

COMMUNITY VULNERABILITY ASSESSMENTS AND ADAPTATION ACTION PLAN

2014



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DISCLAIMER

This Ecosystem Based Adaptation – Community Vulnerability Assessments and Adaptation Action Plan is a result of the projects implemented by *NatureUganda* around Echuya Central Forest Reserve (ECFR) and information generated, collected and shared with organisations and agencies through a consultative **process** as part of the Darwin Initiative Project “Ecosystem Conservation for Climate Change Adaptation in East Africa”.

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LIST OF ACRONYMS

AICM	African International Christian Ministry
ARCOS	African Rural Community Shepherds
CCD	Climate Change Department
CFM	Collaborative Forest Management
CFR	Central Forest Reserve
EFCP	Echuya Forest Conservation Project
FAC	Forest Adjacent Communities
FNCMP	Forestry Nature Conservation Master Plan
GCMs	Global Circulation Models
Ibid	In the Same Place
IFDC	International Fertilizer Development Center
IPCC	Intergovernmental Panel on Climate Change
KIHEFO	Kigezi Healthcare Foundation
LC'S	Local Councils
LLGs	Lower Local Governments
MECADA	Muko Echuya Forest Conservation Development Association
NARO	National Agricultural Research Organization
NEAP	Uganda National Environmental Action Plan
NEMA	National Environment Management Authority
NFA	National Forestry Authority
SOA	Sustainable Organic Agriculture
UGX	Uganda Currency
UNEP	United Nations Environment Programme
UNFCCC	Framework Convention on Climate Change
UNFPA ICPD	United Nations Population Fund International Conference on Population and Development
UOBDU	United Organisation for Batwa Development in Uganda
USAID	United States Agency for International Development
UWA	Uganda Wildlife Authority
UWA	Uganda Wildlife Authority
VIA	Vulnerability Impact Assessment

GLOSSARY OF TERMS

Ecosystem-based Adaptation:

Ecosystem-based Adaptation is defined as ‘the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change’. Ecosystem-based adaptation uses sustainable management, conservation, and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate variability/change. The approach contributes to reducing vulnerability and increasing resilience to both climate and non-climate risks and provides multiple benefits to society and the environment (CBD 2010, IPCC, 2014)

Climate change:

The Intergovernmental Panel on Climate Change (IPCC) 2007, defines climate change as any change in climate over time, whether due to natural variability or as a result of human activity¹.

Vulnerability to climate change:

Vulnerability to climate change has been defined as the degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC, 2007).

Hazard:

A hazard is the potential occurrence of a natural or human-induced physical event or trend, or physical impact, that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources (IPCC, 2014).

Resilience:

Resilience can be defined as the capacity of a social-ecological system to cope with a hazardous event or disturbance, responding or reorganizing in ways that maintain its essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation (IPCC, 2014).

Ecosystem:

Ecosystem is defined as all organisms and the abiotic environment found in a defined spatial area. It is also a functional unit of interacting animals, plants, micro-organisms and their physical environment, e.g. a forest, mountain, lake, wetland etc.

Ecosystem services:

Ecosystem services are benefits people obtain from ecosystems such as food, fuel, fresh water, regulation of soil erosion, landslides, floods, disease outbreaks, and nonmaterial/tangible benefits like recreational and spiritual benefits of natural areas.

¹ The Intergovernmental Panel on Climate Change (IPCC) 2007, Climate Change 2007: Impacts, Adaptation and Vulnerability

CHAPTER ONE: BACKGROUND

1.1 Background

Ecosystem-based adaptation (EbA) is an emerging approach that helps people to adapt to the adverse impacts of climate change. It is the use of biodiversity and ecosystem services as part of an overall adaptation strategy. EbA uses sustainable management, conservation and restoration of ecosystems, taking into account anticipated climate change impact trends, to reduce the vulnerability and improve the resilience of ecosystems and people to climate change impacts.

Uganda is vulnerable to climate change, including increasing temperatures and rainfall, which are having far-reaching consequences on the intensity and occurrences of hazards in Uganda's mountain areas. The most significant future climate change challenges for the mountain ecosystems of Uganda are floods and landslides with impacts on the health, food security and the economic development potential of the population. Enhancing ecological services such as catchment and natural resource management (including restoration) could reduce such vulnerabilities and enhance livelihoods.

Climate Change inflicts great challenges to the world, Africa being arguably the most vulnerable continent to its impacts. Climate change involves change in precipitation patterns, for instance, temperature and can lead to extreme events such as flooding, drought and food insecurity thereby this leads to environmental, social and economic impacts. These problems affect natural resources and people in many different ways. When temperatures rise as they are expected (0.7°C – 1.5°C by 2020) such problems will not only become more common, but also more serious. During this century, temperatures in the African continent are likely to rise more quickly than in other land areas, particularly in more arid regions. Under a high-emissions scenario, average temperatures will rise more than 2°C, the threshold set in current international agreements, over most of the continent by the middle of the 21st century¹. The poor are even more in danger since they will not have the resources to enable them adapt to the new challenges brought about by changes in climate².

There has been growing awareness on the impact of climate change through a number of agencies, organisations, and research institutes that seek to help people understand the patterns of vulnerability and how to adapt to them. The effects of climatic change occur at all levels (global, regional and local). Globally, climate change is likely to adversely affect the ability of physical and biological systems to sustain human development, including socioeconomic development.

According to the United Nations Population Fund International Conference on Population and Development (UNFPA ICPD), the world's ability to meet the basic human needs of its growing populations will continue to heavily depend on a healthy environment. Climate change is likely to disrupt the Earth's ecological systems, exacerbate existing pressures, and reduce the benefits derived from ecosystem goods and services; with serious negative consequences for agricultural production, forests, water supply, biodiversity, health systems and overall human development. Crop failures and other negative agricultural impacts will affect world food availability, accessibility and utilisation, as well as the stability of food systems, hence negatively affecting human quality of life. Food insecurity, in turn, is likely to influence world food markets. For example, food shortages may lead to high food prices. Vulnerable populations (mainly the poor and most marginalised, including children, women and people with disabilities in developing countries) are particularly poorly equipped to cope with the adverse impacts of climate change, because they have a low capacity to respond (i.e., to mitigate or adapt)².

1.2 Introduction to site

Echuya Central Forest Reserve is situated in Bufumbira County in Kisoro District and Rubanda County in Kabale District. The southern end runs along the north-eastern border of Rwanda. The forest lies between 1°14' - 1°21' S and 29°47' - 29°52'E, covers an area of 34 km², and has an altitudinal range of 2,270 – 2,570 metres. It is situated on the high altitude range running between Lake Bunyonyi, 5 Kilometres to the East, and Mgahinga Gorilla National Park, 13 Kilometres to the Southwest. It lies 11 Kilometres east of Kisoro and 15 Kilometres west of Kabale town. The main Kabale - Kisoro road traverses through the northern end of the forest.

The Echuya Forest Reserve encompasses 4,000 ha and includes a permanent high altitude swamp, Muchuya, which lies at 2,300 metres in a narrow valley that is surrounded by steep forested hillsides. Echuya is particularly known for its high quality bamboo,

1 The IPCC's Fifth Assessment Report: <http://cdkn.org/resource/highlights-africa-ar5/>

2 Uganda National Climate Policy, 2012

Yushania alpina. The forest cover is approximately 80 percent mature *Macaranga kilimandscharica* and *Hagenia abyssinica* forest and 20 percent mountain bamboo (*Yushania alpina*). ECFR has high species diversity. Records show that the forest houses approximately 152 bird species, 54 butterflies, 43 moths, and 127 trees and shrubs, of which some enjoy global recognition as endangered species (Grauer's Swamp-warbler) or are near threatened (Kivu Ground Thrush, Handsome Francolin, and Red-throated Alethe). Approximately 40 percent of the butterflies are regional endemics. The key ecosystem goods and services are watershed values, tourism, and bamboo and indigenous people (Batwa).

Echuya was gazetted in 1939 as a forest reserve. At that time, the forest vegetation consisted of dense *Arundinaria alpina* (bamboo) (Howard, 1991). Kingston (1968) reported that in 1947 the bamboo stems in Echuya were big, tall and dense, and hardwood trees and shrubs were scattered in a few places. Botanical field trips conducted by Eggeling (1934), Watt (1956), Kingston (1968) and Davenport, Howard & Mathews (1996) recorded *Arundinaria alpina* as the dominant grass. Other conspicuous plants in the vegetation included *Cassipourea malosana*, *Africana volkensii*, *Dombeya spp.*, *Hagenia abyssinica*, *Hypericum sp*, *Nuxia congesta*, *Myrica salicifolia* and *Faurea saligna*.

Echuya forest has changed in size and composition from 1954 to the present. The area occupied by pure bamboo has decreased from 20.5% to 12.5%, bamboo-hard wood mixture decreased from 48.2% to 26.2% and pure hardwood stands increased from 16% to 51%. *Macaranga kilimandscharica* is the major colonizing hardwood tree species. Most of the gaps are covered with heavy loads of *Mimulopsis* species climbers, which suppress bamboo growth.

The forest is surrounded with high population density. The local population almost entirely on the forest and its natural resources for their basic livelihood needs, for instance, firewood, construction materials (bamboo), and medicinal plants among others. The forest provides services like maintaining hydrological cycles, regulating climate, water and air, pollination and other important uses such as recreation. The forest products have unsustainably been used due to lack of alternative sources of livelihoods. The population is mainly sedentary agriculturalists with beans and Irish potatoes being the most cultivated crops while cows, sheep and goats being the domestic animals most reared in the area.

1.3 Justification and rationale

The major forms of land degradation in Uganda are soil erosion, soil fertility mining, soil compaction, water logging and surface crusting (Zake, et al. 1997). Soil erosion and soil fertility mining are believed to be the most important causes of land degradation. It is estimated that soil erosion accounts for 80% of the total cost of environmental degradation in Uganda (NEMA, 2001). Districts that are most affected by soil erosion are Kabale, Kisoro, Mbale, Rakai, Kotido, Kasese, Nebbi and Moroto. In these districts, 60-90% of the total area is affected by soil erosion (NEAP, 1993). However there is limited empirical evidence to show the impact of soil erosion on crop productivity.

Poverty and food insecurity can in turn contribute to land degradation. Poor and food insecure households may be forced to plant crops on steep slopes or unable to afford to keep land under fallow, invest in land improvements, or use costly inputs such as fertilizers. Poverty and credit constraints may also cause farmers to take a short-term perspective (Pender, 1996). On the other hand, poor people may have more incentive to conserve their land, since this may be their only significant asset, and the opportunity cost of investing in land improvement may be lower for poorer people. Nevertheless, the constraints imposed by poverty and food insecurity may outweigh these factors, thus completing a vicious cycle of land degradation-declining productivity-poverty-further land degradation.

Echuya Forest Conservation Project (EFCP) conducted an assessment of selected sites for demonstration on soil and water conservation structures in collaboration with Lower Local Governments (LLGs) of Kanaba, Murora, Bufundi and Muko in the districts of Kisoro and Kabale respectively. During the exercise, it was agreed that community members who own plots of arable land on the selected sites, be mobilized for a sensitisation and action planning meetings which took place in September 2013. It was against this background that EFCP facilitated meetings to develop/review byelaws for soil and water conservation. This was in a bid to help improve on the governance and enforcement of soil and water conservation implementation around Echuya CFR. In Muko Sub County however, an additional vulnerability assessment was done followed by action planning for adaptation. This was facilitated by **Nature**Uganda together with its partners with support from Darwin Initiative and BirdLife International through a project; Ecosystem conservation for climate change adaptation in East Africa, whose purpose was to integrate the roles and needs of ecosystems in national policies and plans for climate-change adaptation.

CHAPTER TWO: LITERATURE REVIEW

2.1 Past, current and projected climate

The Echuya CFR lies within the Albertine Rift region houses approximately 5,793 plant species, representing 14 percent of all mainland Africa's plant species. Of these species, 551 are endemic, and 25 are threatened (Plumptre et al., 2003). The climate is tropical with two rainfall peaks from March to May and September to November. Annual mean temperatures range from minimum of 7-15°C and maximum 20-26°C. Annual rainfall range from 1400 -1900 mm. A severe dry spell is experienced during January-February and a mild dry weather occurs between June and August.

Uganda experiences moderate temperatures throughout the year. The mean daily temperature is 28°C. Extreme temperatures as low as 4°C are experienced in Kabale, which is located in the western highlands. However, temperatures below 0°C are experienced on the mountain ranges of Rwenzori and mount Elgon. Rwenzori has a permanent ice cap, which is vulnerable to global warming. Highest temperatures (over 30°C) are experienced in Gulu, Kitgum and Moroto in the north and North Eastern part of the country. Although the western, central and northern parts of Uganda experienced good rainfall seasons the eastern region experienced drought in 1997. The country experienced above normal rainfall in 1998 (El Nino year), resulting in floods. The floods had serious negative impacts on several sectors, particularly the health and transport sectors. The flooding of 1998 was followed by severe drought in western region with Mbarara district being the most affected. The analysis also shows sustained warming particularly over southern parts of Uganda. The fastest warming regions are in the Southwest of the country where the rate is of the order of 0.3°C per decade¹.

Between 1971-1986, communities witnessed over exploitation of forest products due to (i) the trans-border illegal trade known as "Magyendo" and (ii) institutional break-down, of the then Forestry Department (now National Forestry Authority) and local authorities. The main policy message is that poor governance and break-down of the rule of law has negative repercussion for rural livelihoods². The Forestry Sector is governed through The Uganda Forestry Policy (2001); the National Forestry Plan (Revised 2011) and the National Forestry and Tree Planting Act, 2003. Sector Vision is *sufficiently forested, economically prosperous and ecologically stable Uganda*.³

2.2 Socio-economic impacts of climate change

Livelihoods of communities surrounding Echuya CFR depend on subsistence agriculture, forest products for commercial and domestic purposes and petty trade. Community use of forest products is very high as there is no alternative source of natural forest products in these sub-counties. With climate change effects, agriculture has been hampered so much in that harvests have declined so much and disease scourge have increased. All these have culminated into low incomes at household level which in turn makes the forest adjacent community more susceptible to many social and economic problems.

The impacts of climate change will increase the challenge of ongoing poverty alleviation efforts in the concerned areas. Communities with close dependence on natural resources and natural-resource based livelihoods will be the hardest hit. Particularly high vulnerability can be expected among the most climate sensitive livelihood systems, namely agriculture (crops and livestock), forest products and fisheries. Within these systems, there are groups that are already marginalised and least able to adjust (e.g. through migration, changing livelihood sources) will be at highest risk, notably women, children, the elderly and the disabled and disadvantaged groups such as the Batwa.

Echuya is situated in one of the most densely populated and poorest agricultural regions of Uganda. Its long-term conservation depends on the support of the surrounding population, since pressure on forest resources - for firewood, poles, bamboo etc. is intense. The local communities (Bakiga and Bafumbira farmers and the marginalised Batwa) have once lacked the capacity to negotiate Collaborative Forest Management agreements that would permit them to access resources legally and to conserve them but this has changed through capacity building in managing natural resources. The result was destructive, illegal harvesting and conflict with staff of the NFA. It is therefore necessary to build on existing livelihoods strengthening programs and improve the capacity of farmers to strengthen and diversify their livelihoods.

1 Uganda NAPA (2007)

2 <http://www.profor.info/sites/profor.info/files/PolicyBrief.pdf>

3 Levi A Etwodu, Impact Of Land Tenure On Forest Conservation In Uganda

2.3 Environmental impacts of climate change

Changes in climate are already threatening Uganda's ecosystems and the livelihoods of people who depend on them (Hepworth and Goulden, 2008). Between 1991 and 2000, for instance, seven droughts were experienced (Oxfarm, 2008). The main impacts of a 1.5°C temperature rise and of more extreme and/or more frequent occurrences of climatic incidents will be on food security, the quantity and quality of water and other natural resources, human health, settlements and infrastructure. Climate change is already having an impact on biodiversity, and is projected to become a progressively more significant threat in the coming decades. Ecosystems are already showing negative impacts under current levels of climate change which is modest compared to future projected changes. In addition to warming temperatures, more frequent extreme weather events and changing patterns of rainfall and drought can be expected to have significant impacts on biodiversity.

Vulnerability to climate change in Uganda is high due to heavy reliance on climate-dependant resources such as rain-fed agriculture, natural disasters and poverty. At the same time, adaptive and mitigation capacity is low due to shortages of economic resources and technology. Further, Uganda's vulnerability to climate change is likely to increase (MAAIF, 2008). The IPCC Fourth Assessment Report (AR4) projected, the resilience of many ecosystems is likely to be exceeded by 2100 by an unprecedented combination of change in climate, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources). Substantial changes in the structure and function of terrestrial, freshwater and marine ecosystems are very likely to occur. In particular, 20-30% of species assessed so far are likely to be at an increasingly high risk of extinction as global mean temperatures exceed 2 to 3°C above preindustrial levels. If the temperature increases by more than 4°C, few ecosystems will be able to adapt, more than 40% of global ecosystems are projected to be transformed, and major extinctions will occur around the globe.

2.4 Ecosystem Valuation

Ecosystem valuation is a widely used tool in determining the impact of human activities on an environmental system, by assigning an economic value to an ecosystem or its ecosystem services. Ecosystem services are a prerequisite for human well-being. They are also a crucial asset that can help communities adapt to changes in climate. In the past, many societies around the world have developed ecosystem-based strategies for coping with climate variability and extremes. With climate change, the need for such strategies will increase. Yet ecosystems themselves will be affected by climate change, and their capacity to deliver provisioning, buffering and regulating services may decrease⁴. A healthy ecosystem will deliver critical goods and services that underpin socio-economic development. However, due to climate change and other impacts, many mountain ecosystems have become degraded or are likely to be negatively affected

A recent study by ARCOS presents an estimated total annual contribution of Echuya forest at UGX 6.28 billion (US\$ 2.511M) in form of different benefits such as firewood, bamboo, domestic water, livestock watering, climate regulation, and landslide and flood control. This contribution is more than the combined development budgets of the two districts of Kabale and Kisoro for the financial year 2013/ 2014, estimated at about UGX 5.7 billion. Local communities adjacent to the forest expressed worry about the continued decline of the resources such as water, firewood and bamboo, which directly or indirectly contribute to their livelihoods. With regrets, the importance of some ecosystem services such as landslides and flood control was appreciated, considering the costs of unfortunate loss of lives, houses, livestock and crops estimated at UGX 397,460,000 (US\$158,984) for only one year in 2012. Moreover, most of the resources and ecosystem services from Echuya forest such as water and firewood do not have feasible alternatives and are likely to have a strong impact on people's livelihoods.

2.5 Non-climate stressors on the environment

Maintaining and restoring ecosystem function is a cornerstone of natural resource climate change adaptation. Through the promotion of resilience, enabling ecosystem responses, and realigning restoration and management activities to better reflect changing conditions are key components. Reducing non-climate stressors, such as habitat destruction and fragmentation, pollution, and invasive species will help improve the ability of natural systems to withstand or adapt to impacts associated with climate change and continue to provide goods and services to local communities.

2.6 Policy context

Climate change is a new policy concern that has matured quickly over the years. Three relevant national policy statements are the 2010 National Development Plan, the 2012 Climate Change Policy, and the 2013 National vision 2040 document. The implementation of Climate Change is supported by the current National Adaptation Programme of Action (NAPA, 2007) whose pilot projects

⁴ UNEP-Ecosystem resilience to climate change, technical report, 2014

picked on some of interventions. The Ministry of Water and Environment has created a full department, Climate Change Department (CCD) that is now coordinating all the issues on climate change in the country. Within NAPA, several projects at landscape level have been initiated, piloted and up-scaled.

The Climate Change Policy emphasizes the adaptation response, particularly in those sectors considered vulnerable to climate change. An important innovation of the policy is its adoption of a sector approach to articulating objectives and strategies that address the climate change challenges within each sector. This therefore ensures collective efforts and building of synergies between sectors. It also ensures the delivery of climate finance happens in a transparent way. No mechanisms that would commit all key actors to high standards of transparency are described and it is also supported by an Implementation Strategy.

The Uganda Vision 2040 document equates climate finance with financing from international sources, which is at odds with the present reliance on domestically sourced financing. Available evidence shows that in spite of the existence of a wide range of global funding mechanisms, Uganda has not received any major publicly sourced financial flows for climate change activities. The National strategy for mitigation and adaptation that was designed to restore the integrity of the ecosystems including land use planning, energy alternatives to reduce impacts on woody vegetation cover, and participatory research to select species and varieties that can adapt to changing temperatures, seasons and extreme events. It also calls for mixing local and traditional knowledge with state-of-the-art technologies and equipment. It encourages civil society involvement in data collection, investigation and experimentation with responses, advocacy and information exchange. It considers public-private sector involvement supports local community opportunities for carbon trading, energy trading and payments for ecosystem service (PES) provision. It calls for investment in climate-disaster risk reduction, including national and local capacities to minimize the damage caused by natural hazards by preparing for, and responding rapidly and effectively to, extreme events.

2.7. Institutional arrangements

Various institutional structures play different roles, and a national coordination function lie with the Climate Change Department (CCD) under the Ministry of Water and Environment. The main functions of the CCD are described in the Policy. In addition to the CCD, three national ministries with specific roles are Ministry of Finance, Planning and Economic Development, National Planning Authority, and Ministry of Local Government. Their respective coordination functions are also described in the Policy. Each of the numerous ministries, departments and agencies with a role to play in the implementation of the climate change policy responses lie with the designate departmental focal points who are accountable for the implementation of the prescribed policy responses that concern them.

At the Local Governance level, structures for natural resource governance have been strengthened including a schematic framework for managing the adaptation fund including the communities and districts. The EbA project is implemented in partnership with a number of sister NGOs, CBOs and community groups namely National Agricultural Research Organization, National Forest Authority, KIEFO, UOBDU, Uganda Wildlife Authority, CFM members, International Fertilizer Development Centre and African International Christian ministry.

2.8. Site and community reconnaissance

Making ecosystems resilient to the impacts of climate change has been recommended as an important component of adaptation strategies in a number of scientific and political fora, including the Conference of the Parties of the United Nations Framework Convention on Climate Change. Central to the implementation of adaptation options are the communities and the will to improve on own livelihoods. The communities chosen for this purpose are the Muko Sub county community, Kalengere parish. This a farming community engaged in Irish potato growing, fruit growing, animal rearing and tree growing. Census records indicate that population of Kisoro District has risen from 186,681 in 1991 to 219,427 in 2002 (about 17.5% up) whereas in Kabale District it rose from 417,218 to 471,783 (say 13.0% increase). The population of sub-counties immediately adjacent to Echuya CFR is shown below, for 2002 Census.

Table 1: Population of Kabale and Kisoro

Kabale District		Kisoro District	
Sub-county	Population	Sub-county	Population
Muko	44,791 people	Kanaba	12,859
Bufundi	31,729 people	Murore	15,582
Total	76,520 people		28, 441

This population increase naturally implies more demands and ready markets for forest products. Handicrafts are on high demand in Rukungiri and Ntungamo districts, also in Rwanda and Eastern Democratic Republic of Congo. There are scanty households around the ecosystem mainly by and of the Batwa. The governance structures of the area are local council systems that spring from village – sub county level. The Land use patterns surrounding Echuya are settlement, forestry, farming and mining (wolfram).

2.9 Land tenure systems

According to the 1995 Constitution and the 1998 Land Act, land is managed under four basic land tenure regimes: customary, mailo, freehold, and leasehold. These regimes confer different land rights to the owners and therefore have different implications on security of tenure. A fifth tenure system applies to public lands.

Security of tenure of natural resources is an important issue if local communities are to use sustainably natural resources in their localities. Tenure is a set of rights that a person or some private entity holds to land or trees (Bruce, 1989)⁵. It includes questions of both ownership and access to resources. Tenure determines whether local people are willing to participate in the management and protection of forests (Bromley, 1991/92)⁶.

During the colonial period, indigenous peoples' rights to harvest and dispose of trees was significantly restricted. Similarly, after independence, Uganda's forest policy, like many other developing countries, has been characterized by the strong concentration of power over forest resources in the central state apparatus, and the corresponding lack of local participation in forest and tree management.

Failure to recognize indigenous systems of forest management and indigenous rights to resources has led to:

1. Loss of incentives by the local communities to protect trees;
2. Discouragement of local people to engage in tree planting and reforestation projects; and
3. Excessive reliance by the state on punitive measures to enforce the law.

Lawry (1990) argues that where forest habitats have little economic value to local people because of restrictive access rules, sustainable local management institutions are unlikely to emerge. Incentives for conservation by local people can be improved by increasing the value of the resource to local people by, for example, granting more access rights or by granting local communities a percentage of forest concession revenues⁷.

Insecurity of land and tree tenure may explain the observed general degradation of the forests throughout Uganda. A centralized state policy that is not backed with enough resources to enforce its rules has led to the condition where most forests in Uganda are de facto open-access resources.

5 Bruce, J. W. 1989. Rapid Appraisal of Tree and Land Tenure. Community Forestry Note 5. Rome, Italy: Food and Agriculture Organization of the United Nations

6 Bromley, Daniel W. 1991/92. "Property Rights as Authority Systems: The Role of Rules in Resource Management." *Journal of Business Administration* 20(1 &2):45370.

7 Lawry, S. W. 1990. "Tenure Policy Towards Common Property Natural Resources in Sub-Saharan Africa." *Natural Resources Journal* 30:403-404.

CHAPTER THREE: SITUATIONAL ANALYSES

3.1 Description of pilot site

Kabale District covers about 1,730 km² of which 111 km² or 6% is wetland area. The district has got a hilly terrain with distinct valleys separating the hills, which are volcanic in origin. The wetlands occur mainly in these valleys. In the majority of cases, the hill slopes adjoining these wetland valleys are high and steep. Before serious drainage took place, wetlands in Kabale District and indeed Muko Sub County were natural sponges and reservoirs in which run-off accumulated and they formed sources of many small rivers and streams. Currently 58% of the total area of wetlands has been converted. Crops grown in converted wetlands include Irish potatoes, beans and sorghum. Silting is a threat that is caused by massive soil erosion in the higher lands. It is proposed that the management of Natural Resources be placed under Local Government, District and Sub County whose offices are responsible for drafting ordinances and by-laws. Echuya Forest Reserve is one of the forests that was selected for CFM implementation involving participation of local communities in resource protection, management and planning of nature reserves (FNCMP, 1999). This led to formation of CFM groups at parish and sub-county levels.

Karengyere is one of the parishes in Muko Sub County which touches Echuya CFR edge and community members had earlier entered into an arrangement with National Forestry Authority (NFA) and local government to manage and sustainably use the forest and other resources outside it. They formed an umbrella community based organisation called MECADA – Muko Echuya Forest conservation Development Association. With the effects of climate change becoming pivotal in every area of development, partners around Muko Sub County have appreciated that climate change effects have impacted on ecosystems and therefore need combined efforts to address the climate change problem. It was against the above background that CFM executive leaders of MECADA were mobilized to go through the process of developing a community vulnerability action plan.

3.2 Community resource mapping

A participatory community action planning followed application of tools of participatory rural approaches. A representative group from the community was consulted during group meetings. The methods employed included the community meetings with community leaders and community members including men and women, youths and old people, participating equally. In other meetings, representatives from local government and other institutions working in the area were involved to input on the action planning process.

Resource mapping allows a community to identify the location, availability, use and state of key natural resources in their local area – the first step to articulating which resources are being jeopardised by climate change. A community resource map was developed to assess the hazards to the environment within the same community. The communities were taken through how to develop a community Resource map and at the end of the session the community members generated a list of the key land marks and resources in their area.

These included Infrastructure like roads, schools, bridges, Churches and Trading centers. Key resources included; Lake Bunyonyi, Echuya Forest and its resources, trees and tree products, hills and associated resources, swamps and rivers. Based on these land marks and resources, the communities were guided to develop a community resource map.

Figure 1: Community resource map generated by Muko community members



3.2.1 Discussions on the community resource map

a) Changes for the last (30yrs)

During the discussion, members revealed that since 30 years back, the situation around Echuya CFR has been changing, characterized by too much rain which led to flooding during rainy season, and drying of some streams during drought thereby leading to reduction in bamboo stocks in the forest. Additionally, it was reported that the dry or wet seasons would be prolonged leading to either scotching of vegetation or increased soil erosion respectively.

b) Natural resource trends

On natural resources, the area covered by hard woods at Echuya forest is increasing, while bamboo at Echuya forest is reducing (being colonised by hard wood tree species). The wetlands flood heavily during rainy season, the arable land in the hills has been affected by runoff reducing on the fertility of the soils.

c) Causes of the changes

Members attributed the changes mentioned above to climate change effects. The flooding of wetlands occurs because of the heavy rains and wetland reclamation. The runoff in the hilly areas is more prominent in places without soil and water conservation structures. Others attributed the changes to population pressure/explosion and high level of poverty with more demand on natural resources to provide goods such as building materials, fuelwood and bean stakes. The change in population structure of montane bamboo is thought to be from various increase in human induced threats whose trends have majorly caused changes in the natural resources.

d) Strategies to minimize effects for climate change/Action planning

The following actions to mitigate the effects of climate change were proposed:

- Proper planning for settlements
- Use of good farming practices

e) Areas More Vulnerable

Hill slopes were presented as the most vulnerable areas as floods/landslides were rampant during rainy seasons thereby destroying crops, households and surface run off leading to soil infertility. However, it was proposed that there should be sensitisation of the public on soil and water conservation like use of trenches and hedge rows. Ensuring that there is good physical planning coupled with enforcement of the bye laws and or laws in place by the respective authorities.

Another area that was earmarked as the most vulnerable was the scenario of hardwoods taking over areas originally occupied by bamboo. It was also proposed that there should be a reduction in bamboo off takes (regulated harvesting of bamboo) and immediate implementation of this proposal. Enrichment planting/restoration of degraded bamboo areas and Bamboo domestication was too proposed.

3.2.2 Case study experiences

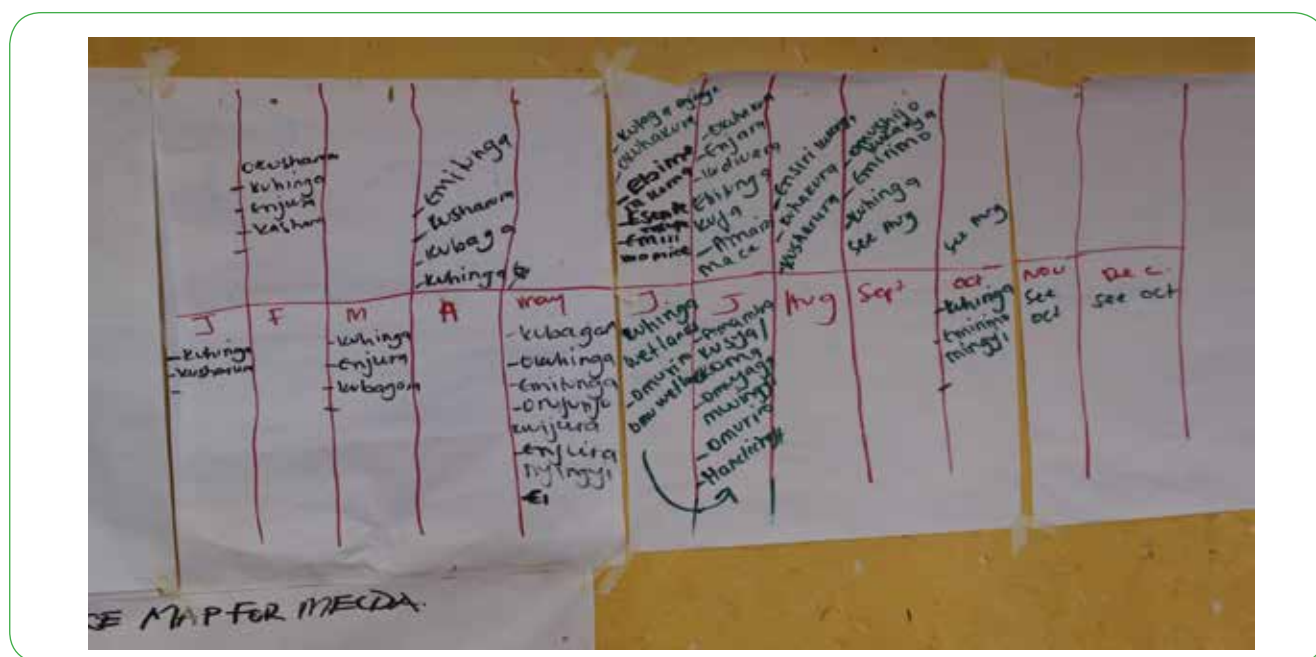
This is sharing information and ideas on climate change issues is one of the ways through which mitigation measure for climate change effects can be arrived at. Climate change is a cross-cutting issue therefore some individuals/communities are vulnerable to its effects than others. Around Muko, community members have realized that there are changes to natural resources in their area. Therefore, building resilience to climate change is the way to go. Environmental friendly practices in agriculture should be adopted if climate change effects were to be minimized. In Muko, some practices like soil and water conservation – Trench construction, planting of agroforestry trees and shrubs for soil stabilisation has been implemented, energy saving stoves, plans to create buffer zones for swamps are under way, afforestation and wood lot establishment and restoration/enrichment planting in degraded areas in the forest are underway.

3.2.3 Recommendations from the communities

- There is need for scaling up climate change mitigation measures to the whole landscape. This can be done through enacting bye laws and ordinances at the sub county and district levels respectively in regard to the implementation of soil and water conservation and or good farming practices.
- Need for exchange visits for community members who have been relaxed in implementing certain interventions to sites where they have been successful for experience and lesson sharing.

3.3 Seasonal Calendars

Figure 2: Seasonal Calendar



3.3.1 Dry Season

In the normal setting without considering climate change effects, dry seasons used to come between January –March, and June – August in Kabale district, Uganda. Seasons in this area determine activities to be done at a particular time. For example, in the

dry season, making of bee hives is a particular practice for males. Dry seasons around Echuya CFR, are characterized by too much sunshine which leads to too much heat leading to drying up of wells and vegetation. This also has a bearing on the pace of cultivating food crops (very low or none) which in turn leads to food scarcity and low income. In the dry season, there is too much wind and dust which causes flu and cough amongst forest adjacent community members.

3.3.2 Wet Season

Wet seasons in Kabale district are between Mid August to December and April to May compared to the dry season where women are busier than men as they concentrate much on cultivating fields. During the wet season, there is much agricultural activity and plant regeneration takes place as soon as it rains. Volumes of water increase at water sources and livestock are healthier as they have enough grass/vegetation to feed on. Heat is moderate and fires in the forests are minimized. This puts the forest health in a good state (short term). Disease scourge is minimized as evidenced by reduced disease registration. All these in turn lead to increased income at house hold level (towards the end of the season) In particular, June is a month for farming in the wetlands which starts with burning, then digging and planting. The month of July is characterized by Forest fires, much wind, higher temperatures and Hand craft making. In August, there is honey harvesting. The mosquitoes are also many around this time of the year. The many mosquitoes lead to people suffering from malaria in the month of September, which is also an active period for farming up to October.

Table 2: Seasonal calendar

Incidences	Months												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Dry season	Drying of vegetation	Low cultivation	Drying of wells			Wetland digging, and planting	Food scarcity, Forest fires Too much wind	Too much heat, Honey harvesting, and Increased disease incidences,					
Wet season				Minimal fires in the forest, and Plants regenerate	Wetland digging and planting, and Increased volume of water				Start of agricultural activity, and Increased disease incidences	Planting of food	Good health, and Available food	Increased income	

3.4 Hazard Mapping

The hazards were added to the resource map earlier developed. The hazards were put on the map as using symbols as seen below.

Figure 3: Community map showing the location of hazards



3.4.1 Hazards

The hazards were identified by the community members as: drought, reduced water, fires in the forest, and swamps, landslides and gullies, erosion and siltation. On the map they are marked with the following letters:

- Drought marked with **D** on the raised hills and forest
- Reduced water in low lands marked with **W**
- Fires in the forest and swamps marked with **F**
- Slides and gullies marked with **S** within the sloping valleys. Landslides are common in places where the hill slopes are steep,
- Erosion is marked by **E**
- Siltation of the lake and rivers marked with **K**
- Flooding marked by **S**

Table 3: Hazards

Hazard	Institution/organisation	Work done
Drought	• AICM	• Tree planting to increase food productivity • Training on effects of drought and planting weather friendly crops
	• Local Government	• Sensitisation on land preparation
	• KIHEFO	• SOA • Livelihoods improvement options (goat rearing, Cuniculture (the agricultural practice of breeding and raising domestic rabbits, usually for their meat, fur, or wool) and onion growing • Health education
Wild fires	• NFA	• Law enforcement
	• Local Government	• Enforcement and sensitisation on soil/land use
Landslides/ soil erosion	• Local Government	• Sensitising Local councils on the good use of terracing and animal grazing
	• AICM	• Enforcing terracing • Soil/terrace stabilisation
Reduced water	• AICM	• Enforcing water harvesting technologies
	• Local Government	• Protection of water sources • Water harvesting technologies
Siltation	• IFDC	• Training communities in minimum tillage • Training farmers in fertilizer application
	• Local Government	• Training communities in soil retention technologies and sensitisation
Ill health	• AICM	• Outreach programmes
	• KIHEFO	• VCT • Conducting medical camps
	• Local Government	• Sensitisation on hygiene

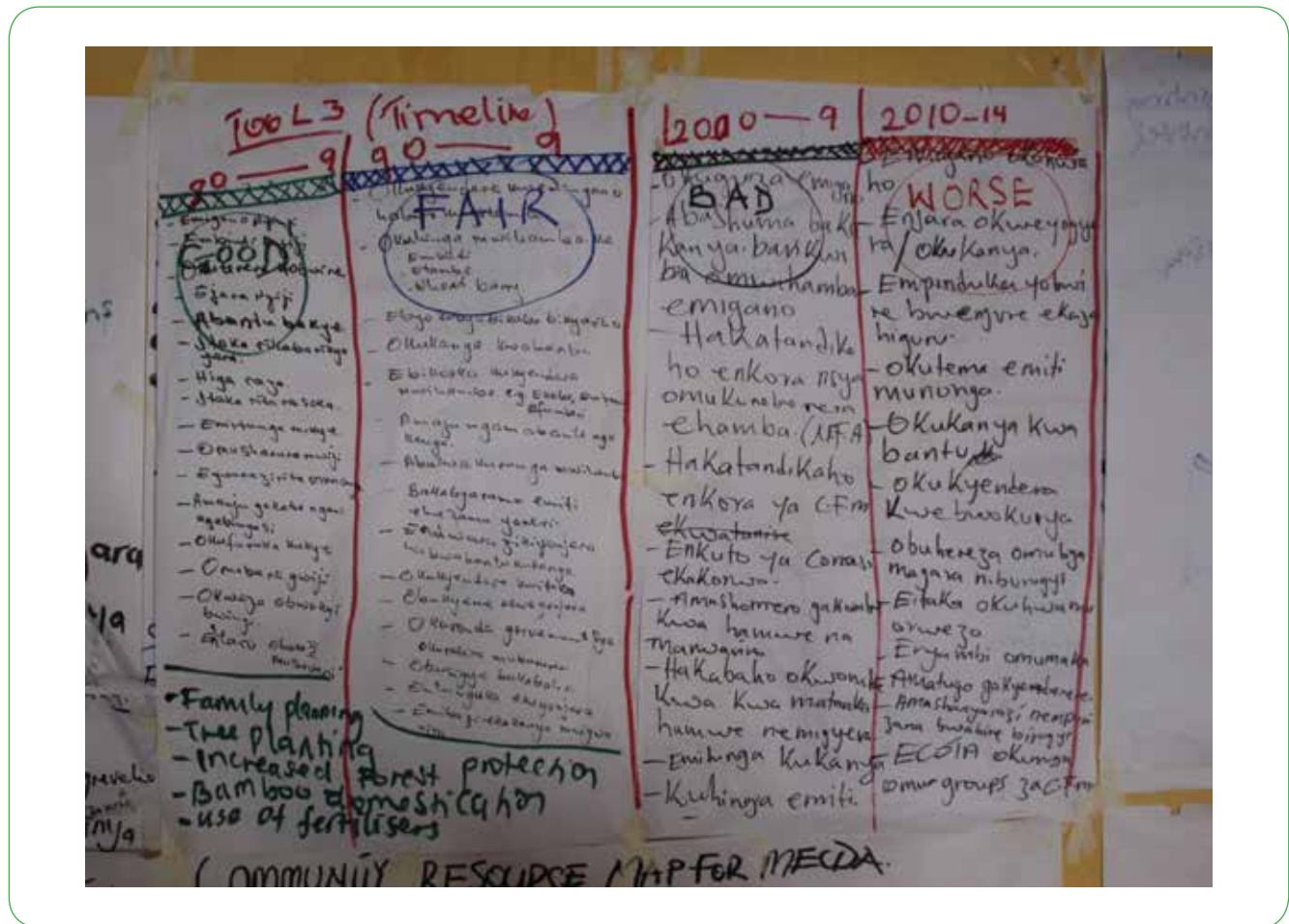
3.4.2 Solutions to hazards

Having identified the hazards as seen in the table above, the community members suggested probable solutions to the problem which included:

- Soil and water conservation through digging of trenches to control runoff
- Migrating to safe slopes to avoid incidences of landslides
- Planting trees and shrubs
- Sleeping under mosquito nets to prevent malaria
- Planting stabilizers on the terraces and trenches
- Use of manure in farming to increase productivity
- Agro forestry trees planted on farm for multiple use
- Awareness on environmental conservation and health

3.5 Timeline Mapping

Figure 4: Time Mapping



a. 1980's-1990's

During this period (1980's -1990's), community members stressed that bamboo was abundant and seasons were steady leading to moderate supply of food. Population was still low using and soils were fertile. Every household had on average an acre of land as community members were practicing good farming practices like fallowing. Soil erosion was minimal and no landslides. Rains were moderated though with minimal hailstorms. Many households were living in grass thatched houses with low rate of migration. However, the 1980's were characterized with war, changes of regime and elections which culminated into breakdown in management systems.

b. 1990's-1999

In the 1990s bamboo in the forest started reducing and community members started planting food (wheat and barley) in the forest. Population of wild life in the forest started reducing, while human population outside the forest was increasing. Population increase led to reduced land acreage per house hold as iron roofed houses increased. Due to population pressure, deforestation started to take root leading to reduced soil fertility and reduction of income levels. In the same period, Pygmies (Batwa) were chased away from the forest by government. Improvement in governance and some social service was registered i.e. election for presidency and LC's, peace and security, women emancipation, and improved health services.

c. 2000-2009

Due to increased need for bamboo that led to the presence of illegal harvesters, community members started paying for bamboo from the forest. This was the period, when a new arrangement in forest management took place, from forest department to National Forestry Authority (NFA). In the same period, Collaborative Forest Management (CFM) started being implemented at Echuya which catalyzed the drive for tree planting. Many social structures were constructed or improved like Kabale – Kisoro tarmac road, schools and hospitals. As much as this was the period when tree planting drive was at its peak,

also tree cutting was high. Flooding had also increased.

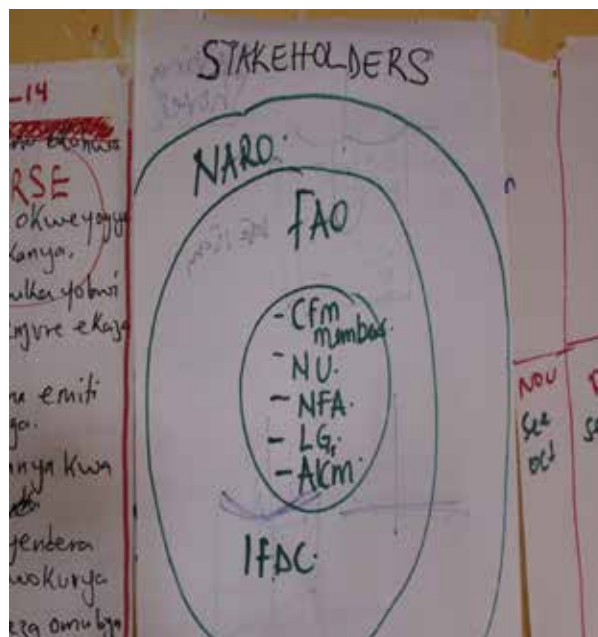
d. 2010-2014

In this period, colonization of bamboo by hard wood trees has been worsening, hence putting at risk community members who earn a living from bamboo products for basketry among others. Famine has been increasing over time due to unpredicted seasons (weather and climate) that lead to low harvests in the garden hence poor nutrition and food insecurity.

Due to high demand of fuel wood and timber brought about by population explosion, cutting of trees has continued. This has led to increased soil erosion and or soil infertility. However, some good changes have also taken place, for example: Improved delivery of health eservices, including free mosquito nets to all households, increased immunization of children, rural electrification, increased use of mobile phones by community members, and increased access to education

3.6 Stakeholders Mapping

Figure 5: Stakeholder Mapping



The stakeholders are as follows;

1. NU: **Nature**Uganda
2. NARO: National Agricultural Research Organization
3. LG: Local Governments
4. NFA: National Forest Authority
5. CFM members: conservation forest management members
6. IFDC: International Fertilizer Development Center
7. AICM; African International Christian Ministry

Suggestions were made on how stakeholders would carry out the implementing strategies geared towards solving problems that has escalated with the effects of climate change, they include: Water harvesting technologies, sensitization on community conservation and adaptation, enterprises development, information sharing or dissemination on community conservation, concept and different copying mechanisms, provision of loans, support in promoting improved agricultural practices, sensitization on sexual and reproductive health.

3.7 Livelihood Vulnerability

Figure 6: Livelihood Vulnerability and trends in the Impact



Table 4: Livelihood Vulnerability and trends in the Impact

Livelihood resource / Asset	Heavy rains	Drought	Ill health	Fires	Floods	Soil erosion and landslides	Siltation
Forest	XXX	XX		X			
Agricultural land (soil)	XXX				X	XXX	
Wetlands	XX						
Roads		X					
Rivers and streams	XX				X		XXX

Key: X = least affected, XX = moderately affected, XXX = most affected

Siltation affects rivers and there by quality of water for domestic and animal use. Soil erosion impacts on agricultural land reducing productivity which affects livelihoods at household levels. Heavy rain affects resources in the forests thereby limiting access to enough fire wood (dead wood). These impact on household incomes by creating the need to buy firewood elsewhere. Flooding happens in the wetlands and arable land destroying crops which would have been the source of income for community members. The resources that were most affected by the hazards include farm land, forests, streams. In priority, farm land was ranked first due to sources of income, food, and employment they provide while forests were second due to source of fuel wood, building materials, basis of farming group under conservation forestry management. Wetlands came third for reasons of farming in dry season and grazing area.

CHAPTER FOUR: ACTION PLANNING

4.1 Background

4.1.1 Community and the environment

The situation is not a desirable one as the people and the environment are under tension due to the tremendous hazardous changes. Community members keep referring to the past state of the environment and effects of climate change. Community members are in a position to act through implementing proposed actions that would improve on the resilience to the effects of climate change in Muko.

4.1.2 Implementation of action plan

The action plan will be implemented through collaborative partnership between local government and other partners. The funds for implementing the action plan may also be solicited from two sources. The first approach will be through Partner financial support. The fact that different partners may have different core program areas and priorities, the selection of certain activities might be defined by among other factors the partner priority in the long run. The foundation for monitoring and evaluation systems is the logical framework, a series of key performance indicators are identified and suit a set of actions and activities raised in the action plan. Secondly, the monitoring team will carry out the evaluation and the team will comprise of community representatives, Sub-County and District Local Government Staff and staff of included Partner.

4.2 Methods and Participants

Basing on the state and location of the resources and services in Muko, a participatory community vulnerability action plan was developed using the six tools of participatory rural approaches. A carefully selected representative group from the community was used during three separate consultative meetings.

4.2.1 Methods

The methods employed included the community meetings with community leaders and community members. Care was taken to ensure that all members of the group, including men and women, youths and old people, participated equally. In one of the meetings, representatives from local government and all institutions working in the area were present to input on the action planning process.

4.2.2 Tools

A number of tools for participatory approaches were used during the process and these included:

- i. Resource Mapping Tool
- ii. Stakeholder Mapping tool
- iii. Community timeline definition tool
- iv. Hazard Mapping Tool
- v. Seasonal Calendar Tool
- vi. Livelihood and Vulnerability Analysis

4.3 Community vision

A well functioning and healthy Echuya forest, improved livelihoods, improved soil management and well conserved wetlands.

4.4 Goal

The overall goal is to increase household income, agricultural yields and food security without compromising the integrity of the natural resources

4.5 Objectives

1. Adapt more resilient farming practices that produce better yields, increase productivity and guarantee food and income security at household level.
2. Implement strategies that promote natural resources (wetlands and forests) conservation without limiting ability to access NTFP/ wetland products within seasons.
3. Ensure better household productivity through improved sanitation (hygiene) and nutrition among the communities.
4. Build capacity of community members in climate change adaptation and ecosystems services restoration for better natural resource management.

Table 5: Muko Vulnerability Impact Action Plan 2015 – 2019

OUTCOMES	Activities	Who takes the lead	Partners	Resources we need (Investments)	Indicators to monitor – socio economic or ecological)	Trend line
Objective 1. Adapt more resilient farming practices that produce better yields, increase productivity and guarantee food and income security at household level	<ul style="list-style-type: none"> • Training community members on good farming practices • Provide material support and technological support • Aid digging of trenches and stabilization of the hill sides 	<ul style="list-style-type: none"> • AICM 	<ul style="list-style-type: none"> • AZN • AICM • C o n e c - tor-USAID • Local government • NARO • IFDC • Excell Hort Consult 	<ul style="list-style-type: none"> • Fertilizers • Seeds • Training materials 	<ul style="list-style-type: none"> • Increased crop yields and land productivity (# of bags of Irish or beans or sorghum from an acre) • Improved household income (amount of income from the sale of agricultural produce) • Adequate household food security (# of households saving harvest for seed /planting the next season) • Improved nutrition among children and improving child appearance (# of households having three meals a day) • Improved quantity and quality of harvests (# of households with more than 5 crops grown in a year) 	<ul style="list-style-type: none"> • Less food secure • About 4/10 save harvest for seeds • Majority of household eat one main meal a day • Most household stock poor seed and consume best seeds
<ul style="list-style-type: none"> • Reduced siltation (Rivers, lakes and swamps) 	<ul style="list-style-type: none"> • Increase the tree planting drive in the area • Put in place proper runoff controls • Restoration of degraded areas in the swamps and forests • Sensitisation and awareness creation on dangers of bare land 	<ul style="list-style-type: none"> • IFDC 	<ul style="list-style-type: none"> • District forest department • WMD • NFA • MECADA • Media and local governments 	<ul style="list-style-type: none"> • Trainings • Agricultural inputs • Seedlings • Equipment 	<ul style="list-style-type: none"> • Willingness of communities to provide labour force employed (# of people participating and # of trenches dug and stabilised) • Number of sensitisation meetings held (# of people sensitised) • Length of lake or river banks planted with buffers (the length (Km) of the riverbank/ lake shores planted with live buffers) • Hectares of degraded parts of lake or river bank/ wetland restored (# of ha restored). 	<ul style="list-style-type: none"> • Few people are willing to provide free labour for group benefits • Few households have runoff control facilities • No riverbank protected

Objective 2. Implement strategies that promote natural resources (wetlands and forests) conservation without limiting ability to access NTFP/wetland products within seasons						
<ul style="list-style-type: none"> Forests and forest resources productivity improved 	<ul style="list-style-type: none"> Increase Tree planting drive Restore degraded portion of forests Sensitisation and awareness creation on forest conservation Limit the off take quantities of the allowed forest products 	<ul style="list-style-type: none"> NFA 	<ul style="list-style-type: none"> District forest department NFA MECADA Media and local governments 	<ul style="list-style-type: none"> Seedlings Trainings Inventory of forest resources Labour during the restoration 	<ul style="list-style-type: none"> More and increased seedlings planted (number of seedlings planted or # of acres planted and /or restored) Increased acreage on Areas planted on farm (number of individuals practicing agroforestry and number of seedlings planted on farm or acreage planted/ under agroforestry) Number of trainings and number of people trained in related areas. 	<ul style="list-style-type: none"> About 50% of households currently planting trees Level of awareness is medium
<ul style="list-style-type: none"> Drought and dependencies reduction 	<ul style="list-style-type: none"> Increase on Tree planting drive Restoration of swamps and forests Sensitisation and awareness creation on better techniques of farming under water stressful conditions Promotion of Sustainable Organic Agriculture (SOA) 	<ul style="list-style-type: none"> NU 	<ul style="list-style-type: none"> District forest department WMD NFA MECADA Media and local governments 	<ul style="list-style-type: none"> Seedlings Trainings Funds to support SDA 	<ul style="list-style-type: none"> Increased seedlings planted (number of seedlings planted or # of acres planted/restored) Adjustment to adoption/uptake SOA (# of people practicing SOA) Use of alternatives to curb drought (# of SOA techniques adapted) Households unable to farm periods of drought (# of households not able to farm during drought) Ability of the swamp to provide coping strategies during drought (number of wetland edge gardens complying to the guidelines) 	<ul style="list-style-type: none"> Only 5/10 households are able to apply alternative farming techniques SOA is being practiced by one in ten households Wetland gardening currently do not comply with the guidelines
<ul style="list-style-type: none"> Wildfires and fire out breaks and frequency reduced 	<ul style="list-style-type: none"> Teaching and sensitising the community members on the ways to curb wild fires. 	<ul style="list-style-type: none"> Local Governments 	<ul style="list-style-type: none"> Media houses Local government Community leaders 	<ul style="list-style-type: none"> Training Law enforcement 	<ul style="list-style-type: none"> Less cases of bush fires reported (number of wildfires reported or the frequency of wildfires or the area of forest/swamp burnt) 	<ul style="list-style-type: none"> Currently, only 1 wild fire per month is reported

<ul style="list-style-type: none"> • Soil erosion controlled and slope protection enhanced 	<ul style="list-style-type: none"> • Training community members on good farming practices • Providing Materials to support soil erosion control • Digging of trenches and stabilisation of such trenches for effective erosion control 	<ul style="list-style-type: none"> • NU 	<ul style="list-style-type: none"> • A2N • AICM • C o n n e c - tor-USAID • Local government • NARO • IFDC • Excell Hort • Consult • Local government 	<ul style="list-style-type: none"> • Implements and equipment • seedlings • Labour during the digging of the trenches 	<ul style="list-style-type: none"> • Reduced frequency of occurrences of erosion (# of times of heavy erosion is reported) • Soil and water conservation trenches dug (# of Km of trenches dug across slopes and # of households with soil and water conservation trenches) 	<ul style="list-style-type: none"> • There is frequent runoff in the hilly areas • Only 2 in ten households have dug soil and water conservation trenches.
<p>Objective 3. Ensure better household productivity through improved sanitation (hygiene) and nutrition among the communities</p>						
<ul style="list-style-type: none"> • (Ill health), hygiene, sanitation and household health improved 	<ul style="list-style-type: none"> • Promote good water harvesting and storage techniques in homes. • Sensitisation the community on food, nutrition, sanitation and hygiene • Campaign for the immunisation of all children. 	<ul style="list-style-type: none"> • KIHEFO 	<ul style="list-style-type: none"> • VHTs • Local governments • Schools • KIHEFO • Diocese of Kigezi (DOK) 	<ul style="list-style-type: none"> • Health services (VCT) • Agricultural inputs • Promotion of Income Generating Activities 	<ul style="list-style-type: none"> • Increased food security (number of households saving harvest for seed / planting the next season) • Reduced incidences of water borne diseases reported (number of people accessing treatment at health centres per month) • Reduced cases of family ill health (number of times household registers disease in a year) 	<ul style="list-style-type: none"> • About 6/10 consume all the harvest and are unable to store for seeds • Majority of household eat one main meal a day • There is high cases of diseases during raining season.
<p>Objective 4. Build capacity of community members in climate change and ecosystems services for better natural resource management</p>						
	<ul style="list-style-type: none"> • Training community members on good ecosystem protection practices • Create awareness and sensitise the community on climate change incidences • Together with the communities, demonstrate models to support livelihoods and conservation 	<ul style="list-style-type: none"> • NU 	<ul style="list-style-type: none"> • A2N • AICM • C o n n e c - tor-USAID • Local government • NARO • IFDC • Excell Hort • Consult • Local government 	<ul style="list-style-type: none"> • Training • Demonstrations • Awareness materials 	<ul style="list-style-type: none"> • Number of trainings and number of people trained in related climate change areas/topics. • Number of demonstrations started / number of people accessing and learning from the demonstration • % of respondents that can explain climate change and observed trends linked to climate change 	<ul style="list-style-type: none"> • Limited knowledge on climate change

Table 6: Vulnerability Action Plan Implementation schedule

OUTCOMES	Activities	2015				2016				2017				2018				2019					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
1. Agricultural land and productivity	<ul style="list-style-type: none"> • Training community members on good farming practices • Material support Digging of trenches 																						
2. Rivers, lakes and swamps and siltation	<ul style="list-style-type: none"> • Tree planting • Restoration of swamps and forests • Sensitisation and awareness creation 																						
3. Forests and forest resources and conservation	<ul style="list-style-type: none"> • Tree planting • Restoration of forests • Sensitisation and awareness creation 																						
4. Drought and dependencies reduction	<ul style="list-style-type: none"> • Tree planting • Restoration of swamps and forests • Sensitisation and awareness creation • SOA 																						
5. Fires and fire out breaks and frequency reduction	<ul style="list-style-type: none"> • Teaching and sensitising the community members on the ways conduct when in the forest. 																						
6. Floods and soil erosions controlled + slope protection	<ul style="list-style-type: none"> • Training community members on good farming practices • Material support • Digging of trenches and stabilisation 																						
7. Ill health, hygiene, sanitation + household health	<ul style="list-style-type: none"> • Water harvesting, proper hygiene and hygiene in homes. • Sensitisation • Immunisation 																						

Table 7: Muko Vulnerability Action Plan proposed implementation budget (in UGX)

OUTCOMES	2015	2016	2017	2018	2019
Ill health, hygiene, sanitation + household health Lead: KIHFEFO	20,000,000	20,000,000 X 5%	20,000,000 X 10%	20,000,000 X 15%	20,000,000 X 20%
Agricultural land and productivity Lead: AICM	35,000,000	35,000,000 X 5%	35,000,000 X 10%	35,000,000 X 15%	35,000,000 X 20%
Forests and forest resources and conservation Lead: NFA	24,000,000	24,000,000 X 5%	24,000,000 X 10%	24,000,000 X 15%	24,000,000 X 20%
Drought and dependencies reduction Lead: NU	5,000,000	5,000,000 X 5%	5,000,000 X 10%	5,000,000 X 15%	5,000,000 X 20%
Fires and fire out breaks and frequency reduction Lead: Local Government	15,000,000	15,000,000 X 5%	15,000,000 X 10%	15,000,000 X 15%	15,000,000 X 20%
soil erosion controlled + slope protection Lead: NU	15,000,000	15,000,000 X 5%	15,000,000 X 10	15,000,000 X 15%	15,000,000 X 20%
Rivers, lakes and swamps and siltation Lead: IFDC	3,000,000	3,000,000 X 5%	3,000,000 X 10	3,000,000 X 15%	3,000,000 X 20%

CHAPTER FIVE: MONITORING AND EVALUATION

Table 8: Monitoring and Evaluation

Composition of the monitoring team	TARGETS												Comments					
	2015			2016			2017			2018				2019				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4	
Team composition <ul style="list-style-type: none"> Local Government that will composed of the technical team (PC and TC) PIT representatives Community Representatives (LC1) 																		The monitoring team will com- pose of NGOs, CBOs and LCOs
Frequency <ul style="list-style-type: none"> Quarterly B-annual 																		Activities will be monitored

APPENDICES

Table 9: Attendance workshop

Name	Organisation	Gender	
		Male	Female
Tushabe Faith	AICM		X
Habyarimana Elias	Chairman of Batwa Murubindi)	X	
Ibrahim Mitole	BirdLife Africa Partnership Secretariat	X	
Masiko Jackson	Muko	X	
Kyampeire Caroline	Kigezi Health Care Foundation		X
Joel M. Wako	Nature Uganda	X	
Valance Turamureba	Nature Uganda	X	
Idah Ndyomugenyi	CFM Member		X
Munyangabe Francis	CFM Member	X	
Dues Tumushabe	CFM Member	X	
Barugahare Joseph Sokebo	Nature Uganda	X	
Rogers Nuwamanya	Nature Uganda	X	
Basiime Jackson	Kibalego	X	
Mutambuzi Gerald	AICM	X	
Michael Opige	Nature Uganda	X	

About *Nature*Uganda

NatureUganda, formally the East Africa Natural History Society, is the oldest conservation organisations in East Africa having been set up in 1909 as a scientific organisation with the primary aim of documenting the diversity of wildlife in East Africa. Although the activities of the society were disrupted by political instability in Uganda in 1970s-1980s, the activities were rejuvenated in early 1990s with the identification of Key Biodiversity Areas (KBAs) such as the Important Bird Areas (IBAs) and Ramsar sites. Over the past 20 years, the activities of the organisation have diversified to embrace biodiversity conservation and sustainable Natural Resource Management.

The organisation implements research, conservation and advocacy programmes with particular focus on priority species, sites and habitats across the country. This is achieved through conservation projects, environmental education together with government lead agencies, local government and local communities, and membership programmes activities such as Public Talks, excursions and Nature-walks that are key advocacy and public awareness tools. Our mission is to promote the understanding, appreciation and conservation of nature.

In pursuing this mission **Nature**Uganda strives to:

- Create a nature-friendly public
- Enhance knowledge of Uganda's natural history
- Advocate for policies favourable to the environment
- Take action to conserve priority species sites and habitats

GOAL is contributing to biodiversity conservation and sustainable natural resource management at both national and international levels.

MISSION is «Promoting the understanding, appreciation and conservation of nature». In pursuit of this mission, NU strives to:

Create a nature-friendly public;

Enhance knowledge of Uganda's natural history;

Take action to conserve priority species, sites and habitats and

Advocate for policies favourable to the environment.

NatureUganda

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