Stakeholders Engagement for Informed Decision-Making, Threats Mitigation and Sustainable Freshwater Services Management in the Great Lakes Region of East and Central Africa

Training Workshop in Integrated Freshwater Ecosystems Management

IFEM

Kigali 17-19 December 2013

Workshop Proceeding Report, January 2014

Supported by: MacArthur Foundation

Contents

LIST OF ACRONYMS

ACNR:	Association pour la Conservation de la Nature au Rwanda
ALT:	Amis du Lac Tanganyika
ARCOS:	Albertine Rift Conservation Society
CRAGs:	Climate-Resilient Altitudinal Gradients
CWMP:	Community Wetland Management Planning
DRC:	Democratic Republic of Congo
EbA:	Ecosystem-based Adaptation
EIA:	Environmental Impact Assessment
EWNHS:	Ethiopian Wildlife and Natural History Society
EWSA:	Energy, Water and Sanitation Authority
FAO:	Food and Agriculture Organization
GIS:	Geographic Information System
IFEM:	Integrated Freshwater Ecosystem Management
IMD:	International Mountain Day
IRBM:	Integrated River Basin Management
IUCN:	International Union for Conservation Union
IWRM:	Integrated Water Resources Management
KMFRI:	Kenya Marine and Fisheries Research Institute
LTA:	Lake Tanganyika Authority
LVEMP:	Lake Victoria Environnemental Management Project
LVFO:	Lake Victoria Fisheries Organization
MEEATU :	Ministère de l'Eau, Environnement et Aménagement du Territoire
NBD:	Nile Basin Discourse
NELSAP:	Nile Equatorial Lakes Subsidiary Action Program
NEMA:	National Environmental Management Authority (Uganda, Kenya)
NGO:	Non-Governmental Organization
NPA:	Norwegian Peoples' Aid
ODEB:	Organisation de défense de l`environnement au Burundi
PWS:	Payment for Water Services
RAMCEA:	Ramsar Centre for Eastern Africa
RNRA:	Rwanda Natural Resources Authority
TEEB:	The Economics of Ecosystems and Biodiversity
TEV:	Total Economic Valuation
UCSD:	Uganda Coalition for Sustainable Development
WECSZ:	Wildlife and Environmental Conservation Society of Zambia

INTRODUCTION

The Albertine Rift Conservation Society (ARCOS), in partnership with Lake Tanganyika Authority (LTA), the Ramsar Centre for Eastern Africa (RAMCEA), and the Nile Basin Discourse (NBD) and in collaboration with the Ramsar Secretariat, BirdLife International (Africa Partnership Secretariat) and the International Union for Conservation of Nature through its Eastern and Southern Africa Regional Office (IUCN-ESARO) are implementing a project termed "*Stakeholders Engagement for Informed Decision-Making, Threats Mitigation and Sustainable Freshwater Services Management in the Great Lakes Region of East and Central Africa*".

The project funded by the John D. and Catherine T. MacArthur Foundation aims to promote regional collaborative actions that address major issues affecting freshwater services in the region and to catalyze sustainable freshwater management and benefits to communities through enhancement of knowledge and skill development as well as supporting informed decisions in mitigating threats facing freshwater ecosystems today.

One of the objectives of the project is to enhance and support a regional network of practitioners, from governments, NGOs and Community groups involved in freshwater ecosystems management. In order to achieve this objective, ARCOS is organizing a series of training activities aimed at building the capacity of these practitioners in the field of freshwater, wetlands and watershed management. The first of these trainings was held in Kigali on 17 -19 December 2013 at Hotel Chez Lando and more than 45 participants from 9 countries of the Great Lakes region attended the training.

A consultative training needs assessment survey was undertaken to determine the topics to be covered. Respondents from all regional agencies working in freshwater management highlighted the following topics as areas where training is required: Integrated Water Resource Management, freshwater biodiversity and ecosystem services, climate change adaptation and mitigation and community development.

Participants to this training were refreshed on the concepts related to these topics and were presented case studies of projects in the region where these concepts are being applied. Moreover, the event was a good opportunity to exchange and network and discuss on the establishment of a regional-wide network of freshwater practitioners, a network that would integrate with the Great Lakes Freshwater Ecosystems Forum established in February 2013 in the framework of the same project.

The present report outlines the proceedings of the sessions of the training and gives an overview of the discussions held as well as the recommendations made.

OPENING CEREMONY

1) Welcome note from ARCOS

Dr. Sam Kanyamibwa, the Executive Director of ARCOS welcomed the participants and reiterated the objectives and the background of the training. He stressed on the importance of water and how working together is crucial to meeting the challenges freshwater resources in our region are faced with.

He said: "*We can do more if we work hand in hand to address the drivers of change we observe today such as climate change, population growth, and the geopolitical context in the region".*

He commented on the lamentable fact that people see water as a resource but most of them do not think about the origin of this resource and the different processes that contributed to having it right here, right now. "Water we use is a result of linked ecological processes happening upstream, much can affect the quantity, quality and the timing of it if we don't pay due attention to ensure these processes continue to operate undisturbed" he said. He therefore called everybody to bring his contribution to the wise management of water resources.

2) Award to the winner of the ARCOS Youth Poster Competition

Dr Sam Kanyamibwa (right) handing a computer to Ms Solange Uwera (left) as a prize to winning the youth poster competition

To celebrate the International Mountain Day 2013 (IMD) that is organized by the UN's Food and Agriculture Fund (FAO), ARCOS in collaboration with the Africa Mountain Partnership Members organized a youth poster competition where contestants were asked to produce a poster that shows how important mountains are important both to highland and lowland dwellers in terms of boosting their economic growth in a sustainable manner.

The competition targeted at students and young people from Africa and had the objective to raise awareness on sustainable mountain development and to reflect this year's IMD theme "Mountains - Key to a Sustainable Future" on the African continent.

The winner of this competition was a student from the University of Rwanda, Rwanda; Ms Solange Uwera, who produced a poster not only outlining the role of mountains in various sectors of the economy but also suggests different ways to address probably the most challenging threat that mountain ecosystems and people are facing: Climate Change.

In recognition of the role that mountains play as water towers that constitute the headwaters to Africa's great rivers the winner was awarded her prize at the opening ceremony. The phrase that resonated in the short speeches held at the occasion was to highlight the role of upstream communities in the safeguarding of water resources; a fundamental principle every water resource manager needs to fully grasp and give full consideration.

3) Opening remarks

Mr Kabalisa Vincent de Paul speaking during the opening ceremony

The opening of the training was officiated by Mr Kabalisa Vince de Paul, the Deputy Director General at Rwanda Natural Resources Authority (RNRA) in charge of the Integrated Water Resources Management Department. In his speech, Mr Kabalisa commended this initiative of ARCOS and its partners to bring together different stakeholders to strengthen the collaborative actions for sustainable use of freshwater in the great lakes region. Noting the importance of water resources as a major source of hydropower, irrigation, and water supply to major towns and various industries in the region, he urged concerted effort to harmonize and coordinate all interventions having any impact on this resource across sectors and borders.

He called upon participants to the training to take the opportunity to refine their knowledge and skills in water resources management, to network and exchange. He said: "*I trust this training will constitute a great networking opportunity for you and that this is only the beginning of your epic journey towards becoming accomplished freshwater ecosystems managers with state-of-the art skills, knowledge and attitudes that are likely to drive the change for the better in the way our freshwater resources are managed*"

He welcomed everybody to Rwanda and invited them to feel at home, interact with locals and get as comfortable as they wish to be in the country of thousand hills.

4) Introductions and expectations

Participants were asked to introduce themselves and express what they expect through this training.

Among 47 participants that were present, the majority were from Non-governmental organizations involved in water resources management. Countries represented consisted of Burundi, DRC, Uganda, Tanzania, Rwanda, Malawi, Zambia, South Soudan, Kenya and Ethiopia. Other participants were from academic and government institutions working in environment regulation agencies such as NEMA (Uganda and Kenya), national energy agencies such as EWSA (Rwanda), as well as national natural resources management authorities such as RNRA (Rwanda).

The expectations from participants as it was expressed during this session can be grouped as follows:

- Learn more about climate change adaptation initiatives in various countries
- Networking with colleagues from different countries of the great lakes region
- Learn the best practices in freshwater management from different regions
- Learn about problems in integrated freshwater ecosystems management in Albertine Rift and mitigation of human impact
- Learn how institutional conflict and overlaps in water and land resources management can be resolved
- Learn how payment for ecosystem services work and the interests of various stakeholders are managed
- Explore institutional set up of existing water initiatives in the region.
- Understand the impact of climate change on freshwater ecosystems in the great lake region and how to mitigate it
- Understand challenges in integrated freshwater ecosystems management and mechanisms to address them.

MODULE 1: INTEGRATED WATER RESOURCES MANAGEMENT

1. Overview and Principles of IWRM

The presentation given by Ms Gerturde NGABIRANO from the Nile Basin Initiative was aimed at giving an overview of how Integrated Water Resources Management as a process works and the main considerations and challenges to overcome.

IWRM is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Integrated Water Resources Management is a cross-sectorial policy approach, designed to replace the traditional, fragmented sectorial approach to water resources and management that has led to poor services and unsustainable resource use. IWRM is based on the understanding that water resources are an integral component of the ecosystem, a natural resource, and a social and economic good.

IWRM is built on 3 main principles:

- Consider different uses of water resources;
- Ensure water allocation and management decisions consider the effects of each use on the others.
- Take account of overall social and economic goals, including the achievement of sustainable development.

The implementation of IWRM is a 3-step process where the initiator has to first ensure that there is an enabling environment in place through the enactment of appropriate policies, strategies and legislation. Second, an institutional framework is put in place through which these policies can be implemented. Finally, management instruments have to be established to allow these institutions to do their job. By ensuring this process is followed thoroughly, efficiency, equitably and sustainability the management of water resources can be easily achieved which is the indicator of success in IWRM.

The questions asked related to the challenges most encountered in trying to implement IWRM. The presenter gave an example of the construction of Rusumo dam on Akagera River where the project has been proposed for production of hydropower, irrigation, and other uses to heighten the social conditions of communities living near the site. Unfortunately, the donor organizations have been principally interested in funding the hydropower component and this threaten to jeopardize the other aspects and overall integration of the project to achieve wider goals.

Another challenge is to reconcile the PWS principle which requires that compensation for upstream communities is effected and the IWRM principle that requires that water as a resource is valued economically (paid) by all its users. Therefore, there is need to harmonize these two fundamental principles because upstream communities are not only resources providers but also resource users.

2. Integrated fisheries management

Using Lake Victoria as an example, the presentation by Dr. William O'jwang from KMFRI looked at the strategies to manage fisheries in a sustainable way and challenges that need to be overcome. In the past, Lake Victoria's management failed to realize that proper fisheries management is not only about fish. In fact, the introduction of the Nile Perch was once hailed to boost the productivity of the lake and so increase the benefits from the lake's fisheries. Recent history has taught us that this approach is wrong and that sustainable fisheries management needs to take into consideration the entire complex processes of the ecosystem.

Building on these lessons, efforts are being made to save the lake from the threat of ecological disaster. Methods include educating fishermen to use sustainable fishing methods and permanent lake monitoring; it is hoped that action now will help the long-term health of the lake.

Among the questions asked at the end of this presentation a common theme was on the great number of initiatives that have been undertaken by various stakeholders in Lake Victoria basin. These actions not producing results; that suggests there is lack of coordination and harmonization of these interventions, which in turn leads to their lack of tangible results. From this conclusion, it was realized that (as the presenter had said), there is need for integration of all the initiatives on the lake. For instance, the LVEMP and LVFO projects should work in cooperation and not as separate entities. Furthermore, where some good initiatives have arguably had results, a lack of documenting successes and proper monitoring has prevented the encouragement of more stakeholders to replicate these initiatives.

Finally, it was recommended that given the increasing population pressure in this basin, fish farming and aquaculture should be encouraged to alleviate the pressure on the lake's fisheries.

As an active break, the issue of Migingo Island was discussed to see if it has anything to do with the management of the lake's fisheries by the two countries disputing the island. It was concluded that proper and harmonized fisheries management would contribute to resolve this issue since the conflict can in reality be explained in terms of dispute over the lake's fish resources.

3. Integrated fisheries management, a case study from Lake Tanganyika

Facilitated by Mr. Theophile M'limbwa of Amis du Lac Tanganyika (ALT), this section looked at the biodiversity of Lake Tanganyika, the threats affecting this biodiversity and the response to these identified threats.

Lake Tanganyika hosts a staggering richness of biodiversity, but what makes it unique is the number of endemic species found in the lake. As an example, among the 250 species of cichlids found in the lake, 98% of the species are endemic to the lake.

Apart from this richness in biodiversity, the lake is also an important source of livelihood to surrounding communities as well as a considerable asset to the economies of the neighboring countries' fishing, transport and tourism industries etc.

Despite the importance of the lake, many threats are affecting it and some of these are putting so much pressure on the lake and its resources that urgent responses are needed to maintain the ecological, social, and economic function of the lake.

These threats include among others the overfishing and use of inappropriate fishing techniques and equipment, pollution from urban waste and oil spills from transport on the lake, invasive species and siltation accompanied by eutrophication.

To help mitigate the effect of these pressures on the lake, ALT has developed a program to build capacity in stakeholders and to raise their awareness on the safeguarding of the lake and its resources through various environmental education activities. The program emphasizes the integration of all factors that influence the lake with the understanding that the root cause of the declining status of the lake is a complex nexus of ecological, social, political, economic, and historical aspects.

The discussion at the end of this session brought forward the issue of the Lake Tanganyika Strategic Action Plan developed by LTA (Lake Tanganyika Authority) which is currently slow in its implementation. Participants called for renewed political will from all countries sharing the lake's basin to implement this action plan. For instance, the representative of LTA at the meeting recalled that the document forbids urban development in the buffer of 150m from the lake but clearly this is not followed in the many urban centres on the lake shore.

4. The watersheds of Zambia, important for wildlife and the people

This contribution by Mr. Patrick Shawa of Wildlife and Environmental Conservation Society of Zambia (WECSZ), aimed at presenting the important watersheds of Zambia and how they sustain a rich biodiversity and form a basis for the economy of the country through the various services they provide to riparian communities.

The 8 main watersheds of Zambia are:

1. Bangweulu Swamps
2. Busanga Swamps
3. Kafue Flats
4. Luangwa Flood Plains
5. Mweru wa Ntipa
6. Tanganyika
7. Zambezi Floodplains.
8. Lukanga Swamps

Zambian hydrographic map, a network of eight watersheds form the hydrographic backbone of the country

Each particular watershed (listed above) is unique in terms of biodiversity and the ecological functions they provide. However, their collective value in terms providing habitats to endangered species, assuring water purification for communities and providing areas for recreation are aspects they all share.

Unfortunately, the increasing human activities in these watersheds is threatening to interfere adversely with the important ecosystems. Agriculture activities continue to claim more and more land at the expense of wetlands through extensive drainage works. In addition, pollution is an increasing factor that is threatening to affect the biodiversity of these ecosystems.

It is indeed a matter of urgency for all the stakeholders in the country to pull their efforts together and work to restore the integrity of these unique ecosystems and the government and various NGOs are working hard to achieve this noble goal.

MODULE 2: FRESHWATER BIODIVERSITY AND ECOSYSTEM SERVICES

1. Freshwater biodiversity and ecosystem services management in Great Lakes region

This presentation by Dr. Willy Kakuru from Makerere University looked at what the ecosystem services are and the tools to use to communicate their importance and threats to them with people who have influence, e.g. decision makers. This presentation had also a group based exercise where people from the same country met in a group and discussed services they gain from freshwater ecosystems and threats that freshwater biodiversity is facing.

According to the Millennium Ecosystem Assessment 2005, the most threatened ecosystems are freshwater systems. In Africa particularly, it has been observed that a very small portion of such systems are covered under the protected areas network which adds to the difficulty to effectively protect their integrity.

Freshwater ecosystems in the Great Lakes region support very important biodiversity, with high levels of endemism that contribute a lot to the livelihoods of different stakeholders and the national economies.

Ecosystem Services Classified; Millennium Ecosystem Assessment 2005

- ***Provisioning***: products obtained from ecosystems, e.g. fresh water, food, fiber, fuel, genetic resources, biochemical, natural medicines and pharmaceuticals
- ***Regulating***: benefits obtained from the regulation of ecosystem processes, e.g. water regulation, erosion regulation, water purification, waste regulation, climate regulation and natural hazard regulation (e.g. droughts, floods, storms)
- ***Cultural***: non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences, e.g. cultural diversity, knowledge systems, educational values, social relations, sense of place, cultural heritage and ecotourism
- ***Supporting***: those that are necessary for production of all other ES e.g. nutrient cycling, soil formation primary production

Unfortunately, these exceptional ecosystems of the Great Lakes region are facing a number of challenges that threaten to disturb their biodiversity and Ecosystem services. These include but are not limited to habitat loss and degradation due to agricultural intensification, invasive alien species, pollution, and overharvesting of natural products.

Overharvesting is one of the most serious threats affecting freshwater ecosystem services in the great lakes region

In light of the high importance of these ecosystem services and the threats they are facing in our region, the presenter called for the mainstreaming of freshwater ecosystem services in the polices adopted in the region and the establishment of a strong institutional framework to support this. The mainstreaming of ecosystem services is a six-step process consisting of:

Step 1: Specify and agree on the problem with stakeholders

Step 2: Identify which ecosystem services are most relevant (to the decision to be made and covering the key stakeholders)

Step 3: Identify the information needs and select appropriate methods, as the study design determines what kind of information you get
Step 4: Assess expected changes in availability and distribution of ecosystem services
Step 5: Identify and appraise policy options based on the analysis of expected changes in ecosystem services
Step 6: Assess social and environmental impacts of policy options, as changes in ecosystem services affect people differently

The presenter also proposed a set of proven tools to assist in designing and implementing targeted actions and interventions to mitigate and minimize threats as well as inform planners, policy and decision makers on the need for prioritizing biodiversity and ecosystem services management as natural capital. These tools are:

- Total Economic Valuation (TEV)
- The Economics of Ecosystems and Biodiversity (TEEB)
- Integrated Water Resource Management (IWRM)
- Integrated River Basin Management (IRBM)
- Community Wetland Management Planning (CWMP)

In the following discussion, participants sought to agree on how to better convince decision makers to give biodiversity and ecosystem service their due importance. Especially, in light of the current drive for increased food production in the region (the Green Revolution). Many important wetlands are being lost to intensive agriculture and the heavy use of agri-chemicals (fertilizers and pesticides) that are causing pollution to water resources. Drawing the lesson from the case of Nakivuwo wetland in Uganda, it was recommended that economic valuation of biodiversity and ecosystem services should be the best instrument to persuade politicians that the 'quick fix' solution is not the best way to go. They should be made realize that maintenance of biodiversity and ecosystem services is the best approach to sustainable development and that its economic gains far exceed what is drawn from conversion of natural habitats to agriculture

2. Freshwater Ecosystem Services- A Case Study of Wetlands

This presentation by Ms Teddy TINDAMANYIRE from the Ugandan Ministry of Water and Environment was, aimed at explaining the challenges of managing fresh water ecosystems and sharing the experiences and lessons learned from Uganda's wetlands management.

Water security is a major and increasing concern in many parts of the world, including both its availability and its quality. It is a proven fact that global and local water cycles are strongly dependent on wetlands and that without the latter, the water cycle, carbon cycle and nutrient cycle would be significantly and detrimentally altered. Unfortunately, policies and decisions do not sufficiently take into account these interconnections and interdependencies.

A wetland **function** is the capacity of the wetland to provide goods and services whereas wetland **services** are the benefits that humans derive from the functions of the wetland.

Wetland functions include but are not limited to hydrological/hydraulic functions (flood control, coastal erosion protection, sediment retention, groundwater recharge/discharge, water holding capacity, maintenance of stream & river flow etc.), climatic functions (carbon sink, micro-climate stabilization, etc.), biodiversity functions (feeding and breeding grounds, migration routes and bio-geographical islands, maintenance of a large genetic pool, etc.), and water quality functions (filtration of particulates, nutrient stripping, biodegradation of toxic compounds, attenuation of heavy metals and wastewater treatment).

Wetland functions are strongly and directly related to the components and processes of the wetland while services are based on the functions but depend more on the use of these functions by humans. The ecological character of a given wetland determines the processes and therefore the services that a wetland can provide. These processes include primary production, consumption, mortality, excretion and egestion, decomposition, sedimentation and re-suspension, etc.

Wetlands' functions are related to the components and processes of the wetland while services depend on the use of these functions by humans

The drivers of change in wetlands operate by altering these processes and thus affecting the potential of the wetland to perform its functions and thus provide services. These drivers include direct ones such as changes in local land use and land cover or the introduction and removal of species as well as indirect ones such as population growth, globalization, changes in trading and markets, changes in governance, changes in technology and cultural and religious factors, etc.

Therefore, sustainable management of wetlands requires careful balance in the use of wetlands good and services to ensure that the use doesn't alter adversely the capacity of the wetland to perform its functions and thus hamper its ability to provide services.

After this interesting presentation, participants discussed the concept of 'wise use' of wetlands as stipulated in the Ramsar convention.

Using the case study of Malawi where it is proposed to divert the Ruo River to meet the Shire at an angle downstream to reduce the flooding of the elephant marsh, it was remarked that the "wise use" is a quite loose concept and that it depends on what stakeholders think is the best option. It is therefore a wise precaution to always conduct a prior thorough analysis of the effects of any proposed intervention and it is a requirement to always take a multi-sectorial approach since wetlands are very complex systems.

3. ARCOS Work in Freshwater Biodiversity and Ecosystem Services

This presentation by Mr Claudien Nsabagasani from ARCOS looked at what ARCOS is doing to promote knowledge and exchange on freshwater ecosystems and to facilitate sound freshwater ecosystem management both locally and regionally.

Collaboration being at the heart of all ARCOS' activities, the ARCOS approach to freshwater ecosystem and catchment conservation is through building partnerships and developing mechanisms for collaboration of all stakeholders in the basin from grass roots communities using resources for subsistence up to national and regional policy-making processes.

The challenges that ARCOS has identified needing immediate attention for urgent response include: the increasing population resulting in widespread deforestation for fuel and timber; increasing land put into agriculture; accelerated erosion, sedimentation and nutrient loading; the increased pressure on the domestic water supply; the increased discharge of waste and pollutants into lakes; pollution; introduction of non-native fish; and over-fishing.

ARCOS undertakes regular assessments to establish the status of biodiversity and ecosystem services in key landscapes of the region

ARCOS' work in addressing these threats can be grouped along six main themes which are:

- Informing public and decision-makers on the status of biodiversity and its habitats
- Enhancing existing co-management schemes and supporting the establishment of new schemes
- Using TEV as a tool to influence decision-makers
- Promoting effective Environmental Impact Assessments (EIA)
- Facilitating climate change mitigation/adaptation measures
- Promoting information sharing, exchange and awareness raising

Through regular assessments to establish the status of biodiversity and ecosystem services in key landscapes, ARCOS aims to keep the decision makers, the resource users and the public informed on the state of key ecosystems. These assessments take a collaborative approach and follow the DPSIR model.

So far, assessments have been conducted in at least 4 landscapes and different stakeholders are using recommendations drawn from these studies in planning and implementing their various interventions. In addition, economic valuation using the TEV tool is being conducted in these same landscapes to further advance the knowledge of the value of these ecosystems.

Also, through the establishment of a regional platform to facilitate the exchange and sharing of information and the compilation of existing information into targeted, user-friendly packages; ARCOS has set out to make knowledge accessible for everyone so all decisions are taken based on sufficient data and accurate information. In this bid, the great lakes freshwater database and web-portal is being developed, the "Great Lakes Waves" newsletter was launched and at least two atlases have been produced in the same spirit to make information universally and easily accessible both at regional and local levels.

ARCOS strives to reduce pressure on freshwater resources by providing alternative livelihoods to user-communities and through various incentives that help reduce reliance to these resources.

Finally, ARCOS coordinates the process to establish networking mechanisms to empower stakeholders to work harmoniously towards addressing specific threats that impede proper freshwater ecosystem management and freshwater resources conservation and development. In this regard, the Albertine Rift Environment Assessment Leadership Alliance (AREALA) has been established to enable civil society actors to operate effectively to enhance Environmental Impact Assessments in the region through networking, advocacy as well as information, education and awareness – raising activities. Furthermore, a regional network of freshwater ecosystem managers has been formed and the great lakes freshwater ecosystems forum established.

In terms of promoting community engagement, ARCOS maintains a small grants program that is specifically designed to support stakeholders in different basins of the region to undertake activities that address some of the challenges of particular concern in the region. Furthermore, ARCOS strives to reduce pressure on freshwater resources by providing alternative livelihoods to user-communities and through various incentives that help reduce reliance to these resources.

MODULE 3: CLIMATE CHANGE ADAPTATION AND MITIGATION

1. Freshwater Ecosystems and Climate Change Adaptation/Mitigation in the Great Lakes Region

This presentation by Prof. Pantaleo Munishi from Sokoine University (Tanzania), focused on clarifying the predicted effects of on-going climate change process on freshwater resources in our region as well as providing various mitigation and adaptation measures that can be adopted to limit the impact of climate change on people and resources in the region.

Climate change which is defined as any change in global temperature and precipitation over time due to natural variability or human activities, may have serious impacts on freshwater ecosystems such as water stress, threatening biodiversity, habitat destruction, flooding and droughts, altered flows of ecosystem services, etc.

The interconnectivity of freshwater systems in the region whereby surface waters of Lakes, Rivers/Streams are associated to floodplains and wetlands and where ground water reserves also make a substantial part of the freshwater in this region (as it is directly associated with surface water recharge and flow) leads to the conclusion that the disturbance of the quantity of available freshwater in the region will have a profound impact on the system as a whole.

More frequent and severe droughts are expected to result from the predicted increase in temperature and decrease in rainfall in our region

Global climate change prediction models show that East Africa will experience an increase in rainfall and temperature. Though conditions are unlikely to be homogenous at local levels and evidence supports the fact that many areas will experience predominantly decreasing rainfall and increasing temperatures.

There are other factors affecting water levels throughout the region, but the following examples highlight the effect that a changing climate is having. In lake Tanganyika the water level is decreasing while the temperature is increasing; in Lake Victoria water levels have decreased by at least 2m since 2008; in Malagalasi wetland, the inundated area shrunk from 18,000 to 15,000 square kilometers (lost 17% of the surface from 1999-2011)[1].

Analysis shows the most significant impact of climate change to freshwater in the region will come from shifts in the volume, seasonality and intensity of precipitation, the alterations of surface

[1] Intensification of irrigated agriculture coupled with deforestation upstream is also believed to contribute to the lowering of levels in freshwater bodies in the region.

runoff and ground water recharge, the changes in evapotranspiration, as well as the increased air and water temperature. The manifestation of this impact will be in terms of either increased volumes (flooding) or water stress (droughts) and changes in timing (seasonality, flow regime and hydroperiods).

Using the tables below, Prof Munishi Pantaleo outlines the changes that are projected to occur in freshwater ecosystems in the region, their effects, and the responses of the systems to these changes.

Table 1: Climate Change Impacts - Riverine Systems LTB

CC Driven Change	**Effects**	**Potential Response**
• Changes amount seasonality and intensity of rainfall • Increased Evapotranspiration	Altered Flows	• Decreased water levels • Altered hydrology of habitats • Changes in aquatic biota population (composition, diversity, structure
• Changes amount seasonality and intensity of rainfall • Increased Evapotranspiration	Reduced Ground Water Recharge	• Decreased Water levels • Decreased riparian plant growth
• Increased Temperature • Changes amount seasonality and intensity of rainfall	Increased Flooding	• Increased erosion and siltation • Altered riverine hydrology • Cascading effects on species and habitats
• Increased Air Temperature	Increased Water Temperature	• Changes in species distributions • Decreased growth rate in aquatic ecosystems • Change in aquatic species diversity
• Increased Temperature • Increased Evapotranspiration • Decreased Seasonal Rainfall	Increased Seasonal and Annual Drought	• Isolation of nearby wetlands • Reduced dispersal of invertebrates an fish
• Increased air temperature • Increased atmospheric CO2	Change in composition and structure of floodplain forests	• Change in riparian plant growth

Table 2: Climate Change Impacts on Wetlands - LTB

CC Driven Change	Effects	Potential Response
• Increased Air Temperature • Increased Evapotranspiration • Changes in the amount, seasonality and intensity of rainfall	Change in Soil Moisture Change in Water Depth	• Change in Hydrologic Regime • Reduction in associated Wetland Species Biodiversity and Production
• More Frequent Droughts • More intense Storms	Loss of filtering Capacity	• Increased Sediments Toxins and Toxins in the surrounding Waters
• Changes in the amount, seasonality and intensity of rainfall	Reduction in Dominant Vegetative Cover	• Loss of Seasonal Food Resources for terrestrial organisms • Loss of Habitat for Migratory Species
• Increased Air Temperature • Increased Evapotranspiration	Drying of Wetlands and waters that connect them	• Fragmentation among wetlands • Loss of natural migration corridors • Species loss

The presenter suggested a set of adaptation and mitigation measures to adopt in face of the impact of climate change that our freshwater ecosystems will face. These have been grouped into two broad categories one being the establishment robust legal and institutional frameworks that unambiguously stipulate the main principles and strategies that need to be adhered to for sustainable use and conservation of water and another one being the adoption of system-wide approach to interventions whereby adaptation responses are based on risk assessment and adaptive management.

Concluding, Prof Munishi affirms that in most cases, improving the ability of freshwater ecosystems to adapt to climate change will not require substantively new measures. Instead it requires renewed attention to the established principles of sustainable water management. Therefore he considers sustainable management to achieve both conservation and livelihoods as a high potential approach to mitigate climate change impacts and he recommends that support to freshwater ecosystem adaptation should be integrated with broader support activities in the water sector.

Adaptation & Mitigation defined

Adaptation:

An adjustment process to a changing environment in a sustainable and permanent manner

Activities that people, individually or in groups and various forms of government, carry out in order to accommodate, cope with, or reduce the adverse effects of climate change

The responses to the changing climate (e.g., acclimatization in humans) and policies to minimize the predicted impacts of climate change

Mitigation:

Intervention or policies to reduce the emissions or enhance the sinks of greenhouse gases

Adaptive capacity:

The ability to adapt to the climate change stresses.

Determinants of Adaptive Capacity include economic resources, information and skills, infrastructure, institutions and equity

Resilience:

The capacity and ability of a society to make necessary adaptations to climate change and affords the opportunity to make systemic changes during adaptation

Vulnerability:

Vulnerability is a function of the character, magnitude and rate of climate variation to which a system is exposed; its sensitivity; and adaptive capacity (IPCC, 2001)

2. Ecosystem-Based Adaptation (EbA) - Learning, living and adapting to a changing climate

Prepared by Ken Mwathe, Olivia Adhiambo, and Carol Njoki and presented by Dr. Julius Arinaitwe from Birdlife International, this presentation sought to highlight the importance of an Ecosystem-based Adaptation approach, to present its principles, and to showcase examples of where EbA projects have demonstrated that the concept works.

Adaptation measures are of four types (anticipatory, reactive, planned, and autonomous) and there exist three general approaches to adaption: behavioral change (soft solutions), technical approach (hard engineering solutions) and reduction strategies (early warning, disaster risk reduction, etc).

Ecosystem-based Adaptation involves the use of biodiversity and ecosystem services to help people adapt to the adverse effects of climate change. This may include sustainable management, conservation and restoration of ecosystems, as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities.

EbA interventions can be in form of sustainable management of upland wetlands and floodplains for maintenance of water flow and quality, conservation and restoration of forests to stabilize land slopes and regulate water flows, establishment of diverse agroforestry systems providing flexible livelihood options, as well as conservation of agro-biodiversity to provide specific gene pools for crop adaptation.

Principles of EbA are the following:

- Promoting the resilience of both ecosystems and societies
- Multi-sectorial approaches
- Multiple geographical scales
- Flexible management structures that enable adaptive management
- Minimize trade-offs and maximize benefits
- Based on best available science and local knowledge
- Participatory, transparent, accountable and culturally appropriate

The benefits of EbA include the applicability over varying scales, multiplicity of benefits, accessibility and endurance, and integration and maintenance of traditional and local knowledge and cultural values.

Notwithstanding the numerous benefits of EbA, attention needs to be drawn on the potential costs of this approach which stem from the fact that it is not always possible to deal with immediate threats and there are always trade-offs to be made when applying such an approach.

Dr Julius closed the presentation by drawing the attention of the audience to the CRAGs concept, a new conservation paradigm that focuses on multi-scale landscape units characterized by high biodiversity and ecosystem service values with an altitudinal range of 1,000 meters or more. By basing interventions on such units rather than the traditional disparately defined landscapes, integrated watershed management is easily achieved and the impact of factors like climate change are accounted for seamlessly since the approach gives space for climate change resilient KBA buffer zone management.

He concluded by recalling the BirdLife Internal-led EbA project with the purpose to enhance biodiversity conservation and society benefits through effective implementation of ecosystem-based approaches to adaptation to climate change in East Africa and to integrate the roles and needs of ecosystems in national policies and plans for climate change adaptation in four countries of the Eastern Afromontane Hotspot. These countries are Kenya, Uganda, Rwanda and Burundi. It is believed that the outcomes of this project will help establish the EbA approach as the most preferred approach in the region and will throw the basis for developing further EbA interventions seamlessly through the development of adapted and regional-specific tools, mechanisms and protocols to deploy such interventions easily.

3. Climate Change Mitigation and Adaptation - Experiences from Nature Palace Foundation

This presentation by Mr David Nkwanga from Nature Palace Foundation looked at key determinants of local vulnerability and gave an example of how communities in Mabamba locality, Uganda; are being helped to cope with the changing environment and contribute to mitigate the effects of climate change.

Mabamba Bay is a Ramsar site (2006). The ecosystem was under serious threat from human extractive activities that include sand mining, hunting, poaching birds, eggs and animals, especially Statunga, and unsustainable wetland agriculture.

Mabamba communities had negative attitudes towards ecosystem conservation because they did not see any value in protecting or conserving the wetland while some other people were benefitting. The site is a touristic attraction. Tourism activities were practiced in disorder since anyone could bring tourists without any

Mabamba communities learning to make biochar - promoting waste-to-Energy to increase clean energy access is one of NPF's approach in Mabamba

payment made to community or district.

As a new protected area, control of human activities and winning community support and participation was both a challenge as well as an urgent need, since the communities lacked motivation to protect and conserve the ecosystem. It is in this background that the Nature Palace Foundation set out to correct this by encouraging pro-poor eco-tourism to achieve ecosystem-based conservation, promoting waste-to-Energy to promote energy access and catchment protection and reduce community vulnerability and introducing community botanic garden and home-herbal gardens to promote species conservation and community health while protecting threatened plant species and fighting poverty.

Results so far attest to the success of this project has been observed by the increased motivation of communities to conserve and guard the ecosystem from those who degrade it, the establishment of community institutions to build cohesion for joint community action and the expanded tourism base.

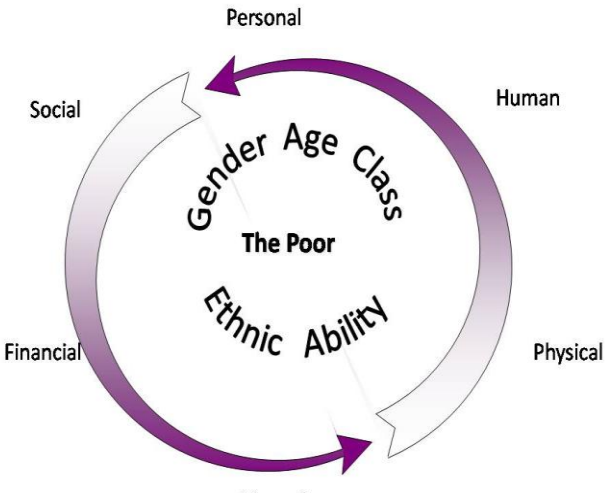
Even though some challenges are yet to be met such as the policy lapses and insufficient support to community institutions initiatives; some interesting lessons can be learned from this intervention and these include successful initiatives such as the soil rehabilitation and farm resilience using biochar, the climate-smart agriculture farmer's kits, and on-farm water harvesting and use for production just to name a few.

MODULE 4: COMMUNITY DEVELOPMENT

1. Community Development and Freshwater Resources Management

This presentation by Dr Godfrey Ogonda from OSIENALA aimed at enhancing the participants' skills to guide community development activities and to recognize the linkages between freshwater resources and community development.

Community development is different from economic development in this sense the former is a process moving from stage to stage; a method of working towards a goal; a program of procedures and a movement sweeping people up in emotion and belief and involve elements such as participation, rethinking, action learning; whereas the latter is about identifying and harnessing local community resources and opportunities and stimulating sustainable economic and employment activity – Kenyon (1994). Simply put, community development aims to build the five capitals of a community: physical, financial, human, social and environmental capital.



Community assets

The principles of community development are:

- **Start with the people** – the existing concerns and situation of people is the starting point of community development
- The **passion and enthusiasm** of local people drives action. Belief, motivation and commitment are the "fuel in the tank" of community development
- **Community ownership** – the community makes and implements decisions, and the community's initiative and leadership is the source of Community development
- **Inclusiveness** –equal opportunity to all. Effort is required to encourage diverse sectors of the community to participate
- **External facilitators** and resource people are "invited in" to work with communities, rather than working for them, or delivering services to them. They challenge and suggest, but not influence community decision-making
- The **existing capacity and community needs** should to be recognized and appreciated as well as creating opportunities for them to build their capacity
- A **holistic/integrated approach** is used in building economic, human, social and environmental aspects of community
- **Changed attitudes and networks** are as important as material outcomes

Community development is potentially a long process but some precautions can make the process a lot easier and smoother. Most importantly, the "one size fits all' approach will not work and there is need to tailor ways of working and communication to meet the needs of the communities. Moreover, one needs to respect, acknowledge, actively listen and respond to the needs of communities and to build open and trusting relationships with communities and vice versa.

Community development is a process that leads to not only more jobs, income and infrastructure, but also communities that are better able to manage change. Community members can better mobilize existing skills, reframe problems, work cooperatively and use community assets in new ways. In conclusion, proper freshwater management need to integrate community development principles because without this, there is no way to achieve the social equity and economic sustainability that is sought in integrated water resource management.

The short discussion that ensued the presentation revolved around the issue of resistance to change that is most often encountered when communities appear rather slow to adhere to the community development intervention that comes their way. In these circumstance, it was advised to work with "early adopters" and give space for others so they will have time to come on-board as they see the initiative is indeed in their interest.

2. Wetland Management with Community Involvement in Uganda

Wetland are subjected to more than one utilization. They constitute ONE resource, MANY interests, and DIFFERENT Stakeholders

This presentation by Ms Lucy Lyango from Ministry of Water and Environment, Uganda, focused on explaining the wise use principle as related to wetlands and the relationships with concepts of community development.

Community involvement is an innovative platform and methodology for improving integrated management of wetland ecosystems. It is a way of harmonizing multiple and competitive interests of stakeholders.

Community participation is a key tool in wetland management. To achieve this, one must use the correct entry point, which may vary according to the community, adopt a community based monitoring and evaluation system, and beware of community antagonism on unrealistic expectations.

Defined as the "maintenance of wetlands' ecological character within the context of sustainable development"[2], the wise use principle is a key concept that links freshwater management with community development because it recognizes that all components of the ecosystem (physical, chemical & biological) are interdependent and cannot be managed in isolation, the same principle that underpins the sustainable development concept.

		Status		
		Threatened	Not threatened	Destroyed
Importance	Vital	**Restore**	**Monitor strictly**	**Restore**
	Valuable	**Ensure wise use**	**Monitor**	**Restore ?**
	Dispensable	**Encourage wise use**	**Monitor ?**	**Forget for the time being**

The Kampala Matrix – a decision-support tool for interventions in wetlands

[2] Millennium Ecosystem Assessment 2005

The rationale to achieving wise use/sustainable development as related to wetland resources is to remember it is ONE resource, MANY interests, and DIFFERENT Stakeholders participating.

In Uganda, it has been over 20 years now that this principle of wise use and community involvement has been applied whereby a community-based framework for wetland management has been established and aggressive awareness campaigns have been undertaken to achieve the full engagement of communities in the management of the country's wetlands systems.

The process involved a long trial and errors path where at least three different approaches have been tried and along the way, many lessons were learned and experiences acquired to arrive at where the country is now. These approaches are namely: the wetland community approach, the resource user approach, and the ecosystem approach.

As an advice to those who are still at early stages of implementing these concepts, it was recommended to aim for early benefits (quick wins) because they present evidence for scaling up and replication. In addition, one needs to have clear tested approaches to community development which should be monitored for relevance from time to time. Finally, there is need to be aware of the resource envelope and ensure that activities mesh and do not stretch it (communities are sensitive to presence, and can easily be deterred by absence of the development workers).

GROUP BASED DISCUSSION AND PRESENTATION

In four groups, participants discussed the way forward after the training especially on how the training should serve a starting point to the establishment of a regional network of freshwater managers in the Great Lakes. For each topic, the groups were asked to identify the problems, the action to be taken, and the strategy to use. The discussion topics are the following:

- **Capacity building**: what are capacity needs in the region? What can be done to build this lacking capacity? How can we do this?
- **Information sharing/networking**: How can we maintain exchange and information sharing after the training? What are channels to use? Who would best do what?
- **Local Action**: what are issues that can be addressed through local action? What action is needed? Who would carry out the action?
- **Regional Action**: what are issues to be tackled at regional level? What can be done? Who would do that and how?

After 30 minute discussions, the participants came back in plenary session and shared the results and recommendations from the group discussion.

The following table summarizes the recommendations from the groups:

Table 3: Group recommendations

	Identified issues	Action to take	Strategy
Capacity building	Communication of the knowledge we have back to different sectors	Develop capacity to undertake TEEB and TEV	Trainings
	Lack of policies on watershed management	Supporting policy processes Setting up regional networks/platforms for informational sharing Documentation of best practices and lessons Twinning of initiatives within the region	Training Set up a page on ARCOS website for debates on issues Development of a tool for best practices
	Lack of coordination and information	Strengthen capacity of institutions	Train practitioners in their sectors on different module (e.g. GIS and Remote sensing, EIA reviewing, etc.)
	Poor working mechanism between CSOs and governments	Strengthen ARCOS partnerships Raise visibility of ARCOS in the rest of the countries	Build a strong civil society forum local to regional for partners Conduct annual forums of partners
Information sharing	Have an identity for the network of freshwater practitioners	Create the Great lakes freshwater network	All participants to join the network
	Maintain continuous communication within the network	To find the best channels to share ideas which may be updated by members e.g.: Newsletters Share all contacts list of all participants in order to be able to communicate easily and grow the networking	ARCOS secretariat to lead the edition of the newsletter and the latter to be shared on ARCOS website

	Develop Information, Education and Communication materials for local communities	Newsletter updated periodically, posters, Booklets translated to local languages for local community, Videos, dramas or documentary films which may be broadcasted to National TVs Create a radio station for sharing information to local community	Fundraising from government agencies and other donors by the network members.
	Encourage interaction of network members at local level	Form small groups within the network depending on everyone ‘s interest Great lakes freshwater network group may work with other existing authorities	ARCOS secretariat to share all contacts list of all participants
	Have face to face meeting to iron up issues that cannot be shared online	Meet once a year or hang on the forum of Great lake freshwater forum	Fundraise within Network members Hang on to the Great lakes forum’s biennial meeting
Local Action	Increased demand and pressure on the resources	Use resources in a sustainable manner Provide alternatives to livelihood	Employ sustainable approach through traditional knowledge practices
	Pollution	Create awareness Joint regional projects to address the problems	Advocacy to influence policy Develop awareness materials
	Inadequate awareness	Enhancing awareness Compile a good IFEM materials for the communities (Case studies shared)	Working with schools clubs, Youth and women
	Interventions which are not based on community needs	Undertake focused interventions Engaging communities to identify interventions (Bottom-up)	Engage communities to identify their needs

Regional Action	Pollution of shared water bodies – Differential actions and decisions	Initiate a review and preparation of specific policies for freshwater ecosystems	Set harmonized standards for action
	Agriculture as the major driver of change - wise use in wetlands and freshwater ecosystems	Lobby and advocacy for more inclusion of freshwater ecosystem management in National Planning.	Determine wise-use activities for freshwater ecosystems
	Inadequate information and active mechanism for information sharing	Further research into freshwater ecosystems to generate information for decisions at national level. Establish an Expert Advisory Panel for science based management of freshwater Ecosystems – to review all the necessary information and advise of the way Forward for issues related to management of freshwater ecosystems including Lobbying	Identify Information gaps across the region Generate new information to address gaps. Strengthen/establish a Clearing House for data and information sharing
	Regional approach – Other freshwater bodies Finance for activity implementation	Sensitization at the decision making /political level apart from technocratic sensitization. Undertake an analysis to identify bottlenecks in ratification of the Maputo Convention	Prepare shared strategies among member countries. Harmonize policies for freshwater ecosystems – e.g. wetland policy. Revive the Maputo Convention

GENERAL CONCLUSIONS AND WAY FORWARD

Presenting their vote of thanks, various participants thanked ARCOS for organizing this important training and for allowing practitioners from so many countries to sit together and discuss issues that matter to all of them. William O'jwang from LVFO said: "*the fact that we met here as Africans is a strong signal that Africans can sit together and discuss issues affecting the continent and come out with solutions. The way it was done before only involved donors setting their priorities and we Africans make sure we fit in there. But this will send them a signal that this is about to change: we set up our priorities and they have to fit in there*".

Mengistu Wondafrash from Ethiopia remarked that harmonization and integration was the main message to take from this training. Applying this principle cannot be as direct and easy as we would wish since there are many stakeholders within any watershed and multiple resource users sometimes with diverging interests. Sustainability therefore is an outstanding issue to take into consideration as watershed managers. Hence, he suggested a separate module on this topic to developed for inclusion in subsequent such trainings.

Certificates of participation were issued to all participants to the training

Shewaye Deribe from Malawi said: "*We are glad that ARCOS has taken this leading step to implement the regional strategy that was established a while ago. We are committed to take this network to the next level and I believe after this training, we now have got all it takes to make this scheme successful*"

Closing the training; Dr. Sam Kanyamibwa, the Executive Director of ARCOS, called for continued engagement in the network that is established. He said: "*I invite you all to keep in the loop, be proactive to suggest new ideas and propose ways forward to advance this agenda we established ourselves. We have a good network rich in diverse expertise and building on this tremendous strength I hope we will be able to keep this gathered momentum through developing new materials to grow the network and bring on-board new actors as well*". He expressed full commitment on behalf of ARCOS to build on the momentum gathered and step up effort to foster networking and exchange at regional level in the bid to help stakeholders seek solutions to pressing threats in a harmonized way.

FIELD VISIT

As a way to allow participants to get a glimpse of the major threats affecting our freshwater ecosystems and the action being carried out to solve these, a field visit to Bugesera district was undertaken to experience first-hand the problems facing Akagera River and its basin and the various activities carried by stakeholders in the district to address those problems.

Participants visited a cooperative making handcrafts from water hyacinth removed from the lagoon lakes near Akagera River in Bugesera district and they also were shown the siltation the river is undergoing and the encroachment of its wetlands by sugar cane plantations. The participants also discussed with local leaders about their actions to manage the freshwater in their jurisdictions.

Addressing the visiting team, the Vice-Mayor in charge of Development and Economic Affairs of Bugesera District said: "*We as a district are doing everything we can to address the water shortage and water quality problems faced by our population. Notwithstanding the successes we have known so far in our undertakings, we believe that a more integrated way to doing things not only at national level but also across borders would make our efforts even more efficient and effective*"

The participants praised the efforts being made to address the invasive species problem by COVAGA cooperative in Gashora and they expressed their gratitude to the donors that supported this initiative including the Rwanda Environmental Management Authority and Bugesera District who provided political back up for the initiative.

On the Left, the Vice-Mayor of Bugesera District explaining to participants the on-going efforts the district has made to address the water shortage in Bugesera. On the Right, the District's environmental officer describing to participants the problem of siltation of Akagera River and the efforts the country has taken to address this.

ANNEX I: LIST OF PARTICIPANTS

No	Name	Organization/Country	Country of Origin/City	e-mail
1	Jamus Joseph	NPA	South Soudan	jamusj@npaid.org
2	Willy Kakuru	Resource Person	Uganda	wnkakuru@yahoo.com
3	Mr David Nkwanga Kintu	Uganda Coalition for Sustainable Development	Uganda	naturepaldn@gmail.com
4	Meni Malikwisha	NBD Congo	Uganda	menimalik@yahoo.fr
5	Lucy Iyango	RAMCEA	Uganda	iyangol2010@gmail.com
6	Teddy Tindamanyire	Ministry of Water and Environment	Uganda	tindamanyiremtt@yahoo.co.uk
7	Ms. Carol Kagaba Kairumba	RAMCEA/Senior Wetlands Officer	Uganda	ckagaba2001@yahoo.com
8	Patrick Shawa	Wildlife & Environmental Conservation Society of Zambia/ Zambia	Zambia	pshawa@gmail.com
9	George Mbewe	Department Of Water Affairs	Zambia	geombewe@yahoo.com
10	Evariste Rufuruguta	MEEATU	Burundi	erufuguta@yahoo.fr
11	Prime Makenze	AGDB Burundi	Burundi	makprime@yahoo.fr, agdbbur@yahoo.fr
12	Antoine or Jean Baptiste Niyongabo	ODEB	Burundi	nkigba2000@gmail.com
13	Mr Jeremie NKINAHATEMBA	LTA - Chairperson of the Lake Tanganyika Management Committee	Burundi	irnkina@yahoo.fr
14	Theophile M'limbwa	Amis du Lac Tanganyika	DRC	mulimbwa49@gmail.com
15	Jean Paul Lubula	Government_South Kivu	DRC	jplubula2@gmail.com
16	Kabengele Kabamba	Government_North Kivu	DRC	kabengelekabamba@gmail.com
17	Josué ARUNA SEFU	Association des Agriculteurs Sans Frontière	DRC	aasfbukavu@yahoo.fr
18	Dr william Ojwang (KMFRI)	Kenya Marine and Fisheries Research Institute	Kenya	w_ojwang@yahoo.com
19	Julius Arinaitwe	BirdLife	Kenya	Julius.Arinaitwe@birdlife.org
20	Godfrey Onyango Ogonda	OSIENALA / Kisumu	Kenya	ogonda@osienala.org, gogonda@yahoo.co.uk
21	Dominic Mumbu	Nature Kenya	Kenya	monitoring@naturekenya.org
22	Stephen M. Katua	Deputy Director - Coastal, Marine and Freshwaters, NEMA	Kenya	stephenkatua@yahoo.com

23	Nsengimana Serge	ACNR	Rwanda	serge@acnrwanda.org
24	Johson Nkusi	World Water Forum, RENGOF	Rwanda	rwandabamboos@yahoo.com
25	Gerturde Ngabirano	NELSAP	Rwanda	gngabirano@nilebasin.org
26	Kabalisa Vincent de Paul	RNRA, Water Department	Rwanda	kabalisa@hotmail.com
27	Uwacu Sylvie	Bugesera Environment Officer	Rwanda	uwasyly@yahoo.fr
28	Umutoni Augusta	ABAKIR	Rwanda	acumutoni@ewsa.rw, augumutoni@gmail.com
29	PNPT	ARCOS Member	Rwanda	pnptbanda@yahoo.fr
30	Ntakirutimana Tumusiime Egide	ARCOS Member	Rwanda	newegide@gmail.com
31	Eric Izerimana	ARCOS Member	Rwanda	izerickos@yahoo.fr
32	Amani Mabano	ARCOS Member	Rwanda	amanima13@yahoo.fr
33	Uwera Solange	ARCOS Member	Rwanda	solangewera@gmail.com
34	Jules Cesar Dushimimana	ARCOS Member	Rwanda	juduce@gmail.com
35	Sam Kanyamibwa	ARCOS Staff	Rwanda	Skanyamibwa@arcosnetwork.org
36	Faustin Gashakamba	ARCOS	Rwanda	gashakamba@gmail.com
37	Claudien Nsabagasani	ARCOS	Rwanda	claudienn2000@yahoo.fr
38	Wenceslas Gatarabirwa	ARCOS	Rwanda	wgatarabirwa@arcosnetwork.org
39	Muvunankiko Gilbert	ARCOS	Rwanda	gilbo20@gmail.com
40	Bigengimana Yvonne	ARCOS	Rwanda	bigyvonne1@yahoo.fr
41	Mengistu Wondafrash	Ethiopian Wildlife and Natural History Society	Ethiopia	m.wondafrash@ewnhs.org.et
42	Shewaye Deribe Woldeyohannes	Ethio Wetlands and Natural Resources Association (EWNRA)	Ethiopia	shewawetland@gmail.com
43	Mr. Laison Mseu	Water Resources Development Officer	Malawi	laisonmseu@yahoo.co.uk
44	Ms Emmie Chigamane	Ministry of Environment and Climate Change Management	Malawi	madaemmie@yahoo.com
45	Christopher Mwambene	Coordination Union for the Rehabilitation of Environment" (CURE)		cmwambene@gmail.com
46	Pantaleo Munishi	Sokoine University of Agriculture	Tanzania	pmunishi2001@yahoo.com
47	Byiringiro Elysé	Freelance Journalist	Rwanda	bylysee@gmail.com

ANNEX I: IFEM TRAINING AGENDA

Time	Item	Speaker
Day I – 17 December, 2013		
08:30-09:00	General Introduction and Self-introduction for all the participants	Claudien Nsabagasani
09:00-09:10	General Welcome Remarks from ARCOS	Dr Sam Kanyamibwa, Executive Director ARCOS
09:10-09:20	Meeting Opening Statement by Guest of Honour	Guest of Honour
09:20-09:30	Award to the winner of the "Youth Poster Competition": Certificate & Prize	Guest of Honour
09:30-09:45	Training overview, expectations	Faustin Gashakamba
09: 45-10:00	Group Photo with Guest of Honour	Faustin Gashakamba
10:30-11:00	Break	Josephine Bbaale
11:00-11:45	Introduction to Integrated Water Resources Management	Ms Gerturde Ngabirano/NELSAP
11:45-12:30	Integrated Resource Management: an approach for restoring and conserving the Lake Victoria Environment and Fisheries?	Dr William O'jwang/KMFRI
12:30-13:00	Questions and answers	Gashakamba Faustin
13:00-14:00	Lunch	Josephine Bbaale
14:00-15:30	Case study: Lake Tanganyika Fisheries management	Mr Théophile M'limbwa NSIBULA/ALT
15:30-16:00	Break	Josephine Bbaale
16:00-16:45	Freshwater biodiversity and ecosystem services in the Great Lakes region	Dr Willy Kakuru/Makerere University
16:45 - 17:30	Freshwater Ecosystem Services - A Case of wetlands	Ms Teddy Tindamanyire/Ministry of Water and Environment, Uganda
Day II – 18 December, 2013		

08:30 - 08:45	Day I review	Gashakamba Faustin
08:45 - 09:30	Questions and answers	Gashakamba Faustin
09:30-10:15	Case Study: ARCOS work in freshwater biodiversity and Ecosystem Services	Mr Claudien Nsabagasani
10:15-10:45	Break	Josephine Bbaale
10:45 - 11:30	Freshwater Ecosystems and Climate Change Adaptation/Mitigation in the Great Lakes Region	Prof Pantaleo Munishi/Sokoine University, Tanzania
11:30 – 12: 15	Ecosystem based Adaptation (EbA) approach	Dr Julius Arinaitwe/Birdlife
12:15-13:00	Questions and answers	Gashakamba Faustin
13:00-14:00	Lunch	Josephine Bbaale
14:00-14:45	Case Study: Climate Change mitigation and adaptation experiences from Nature Palace Foundation/UCSD	David Kwanga Kintu/UCSD
14:45-15:30	Community development and Freshwater resources management	Dr Godfrey Ogonda/OSIENALA
15:30-16:00	Break	Josephine Bbaale
16:00 -16:45	Case study: Wetland management with community involvement in Uganda	Ms Lucy Lyango/ Ministry of Water and Environment, Uganda
16:45 - 17:30	Questions and answers	Gashakamba Faustin
18:00 – 19:00	Workshop cocktail and drinks	ALL
Day III – 19 December, 2013		
08:30 - 08:45	Day II review	Gashakamba Faustin
08:45 – 09:30	General Conclusions and Way Forward	Sam Kanyamibwa
09:30 – 10:15	Meeting Closing	Guest of Honour
10:45 – 17:00	Field Visit	Bugesera District