projects in the inventory and can nominate new projects, policies or initiatives through an interactive upload page. The African Technology Policy Studies Network will continue to manage the Database entries even after the completion of the INTREPID project, under the auspices of its science communications and policy advocacy programmes.

Participants Review the INTREPID Database Resource

The forum reviewed the Database platform and through a facilitated session, provided lists of projects and policy initiatives in the Mara which needs to be included in the Database. Mr. Grant explained that the project team would like to receive contacts of all participants who may wish to review the details of the projects already entered in the Database to ensure constancy and accuracy of the data.

The following participants volunteered to further review the Database resource (Table 6).

NAME	EMAIL ADDRESS
Ms. Githaiga Nancy (Kenya)	ngithaigah@yahoo.com
Mr. Rudolf Glotzbach (Tanzania)	nglotzbach@snuworld.org
Dr Musa Dube (Swaziland)	madube@agric.uniswa.sz
Prof Joseph Obua (Uganda)	obua@forest.make.ac.org
Dr Mohamed Said (Kenya)	M.SAID@CGIAR.ORG
Dr Musonde Mumba (Kenya)	mmumba@wwwfearpo.org
Prof Henry Muhoo (Tanzania)	hmahoo10!yahoo.co.uk
Prof Femi Olokesusi (Nigeria)	femioloke@yahoo.com
Ms. Deepa Pullanikatil (Lesothos)	d-pullani@yahoo.com
Mr. Stephen Manegene (Kenya)	smanegene@kws.org
Mr. Patrick Ohayombe (Kenya)	rapospat@yahoo.com
Prof Francis Mutua (Kenya)	fmmutua@gmail.com

6 THE POLICY BRIEF

The final session of the forum was dedicated to various forms of facilitated sessions designed to engage forum participants in the drafting of the policy based on a syntheses of lessons learned from the forum and experiences elsewhere. The sessions were chaired by Dr Simon Langan of the Macaulay Institute, Aberdeen UK. He gave a presentation of the general framework and expectations of what a policy brief should be: simple, addressing a key policy issue, no more than four pages, factual etc. Dr Langan suggested that the participants discuss and agree the title, executive summary, background and conceptual issues including policy issues to be addressed, current research in the Mara, past and current policies and management initiatives, potential linkages, complementarities, gaps in knowledge, the evidence base, and policy recommendations.

The Facilitators requested that participants to participate fully in the process to ensure that the key policy issues and points they would like to make in each part of the policy brief are taken into account. The participatory sessions started with a plenary brainstorming session, followed by a series of break out groups and subsequently a concluding plenary session to synthesize the huge amount of data generated. Some of the highlights of the sessions are presented in Figure 23 and 24 below.

Participants Brainstorm on the Policy Brief Outline

The forum spent substantial time discussing the appropriate title, structure and content of the policy brief and strategies for dissemination to ensure effective policy impacts (Figure 23). The participants from the different organizations shared their experiences through a series of facilitated participatory processes (Figure 24).

Cross sections of the participatory sessions to synthesis the information generated from the forum for the policy brief

At the end of the day a huge amount of data was gathered and a team of representatives from the key institutions working on the Mara basin were selected to take forward the synthesis of the material to produce the policy brief. The selected policy brief writing team included delegates from World Wide Fund for Nature (WWF), International Livestock Research Institute (ILRI), Tanzanian National Park Authority (TANAPA), University of Nairobi (UN), Africa Technology Policy Studies Network (ATPS) and the Macaulay Land Use Research Institute (MLURI). It was agreed that the policy brief should provide clarity on the current situation in the Mara basin, identify linkages, constraints and complementarities, and identify areas of further work to take forward the integrated trans-boundary management framework and make key policy recommendations.

The policy brief writing team meet on the 15th of March to synthesize the information garnered by the forum and the agree tasks for completing the policy brief. The final policy brief that was produced by the team is circulated under a different cover.

7 CLOSURE OF WORKSHOP

The form was concluded in a facilitated plenary session to address issues left in the Parking Place. Some of the pertinent issues addressed include a number of questions such as:

7.1 How do we get the concepts of integrated trans-boundary management off the shelf and move into action?

The forum agreed that while moving from concepts and policy statement to actual implementation remains a challenge, publications in popular media, policy advocacy, and stakeholder engagement could go a long way to ensure proper implementation of integrated management. Dr Urama explained that promoting networking in communicating the concept of integrated trans-boundary river management is one of the central aims of the INTREPID project. He encouraged the participants to take the message back to their regions, countries, local communities, and also implement the concepts in their own capacities as individuals. He noted that the ATPS will continue to play the role of a knowledge broker in this regard through the web-hosted knowledge boards, dissemination of proceedings and policy briefs to their listserv and Networks in Africa through the websites of the project partners. He noted that the Macaulay Institute would also do the same. He referred to an article which is already published in eStrategies in the UK which will be disseminated widely in Europe and Africa. He also informed the forum that ATPS had invited a Science Journalist to the forum and that he will be publishing an article on the outcomes of the forum for wider dissemination in Africa. It was suggested that great milestones would be achieve if all participants would take the message home. The forum agreed that all participants should send to ATPS a list of relevant ministries, local actors, and networks to which the report and the policy brief should be sent.

7.2 Would the Interactive Database Resource be expanded to include projects and management initiatives in other vulnerable river basins in Africa?

Dr Urama explained that the INTREPID project idea was initially conceived to cover three river basins in Africa and Europe: the Mara, the Okavango, the Chad and the Guadiana, but there was a need to first engage with stakeholders in a case study of one catchment to scope the issue, existing knowledge, knowledge gaps, policy gaps, etc. The specific support actions project (INTREPID) is therefore focused on the Mara River basin only. He however noted that the ATPS and the Macaulay Institute are keen to take forward the ideas emerging from the INTREPD project in a new research programme which would be one of the secondary outcomes of the INTREPID project. He noted that participants interested in taking forward the pan-African project initiative should contact the project team.

Further to the above, there was a brainstorming exercise on new research and new project initiatives that participants would like to see happen. A number of disciplinary and trans-disciplinary research and integrated management ideas were documented. Some of the research gaps identified as necessary for developing a sustainable integrated trans-boundary river management policy in the Mara River include:

- Indigenous knowledge systems: A lot of tacit knowledge held by different knowledge communities have been hitherto excluded from the analyses. There is need to map what knowledge exists in these difference knowledge communities including the orthodox science and indigenous knowledge communities in the basin. Both knowledge systems need to be harnessed properly.
- Joint methodological protocols for data collection and analysis: There is need to develop joint harmonized methodologies and protocols for data collection across projects and across the borders to ensure comparability of data.
- Links between water, biodiversity and livelihoods: Little is known about the inextricable linkages between parts of the system. There is need to develop a systems wide methodology and frameworks to better understand these linkages, the strengths of the linkages and the associated actors: humans, wildlife, plants and animals.
- Linkages between existing Acts, Legislations and Directives on water, biodiversity and livelihoods: A study is needed to examine the existing Acts, Legislations and Directives on these interrelated issues at the national and international levels in order to synthesize the conflicts and synergies amongst them.

- Information on livelihoods in park adjacent communities: A study is required to map the livelihoods in park adjacent communities, how these are linked to activities in the Parks and alternative livelihood sources in the basin.
- Multiplier effects of tourism and hunting: A study is required to unpack the multiplier effects of wildlife tourism and hunting at the national, regional and community levels.
- The true economic value of the ecosystem services provided by the Mara river basin and value based management options: There is need to conduct environmental valuation surveys to establish the economic and non-economic value of ecosystems services in the Mara and their implications for economic growth in Kenya and Tanzania. This study should include economic and environmental value trade-off analyses.
- Potential buy-in by national governments and local communities – A study to understand the current mid-sets, attitudes and propensities to adopt an integrated trans-boundary river management policy for the Mara River need to be carried out in tandem with the economic valuation surveys. This is necessary to inform appropriate economic and non-economic incentives for sustainable implementation of the policy once developed.
- Extended Cost-benefits and associated resource requirement (not financial) required by governments to implement the policy: An extended cost benefit analyses is required
- Baseline data on species checklist to document type of species, population trends, and interactions is required.

As shown in the list above, there is still much work ahead for a sustainable integrated trans-boundary river management policy to be developed for the Mara River. There are still significant knowledge and institutional gaps that need to be addressed.

7.3 Closing Remarks

Mr Davidson of the Macaulay Institute and Dr Urama of ATPS made closing remarks.

Mr Davidson thanked all the participants for the hard work and productive deliberations. He said that the forum had generated a lot of information while participation had been beyond expectation. He noted that the participants had shared their experiences which, would be translated into more tangible outcomes in the future. He also thanked ATPS and the facilitators Ms Diana Pound from Dialogue Matters and her assistant Deepa Pullanikatil from the ATPS Lesotho Chapter for ensuring the meeting was a success.

Dr Urama thanked the ATPS Secretariat for the logistical support prior to and during the meeting. He urged participants to keep the networking spirit especially to share their experiences. In addition, participants were requested to interact with the database to contribute towards a draft template and also participate in the

writing of the policy brief to ensure that the brief and the policy brief will represent the collective views of the participants at the forum and not that of the project partners only. He hinted that the ATPS will be interested in developing a new program with interested partners on innovations systems for integrated trans-boundary river management in the Mara as well as other semi-arid river basins in the continent.

8 Annex 1: Conference Programme

	ATPS/MI/TANAPA CONFERENCE AND WORKSHOP
PLENARY SESSION	INTEGRATED TRANS-BOUNDARY RIVER MANAGEMENT POLICY DEVELOPMENT
	Tuesday, 11 March 2008

Pre-workshop planning meeting:

Venue: TBA

16:00 – 18:30: ***Invited Participants Only:*** Dr Kevin Urama, Mr. Grant Davidson, Dr Simon Thirgood, Dr Simon Langan, Ms. Diana Pound, Ms. Deepa Pullanikatil, Carol Thuku

Wednesday, 12 March 2008
Venue: TBA

Opening Session

Chair: Prof Sam Ekstrand, *Department Manager, Water Resources and GIS IVL, Swedish Environmental Research Institute P.O Box 210 60, 100 31 Stockholm Sweden*

08:30 - 09:00 Workshop registration

09:00 – 09: 30 Welcome remarks from Dr Kevin Urama, *Project Coordinator, Senior Research Fellow, Macaulay Institute, UK and Executive Director ATPS*

Brief welcome remarks from:
Mr. Grant Davidson, *Program Administrator, Macaulay Institute, UK*
Dr Osita Ogbu, *former Executive Director, ATPS and former Economic Adviser to The President and Chief Executive, National Planning Commission, Federal Republic of Nigeria.*
Dr Emmanuel Gereta, *Tanzanian National Parks Authority (TANAPA)*
EU Commission Representative

09:30 - 09:50 **Opening Presentation**: - Integrated Trans-boundary River Management Policy Development, EC Commission Specific Support Action Project
Contract N^{0} FP6 – INCO-CT-2007-043784 INTREPID: An introduction,
by Dr Kevin Urama, Senior Research Fellow (MLURI)/Executive Director, ATPS

09:50 - 10:10 TEA/COFFEE BREAK and PHOTOSESSION

Plenary Session I – Good practice in managing water, biodiversity and livelihoods: some example policies and projects

Chair: Prof Francis Mutua, *Professor of Hydrology, University of Nairobi, Kenya*
Rapporteur: Dr Funke Alaba, *University of Pretoria, South Africa*

10:10 – 10:30 **Presentation 1**: Is IWRM under the EU Water Framework Directive and the EU Water Initiative a Template for Integrated Management of Water, Biodiversity and Livelihoods? *by Dr Angela Periera, European Commission Joint Research Council, Italy*

10:30 - 10:50 **Presentation 2**: Is IWRM under the African Water Vision 2000 a Template for Integrated Management of Water, Biodiversity and Livelihoods? *by Prof Francis Mutua, Professor of Hydrology, University of Nairobi, Kenya*

10:50 - 11:10 **Presentation 3:** Conservation of Biodiversity and Sustainable Livelihoods: Theory and practice in the Mara River basin *by Dr Simon Thirgood, MLURI*

11:10 - 11:30 **Presentation 4:** Ecosystems Approach and Convention on Biological Diversity

by Diana Pound, IUCN Commissioner, Dialogue Matters, UK.

11:30 - 12:00 *Questions and discussion focusing on the linkages and complementarities amongst these policy directives*

12:00 - 13:00 **Facilitated Session I:**
Facilitators: Diana Pound, *Dialogue Matters, UK & Deepa Pullanikatil, Lerotholi Polytechnic, Lesotho*

Facilitated Discussion
Thinking about Integrated Management of Water, Biodiversity and Livelihoods:

1. *What are the risks and challenges of integrated management (including transboundary issues)?*
2. *What are the likely benefits of integrated trans-boundary management of water, livelihoods and biodiversity?*
3. *What will happen without integrated management?*
4. *What are the likely constraints to implementing integrated management of water, biodiversity and livelihoods in the Mara River basin, including trans-boundary issues?*
5. *What are alternative ways to achieving good management?*

13:00 - 14:00 LUNCH {Facilitation team to set up for afternoon session}

Plenary Session II: Experiences and Evidence from the Field
Chair: Dr Inyasi Lejora, *Head of Ecology Department, TANAPA, Tanzania*

14:00 - 14:20 **Presentation 5** – Some examples of good practice: IWRM in Africa, Europe and Latin America – TWINBAS & TWINLATIN *by Prof Sam Erkstand, IVL Swedish Environmental Research Institute Ltd, Sweden*

14:20 - 14:40 **Presentation 6** - Some examples of good practice: IWRM, CBD and SL in the Mara River basin- WWF Mara River Project *by Dr Mumba Musonda, World Wide Fund for Nature (WWF)*

14:40 - 15:00 **Presentation 7** - Some examples of good practice: Integrating WRM, CBD and SL in the Mara River basin - ILRI Mara River Project by *Dr Mohammed Said, International Livestock Research Institute (ILRI), Kenya.*

15:10 - 15:40 TEA/COFFEE BREAK

Plenary Session III:
Chair: Dr Simon Thirgood, *Macaulay Institute/Aberdeen Centre for Sustainability, UK*

15:40 - 16:00 What have we learned so far? *Grant Davidson, Macaulay Institute and Simon Langan, Macaulay Institute*

16:00 - 17:30 **Facilitated Session II**
Facilitators: Diana Pound, *Dialogue Matters, UK* and Deepa Pullanikatil, *Lerotholi Polytechnic, Lesotho*

Thinking about the Mara River basin; what can we learn to inform the policy brief?

Discussions in groups answering questions such as:

The current situation
1. *What are the key issues and conflicts of interest in the Mara River basin? (What evidence do you have for these?)*
2. *What management is working well now?*
3. *What are the success stories? – What can we learn from them?*
4. *What can we learn from projects that worked less well?*

Trends and opportunities

5. *What are the positive socio economic and environmental trends that integrated management would need to strengthen and enhance?*
6. *What are the negative trends that integrated management would need to mitigate?*
7. *What new opportunities could integrated management harness? (eg. Funding, policy changes, organizational changes)*

Who is doing what?

8. *Who is doing what now? Organizations, responsibilities and activities*
9. *Who else would need to be involved?*

Gaps in knowledge

10. *What information is needed for integrated management? What information do you have that could answer this question?*
11. *What are known gaps in knowledge? (eg technical knowledge, research topics/questions, institutional responsibilities, human uses and effects).*

Constraining factors, promoting factors

12. *What are the factors that lead to success in integrated management?*
13. *What are the factors that lead to failure in integrated management?*

Mapping interconnectedness between existing institutions for managing water, wildlife (including plant and animal species) and livelihoods in the Mara River basin:

14. *Draw diagrams showing linkages, both positive and negative, between different human uses and the natural environment – to help think about the interconnectedness of different factors.*

15: Draw a diagram showing the interconnectedness between existing institutions for managing water, wildlife (including plant and animal species) and livelihoods in the Mara River basin in Kenya and Tanzania. Include existing and potential linkages amongst them, including trans-boundary issues.

17:30 – 19:00 Networking time

19:00 - 21:00 Cocktail Reception for all participants *(venue to be announced)*

PLENARY SESSION

ATPS/MI/TANAPA CONFERENCE AND WORKSHOP
INTEGRATED TRANS-BOUNDARY RIVER MANAGEMENT POLICY DEVELOPMENT

Thursday, 13 March 2008

Plenary Session III: INTREPID Database

09:00 - 09:20 Presentation 8: Introducing the INTREPID database *by Mr. Grant Davidson, Macaulay Institute, UK*

09:20 – 09:30 Questions and discussions

1. *What do you like about it now?*
2. *Room for improvement – how can we improve on the database to make it more user-friendly?*

09:30 – 10:30 **Facilitated Session III: Break-out Groups**
Aim: To review database and infill gaps

Group 1: Policies, Projects and Programs on IWRM in the Mara River basin
Chair: *Dr Mumba Musonda, World Wide Fund for Nature (WWF)*
Rapporteur, Dr Ozor Nicholas, University of Nigeria, Nsukka

Group 2: Policies, Projects and Programs on CBD in the Mara River basin
Chair: *Dr George Essegbey, ATPS Ghana*
Rapporteur: Ms. Evelyn Oroko, ATPS Kenya.

Group 3: Policies, Projects and Programs on SL in the Mara River basin
Chair: *Prof Eric Eboh, Executive Director, African Institute for Applied Economics, Nigeria*
Rapporteur: Dr Fred Amu-Mensa, ATPS Ghana.

10:30 – 11:00 TEA/COFFEE

11:00 – 11:30 Reports from the working groups (5 – 10 minutes each)

11:30 – 12:30 Facilitated Session
Facilitators: Diana Pound *Dialogue Matters, UK* and Deepa Pullanikkatil, *Lerotholi Polytechnic, Lesotho*

Infilling gaps in the Database: Policies, research and projects in the Mara

1. *What other policies or project initiatives are you aware of in Kenya and/or Tanzania that address IWRM, CBD, and SL or any combinations of these?*
2. *Do any of these policies or projects conflict with each other in any way?*
3. *Do any of these policies overlap at the same decision making level?*
4. *To what extent are you satisfied with the database?*
5. *What needs to be done to take the database forward?*
6. *Who needs to be involved in doing this?*

Given everything you have discussed – What are the principles of good practice in integrated management that the policy brief should promote?

12:30 - 13:30 LUNCH

Session IV: Plenary session: To agree on content of policy brief

Chair: Simon Langan, *Integrated Water Catchment Management, Macaulay Institute, UK.*

Facilitators: Diana Pound *Dialogue Matters, UK* and Deepa Pullanikkatil, *Lerotholi Polytechnic, Lesotho*
Rapporteurs: Carol Thuku-Mbugua and Lucy Mwangi, ATPS- to draft text concurrently

13:30 – 13:50 What makes a good policy brief? Agree structure, word length, etc

13:50- 15:30 **Drafting the policy brief based on what we have learned so far and experiences elsewhere. (Facilitation team to provide structure for the participatory process)**:

1. Document understanding of the current situation in the Mara basin, identify linkages, constraints and complementarities, agree a framework for integration, and key recommendations.

Guiding Questions:

1. *How well are policies, programs and projects integrated? Identify existing and potentials linkages, conflicts and complementarities.*
2. *How would integration influence/benefit/help achieve sustainable management of water, livelihoods and biodiversity in the catchment? Identify key benefits and challenges of integration including trans-boundary issues that you would like to see in the policy brief.*
3. *How possible is integration management in the Mara basin? Develop and agree framework of integration if possible, cite examples of good practice if possible.*
4. *What are the areas of uncertainties and risks in pushing for integrated management in the Mara? Identify both reducible and irreducible uncertainties associated with integrated management for the economic, ecological, and water sectors in Kenya and Tanzania.*

Using a meta plan, address the following question:

5. *What are the key points you would like made under each section of the policy brief and what recommendations would you like to see in the policy brief?)*

15:30 - 16:00 TEA/COFFEE BREAK

16:00 - 16:30 A report on the policy brief drafted from the preceding sessions by *Dr Simon Langan, The Macaulay Institute.*

16:30 - 17:00 **Response to the draft content of the policy brief:**
Question 1: What do you like about it?
Question 2: What needs to be done to improve the policy brief?
Question 3: What are the next steps in finishing and polishing the policy brief?
Question 4: Who will like to be involved in reviewing the final version of the brief?

17:00 – 17:10 **Facilitated brainstorming on future project initiatives**
Facilitators: Diana Pound *Dialogue Matters, UK* and Deepa Pullanikkatil, *Lerotholi Polytechnic, Lesotho*

17:10 – 17:30 **Concluding remarks by the project team:**
Mr. Grant Davidson, *Project Administrator, Macaulay Institute, Aberdeen UK*
Dr Kevin Urama, *Project Coordinator, Macaulay Institute, Aberdeen UK / ATPS*

PLENARY SESSION

ATPS/MI/TANAPA CONFERENCE AND WORKSHOP
INTEGRATED TRANS-BOUNDARY RIVER MANAGEMENT POLICY DEVELOPMENT

Friday, 14 March 2008

Session V – Review of Policy Brief and Workshop Outputs

09:30 – 12: 30: ***Review Team only:*** Dr Kevin Urama, Mr. Grant Davidson, Dr Simon Thirgood, Dr Osita Ogbu, and Dr Simon Langan, Ms. Carol Thuku {*other team members to be decided*}

09:30 onwards Field trip/City tour – *Interested participants to register at workshop Secretariat. Cost of tour will have to be paid by interested individuals.*

9 Annex 2: Participants List

Participants of the INTREPID Stakeholders Forum held in Arusha, Tanzania

CAMEROON

1. Dr Ndeso ATANGA
Senior Lecturer
Head of Nursing Science Department
Faculty of Health Sciences
University of Buea
P.O. Box 63, Buea, SWP, Cameroon
Tel: + 237-75816047
Cell: +237-99841433
Email: lawrenkum@yahoo.co.uk

2. Ntangsi Max MEMFIH
Department of Economic and Management,
Faculty of Social and Management Sciences
University of Buea, P.O. Box 63, Buea – Cameroon
Tel: (237) 332 36 66/99 80 20 83/77 21 25 88
Fax: (237) 332 22 72.
E-mail: ntangsi2005@yahoo.com or m_ntangsi@hotmail.com

COTE D'IVOIRE

3. Dr Arsène KOUADIO
Executive Director
Institut pour le Développement (IPD)
08 BP 1295 Abidjan 08,
Côte d'Ivoire
Tel: +225-224 46099
Fax: +225-224 42829
Email: arsenekk@yahoo.fr

GHANA

4. Dr George O. ESSEGBEY
Senior Research Scientist
STEPRI-C.S.I.R.
P.O. Box CT 519
Accra, Ghana
Tel: +233-21-779401/773856
Fax: +233-21-773068
Email: george_essegbey@yahoo.co.uk

5. Dr Fred AMU-MENSAH
Senior Research Scientist
CSIR Water Research Institute
P.O. Box M.32
Accra, Ghana
Tel: +233-24-4748197
Fax: +233 21 77 7170
Email: assabil@aim.com or obeyie@gmail.com

ITALY

6. Angela Guimaraes PEREIRA
Institute for the Protection and Security of Citizens
European Commission Joint Research Council
Italy
Email: angela.pereira@jrc.it

KENYA

7. Dr Mohamed SAID
International Livestock Research Institute (ILRI)

P.O. Box 30709
Nairobi, Kenya
Tel: +254 20 422 3000
Fax: +254 20 422 3001
Email: m.said@cgiar.org

8. Mr. Edmond ODABA
Senior Programme officer
Kenya Water for Health Organization (KWAHO)
P.O. Box 61470 Nairobi
Kenya
Tel: 254 20 607425
Fax: +24 20 606718
Email: info@kwaho.org

9. Eng. Nesline OGWE
Technical Department
National Irrigation Board
P.O. Box 30372- 00100
Nairobi, Kenya
Tel: +254 20 2738065
Fax: +254 20 2722821/2711347
Email: technical@nib.or.ke

10. Prof Francis MUTUA
Professor of Hydrology
Department of Meteorology
University of Nairobi
P.O. Box 30197-00100
Nairobi, Kenya.
Tel: +254 20 444 1045
Cell: +254 722 835867
Email: fmutua@uonbi.ac.ke

11. Dr Musonda MUMBA
World Wide Fund for Nature (WWF)
P.O. Box 62440-00200
Nairobi, Kenya
Tel: +254 20 387 7355
Fax: +254 20 387 7389
Cell: +254 723 786183
Email: mmumba@wwfearpo.org

12. Ms. Nancy GITHAIGA
Maji-na-Ufanisi (Water & Development)
P.O. Box
Nairobi, Kenya
Tel: +254 20 272 7107
Email: nancy.githaiga@majinaufanisi.org

13. Mr. Stanley AMBASA
Head, Lake Victoria Environmental Management Project
National Environmental Management Authority (NEMA)
Kapiti Road, of Mombasa Road
P.O. Box 67839-00200, Nairobi
Tel: +254 20 605522/6/7
Fax: +254 20 608997
Email: ambasas@yahoo.co.uk

14. Mr. Ben Okindo MIRANGA
Programme Officer
Health and Water Foundation
P.O. Box 16923-00100, Nairobi
Tel: +254 20 2734261
Fax: +254 20 2734257
Email: info@healthandwater.org

15. Mr. Stephen MANEGENE
Head Biodiversity Planning and Environmental Assessment
Kenya Wildlife Service (KWS)
P.O Box 40241-00100
Nairobi, Kenya.
Tel. +254 20 600800,602345
Fax: +254 20 603792
Email: smanegene@kws.org

16. Eng. Dan OWORE
Regulatory Services Manager
Water Services Regulatory Board
P.O. Box 41621-00100
Nairobi, Kenya
Tel: +254 20 273 3561
Fax: +254 20 273 3558
Email: info@wsrb.or.ke

17. Mr. P. MATSESHE
Field Coordination Manager
Water Services Trust Fund
P.O. Box 49699-00100
Nairobi, Kenya
Tel: +254 20 272 0696
Fax: +254 20 272 4357
Email: info@wstfkenya.org

18. Eng. Alfred AMOMBO
Athi Water Services Board
Africa-Re Centre
Hospital Road, Upper Hill
P.O. Box 45283-00100 GPO
Nairobi, Kenya
Tel: +254 20 272 4292/3
Fax: +254 20 272 4295
Email: info@awsboard.com or aamombo@awsboard.go.ke

19. Eng. Simeon Otieno DULO
Water Resources Engineer
University of Nairobi
P.O. Box 6885-00300
Nairobi, Kenya
Tel: +254 20 318262
Cell: +254 733 423864

Email: otienodulo@yahoo.co.uk or sodulo@uonbi.ac.ke

20. Mr. Patrick HAYOMBE
Deputy Director
Applied Water Research
Kenya Water Institute
P. O. Box 60013-00200
Nairobi, Kenya
Tel: 254-20-607425/33/43
Fax: 254-20-606718/606356
Email: rapospat@yahoo.com

21. Mr. Kimemia MUGO
Journalist
Weekly Water Report, Middle East and Africa
OOSKA news, LLC
Tel: +254 20 2190370
Email: kimemiam@gmail.com

NIGERIA

22. Prof Eric EBOH
Executive Director
African Institute for Applied Economics
128 Park Avenue, GRA,
P.O. Box 2147
Enugu State, Nigeria
Tel: +234 42 256644
Fax: +234 42 256035
Email: eceboh@yahoo.com

23. Prof Femi OLOKESUSI
Nigerian Institute for Social Science Researcher (NISER)
P.M.B 5 UI Post Office
Oyo Road, Ojoo, Ibadan, Nigeria
Tel: +234 2 8103345/8102904
Fax: +234 2 2413121
Email: femioloke@yahoo.com

24. Dr Nicholas OZOR
Lecturer
Department of Agricultural Extension
Faculty of Agriculture
University of Nigeria, Nsukka
Enugu State, Nigeria.
Cell: +234 803 5781264
E-mail: sunny_ozor@yahoo.com

SOUTH AFRICA

25. Dr Olufunke ALABA
Post-doctoral Fellow
Department of Economics
University of Pretoria
South Africa
Tel: +27 72 438 7458
Email: funkeal@yahoo.com

SWAZILAND

26. Dr M. A. DUBE
Senior Lecturer & ATPS National Coordinator
University of Swaziland
Faculty of Agriculture
P.O. Luyengo M 201,
Swaziland
Telefax: +268-527 4021 ext 1128
Cell: +268 618 15 79
Email: madube@agric.uniswa.sz

SWEDEN

27. Dr Sam EKSTRAND
IVL Swedish Environmental Research Institute Ltd
Box 210 60, 100 31
Stockholm, Sweden
Email: sam.ekstrand@ivl.se

TANZANIA

28. Prof Henry MAHOO
Sokoine University of Agriculture
Tanzania
Email: swmrg@suanet.ac.tz or hmahoo10@yahoo.co.uk

29. Mr. Lusekelo MWAMBULI
Basin Hydrologist, Lake Victoria Basin
Ministry of Water
P.O. Box 1342 Mwanza - Tanzania
Dar es Salaam, Tanzania
Cell: +255 755 318616
Tel: +255 28 2500657
Fax: +255 28 2500820
Email: lvbwo@yahoo.com

30. Mr. Stephen MARIKI
Conservation Director
WWF Tanzania Programme Office
Tanzania
Email: smariki@wwftz.org

31. Dr Emmanuel GERETA
Tanzania National Parks (TANAPA)
P.O. Box 3134
Arusha, Tanzania
Email: e.gereta@habari.co.tz

32. Mr. William KASANGA
Project Manager
Mara River Basin Project
WWF
Tanzania
Email: wkasanga@hotmail.com

33. Mr. Freddy Mhina MNGUBE
Coordinator
Mara River Basin Project
WWF

Tanzania
Email: fredmhina@yahoo.com

34. Dr James WAKIBARA
Park Ecologist
Serengeti National Park
Email: jwakibara@yahoo.com

35. Mr. Inyasi LEJORA
Head of the Ecology Department
Tanzania National Parks (TANAPA) HQ
P.O. Box 3134
Arusha, Tanzania
Email: Ilejora@hotmail.com

36. Mr. Rudolf GLOTZBACH
Water Resources Management Advisor
SNV- Tanzania
P.O. Box 11290, Mwanza
Tel: +255 28 2500130
Email: rglotzbach@snvworld.org

37. Prof Mark MUJWAHUZI
Chief Technical Adviser
Water for African Cities
Dar es Salaam Project
Tel: +254 22 2700407
Email: mujwahuz@udsm.ac.tz

38. Arnold Lucas MAPINDUZI
Senior Environmental Management Officer
(Natural Resources)
National Environment Management Council
P.O. Box 63154
Dar es Salaam, Tanzania
Tel: +255 22 213 4434
Fax: +255 22 211 1579
Email: amapinduzi@hotmail.com

39. Ms. Hulda GIDEON
Tanzania Commission for Science and Technology
(COSTECH)
P.O Box 4302, Dar es Salaam, Tanzania
Fax: 255 22 2775313
Tel: 255 22 2700754/5
E-mail: hgideon@costech.or.tz

UGANDA

40. Prof Joseph OBUA
Head of Department of Forest, Biology and
Ecosystems
Makerere University
P.O. Box 7062, Kampala, Uganda
Tel : +256 414 543647
Fax : +256 414 533574
Email: obua@forest.mak.ac.ug

UNITED KINGDOM

41. Dr Nick HEPWORTH
Water and Environment
School of Development Studies
University of East Anglia, Norwich, UK
Tel: +44 7906 083 222
Email: n.hepworth@uea.ac.uk

FACILITATORS

42. Ms. Diana POUND
Dialogue Matters
55 Scotton Street, Wye, Ashford, Kent
United Kingdom
Tel: +44 1233 813875
Email: diana.pound@dialoguematters.co.uk

43. Ms. Deepa PULLANIKATIL
Lecturer, Civil Engineering
Lerotholi Polytechnic
P.O Box 1519, Maseru 100, Lesotho
Tel: +266-22313376, +266 63072665
Fax: +266 22310265
Email: d_pullani@yahoo.com

THE MACAULAY INSTITUTE

The Macaulay Institute
Craigiebuckler, Aberdeen
AB15 8QH
Scotland, UK
Tel: +44 1224 498 200
Fax: +44 1224 311 556

44. Mr. Grant DAVIDSON
Email: g.davidson@macaulay.ac.uk

45. Dr Simon THIRGOOD
Email: s.thirgood@macaulay.ac.uk

46. Dr Simon LANGAN
Email: s.langan@macaulay.ac.uk

ATPS SECRETARIAT

African Technology Policy Studies Network
(ATPS)
3rd Floor, Chancery Building, Valley Road
P.O. Box 10081-00100
Nairobi, Kenya
Tel: +254 20 271 4092
Fax: +254 20 2714028

47. Ms. Lucy MWANGI
Email: lmwangi@atpsnet.org

48. Ms. Carol MBUGUA
Email: cthuku@atpsnet.org

49. Ms. Evelyn OROKO
Email: eoroko@atpsnet.org

PROJECT COORDINATOR

50. Dr Kevin C. URAMA
Senior Research Fellow, Macaulay Institute *and*
Executive Director, ATPS
Email: kurama@atpsnet.org