

Research Paper

The assessment of generic management efforts to address the effects of poor land use practices in lake nakivale wetland system in Isingiro district, Uganda

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ABSTRACT

Lake Nakivale Wetland system, a Ramsar site is currently experiencing severe pressure from human induced degradation emanating from poor land use practices. Consequently, environmental problems such as wetland encroachment, deforestation, siltation of water bodies, frequent fires, and degradation of wildlife habitats as well as, over-exploitation of wetland resources are now evident, widespread and appear to be real threats to its conservation. In 2009, Isingiro District Local Government in collaboration with partners in conservation supported the implementation of interventions such as digging of trenches across the steep slopes of surrounding hills and tree planting on the shoreline to minimize the effects of soil erosion on the wetland. This article provides the results of the study that was carried out to assess the effectiveness of wetland management. The study examined the major threats to the conservation of the wetland, the initiatives by the local government to address the environmental problems and attitude of neighbouring communities towards the implementation of management efforts. It also examined the existing legal and institutional framework for managing wetland resources. A household survey, focused group discussions and semi- structured interviews were conducted. In addition, analysis of stakeholders involved in wetland conservation was carried out. The results indicate that although, there were adequate legal provisions and institutional framework for conserving wetlands in Uganda, threats and pressures on Lake Nakivale Wetland were immense, widespread and alarming. Law enforcement and the political will to support institutions mandated to manage the wetland achieve conservation objectives were weak and insufficient. The district department responsible for wetlands conservation was understaffed, poorly funded and ill-equipped to deal with conservation challenges. There was a need to build the capacity of Isingiro District Local Government and local people to effectively and efficiently implement wetland conservation programmes and improve land use practices with or without external assistance, if the integrity of Lake Nakivale Wetland system was to be sustainably secured.

Key words: Institutional framework, land use practices, management effectiveness, wetland ecological character, wetland conservation.

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Abbreviations: **COBWEB**, Community Based Wetland Biodiversity Conservation project; **DWAF**, Department of Water Affairs and Forestry; **FAO**, Food and Agriculture Organisation of the United Nations; **IDLG**, Isingiro District Local Government; **GEF**, Global Environment Facility; **IUCN**, International Union for Conservation of Nature; **NEMA**, National Environment Management Authority; **SADC**, Southern African Development Community; **UBOS**, Uganda Bureau of Statistics; **UNDP**, United Nations Development Program; **UNHCR**, United Nations High Commissioner for Refugees.

INTRODUCTION

Uganda has extensive coverage of wetlands of International Importance (Ramsar sites) which are estimated to be 307,756 ha and widely distributed (NEMA, 2009). Lake Nakivale wetland is part of the larger Lake Mburo National

Park – Lake Nakivale Wetland System. It was designated as a Wetland of International Importance by the Conference of Parties to the Convention on Wetlands (Ramsar Convention) on 15th September, 2006.

The wetland system supports globally threatened species of birds such as Papyrus yellow Warbler (*Chloropeta gracilirostris*), Red faced Barbet (*Lybius rubrifacies*), Papyrus Gonolek (*Laniarius mufumbiri*) and shoebill (*Balaeniceps rex*) (Nature, 2009).

In addition, the wetland system provides refuge to 22 species of migrant birds during adverse conditions (WMD/NU, 2008). It also hosts two of the endangered cichlid fish species *Astatoreochromis* spp and *Astatotilapia* spp.

A recent survey indicates that wetland system has a total of 123 plant species from 94 genera and 43 families. Of these, 16 were trees, 21 shrubs and 86 herbaceous (Nature, 2009). The wetland is also a habitat for animal species such as hippopotamus (*Hippopotamus amphibius*), sitatunga (*Tragelaphus spekii*) and Nile crocodile (*Crocodylus niloticus*). Furthermore, it acts as a permanent source of water for domestic use, livestock and wildlife, and provides pasture for the herds of cattle during dry seasons.

As a Ramsar site, the wetland is expected to be managed and utilised based on the concept of "wise use" which is hinged on the three main principles, namely; the maintenance of the wetland integrity, socio-economic benefits and the need for current use, not to compromise the existence of the same benefits for future generations (Ramsar Convention Bureau, 1993).

The management of the wetland of International importance is also supposed to be entrenched in the national legislation and policies, and supported by the regional and international cooperation framework. The party states are required to develop comprehensive national laws, policies and management plans that guide the implementation of national actions and enhance the framework for international and regional cooperation (Ramsar Convention Secretariat, 2007a; WMD/NU, 2008).

On this basis, the management of a Ramsar site is expected to be guided by a management plan that provides the strategic direction on how the "wise use" concept can be achieved. It is also a requirement that planning process should take into account the management objectives of the wetland as well as, external natural and human induced factors (poor land use practices inclusive) and their influence on the site (Ramsar Convention Secretariat, 2007b).

In Uganda, wetland conservation is enshrined in the constitution (GOU, 1995) and the National Environment Act (Cap. 153) of 2000 which provide a legal framework within which wetlands conservation can be enhanced. Section 36(1) of the Act provides for the restricted use of wetlands and prohibits activities that have negative impact on the ecosystem.

The aforementioned notwithstanding, Lake Nakivale Wetland is currently experiencing human pressure emanating from poor land use practices. The wetland is threatened by encroachment, deforestation, siltation, fires, and over-exploitation as well as, loss of vital wildlife

habitats.

Overgrazing in hilly areas around the wetland has led to soil erosion and subsequently the siltation of Lake Nakivale. Some sections of the wetland have been converted into crop fields, an action that is likely to adversely affect ecosystem services (Schackleton et al., 2008).

In attempt to address these threats, Isingiro District Local government and conservation partners such as the International Union for the Conservation of Nature (IUCN), United Nations Development Program (UNDP) and Global Environment Facility (GEF) have supported the implementation of conservation interventions like digging of trenches on steep slopes of surrounding hills, planting trees along the shoreline, monitoring and regulating harvesting of fisheries resources.

It is on this basis that a study was carried out to assess the effectiveness of management interventions to address the effects of poor land use practices, examine the existing legal and institutional framework, and analyze stakeholders' roles and the local people's (wetland dependent communities) attitude towards the interventions being promoted.

Although, recent conservation strategies designed to manage protected areas have developed in some countries as a result of management effectiveness assessment (DWAf, 2004; Price et al., 2007; Hartley et al., 2007; Leverington et al., 2010; Adekcola et al., 2012) not much has been done to examine the management effectiveness of wetlands in Uganda. Even where management effectiveness has been applied, for instance, in Southern California and Germany, emphasis has been put on specific variables such as water quality (Brown and Bay, 2005; Trepel, 2010).

The purpose of the study was therefore; to establish how effective the current management efforts to conserve the wetland are, generate information that could be used to raise awareness amongst policy makers and wetland managers on the current conservation challenges. Lake Nakivale Wetland is facing, existing management weaknesses and gaps as well as, the need for active adaptive management approach to save the Ramsar site.

MATERIALS AND METHODS

The wetland is found in Isingiro District and falls within geographic coordinates of 30° 49' to 31° 04' East and 00° 33' to 00° 47' South. In the middle of the wetland is Lake Nakivale which is 14 km long, 6 km wide and has a maximum depth of 3.5 m at high water level (Nafirri, 2010). The Wetland System intertwines with Lake Kachera and Kijjanibarola Wetlands through River Rwizi Wetland which is the principle inflow and outflow of Lake Nakivale and Mburo and feeds into Lake Victoria. In the north is Lake Mburo National Park which is the only protected area in Uganda in which the Impala (*Aepyceros melampus*) is found.

The area was selected because Lake Nakivale Wetland is

a Ramsar site that supports globally threatened wildlife species and livelihoods of thousands of nationals and refugees and yet its existence and integrity was being threatened by human induced degradation. Above all, no study has been carried out in the area as far as the subject matter is concerned.

The study employed triangulation approach by using a multiple methods which included household survey, focused group discussions, interviews and field observations. Three out of ten parishes that border Lake Nakivale Wetland whose residents affect and are affected by the existence of the wetland were randomly selected for household survey. The parishes which were selected are Kamuri, Kankingi and Kyabishaho with a total of 1,750 households with estimated human population of 10,745 people (UBOS, 2012). The reliability (confidence level) of 95% and the acceptable margin of error of 5% was used to come up with the sample size (number of sampled households).

The study largely used probability sampling to reach individual household heads or other members in a household for interviews and administration of a questionnaire. This was done in order to minimize biases and give equal chance to residents to participate in the survey. The questionnaire covered key indicator factors (Leverington et al., 2010). The indicator factors that were covered are site values, threats, relationship with stakeholders, management needs, planning and legal and institutional framework. The following systematic sampling technique was used to select individual household heads and other household members in the selected village for interviews and administering a questionnaire:

The researcher or research assistants accompanied by the village chairman went to the centre of randomly selected village, tossed a 200 shillings coin and then chose the direction to follow based on the head or tail face. The researcher or his assistants then walked in the selected direction and chose every second homestead for household head and fourth homestead for other members of household other than household head until six households were got. In case the targeted respondent was absent homestead was skipped and the exercise continued following the predetermined sequence.

Where the boundary of the village was reached before getting the required number of households, the researcher or his assistants were forced to return to the centre of the village and take opposite direction until the required number of households was reached. A total of 315 households were randomly selected and the household heads or other family members were administered with a questionnaire. In terms of gender 48.6% of respondents (n = 153) were males while 51.4% (n = 162) were females.

In order to reach government officials and opinion leaders who had quality information because of their official positions, expert sampling, one of the purposive sampling techniques was used. These individuals included:

officials responsible for the management of wetlands, environment, natural resources, and refugee camp leaders. The information generated from these leaders was used to get an insight of government and stakeholders' efforts towards the management of Lake Nakivale Wetland and improvement of land use practices.

The stakeholders were put into seven categories based on what level of local government they operate and nature of the organizations and agencies. The categories are central government institutions, district institutions and offices, sub-county level institutions, international agencies, international non-governmental organizations, national non-governmental organizations and village level community based organisations and local council one.

The in-depth interviews were held with the following district leaders: District Natural Resource Officer who was holding the portfolios of environment and wetland officer, District Chairman, District Secretary for Production, District Planner, District Agriculture Officer and District Fisheries Officer. This was done in order to understand political and technical issues in depth as well as, broad scope of decentralization of wetlands management in the country (Marshall and Rossman, 1995; Atkinson, 1998; Boyce and Neale, 2006).

At the sub-county level, the chairmen, chiefs and community development officers were interviewed. The Coordinator of Community Based Wetland Biodiversity Conservation (COBWEB) Project was also interviewed to establish the project objectives and the kind of project interventions geared towards the conservation of Lake Nakivale Wetland. The use of group discussion provided an avenue for purposeful use of interaction in order to generate information on attitudes, beliefs and opinions on land use and wetland management issues.

The group discussions were kept focused by use of a semi-structured group discussion guide (Dilorio et al., 1994). The group discussion guide was first pretested using six members of Rukinga Fishing Village Beach Management Committee to assess its effectiveness in generating desired information and determine the length of time required to obtain adequate and meaningful data. After the pre-test, a few alterations were made to fine tune the guide in order to make the questions clearer and well understood by the group.

The groups were considered to be homogeneous in terms of specialization because all group members were resource users who were involved in either fishing activities or harvesting herbal medicine and handcraft materials. However, in terms of gender and age, the groups were heterogeneous. In total, four group discussions were held as follows: Rukinga Fishing village (n=10), Kikutsi Fishing Village (n=6), Rubondo village (n=8) and Kabazana village (n=10).

This study used tools that have been put in place as a result of Ramsar Convention framework to form a benchmark for regular assessment and monitoring of mana-

ment performance of Wetlands of International importance (Ramsar sites).

Secondary data from documents like district development plans, budgets and environmental action plans of Isingiro District Local Government was used in the assessment of human and financial resource allocation to the District Natural Resources Department. The review of relevant legal documents was carried out to assess the legal and institutional framework for management of Lake Nakivale Wetland.

The Statistical Package for Social Scientists (SPSS version 7.5) was used to process data and Pearson's Chi-square (χ^2) was the key statistical tool used to analyze it. Reliability (confidence level) of 95% and the acceptable margin of error of 5% was used to come up with the sample size.

RESULTS

Assessment of threats to the conservation of Lake Nakivale wetland ecosystem

The household survey revealed that encroachment of the wetland was a major threat to the conservation of Lake Nakivale ecosystem that required urgent management attention. The majority of the respondents (68.9% /n = 217) indicated that conversion of the wetland into crop field was the most serious and widespread threat to management of the wetland.

The second threat captured by the household survey was deforestation (18.4% of the respondents n = 58) as a result of poor traditional farming practice that encourages clearing of vegetation cover before crops are grown, charcoal burning and collection of fuel wood. This was followed by the siltation of Lake Nakivale (6% of the respondents, n=19) as a result of soil erosion from adjacent crop fields, poorly drained road network and overgrazed steep slopes of the surrounding hills.

Over-exploitation of wetland resources such as fish, medicinal plants and building materials was raised by 5.1% of the respondents (n=16). Finally, the problem of fire that sometimes spills over from the neighbouring agricultural fields to the wetland destroying wetland resources was raised by only 1.6% of the respondents (n = 5) (Table 1).

Perception of local people towards the management of Lake Nakivale Wetland

About 97.1% of the respondents (n = 306) were of the opinion that Lake Nakivale Wetland was less conserved now than 15 years ago. On the government's interventions, 36.5% of the respondents (n = 115) were of the view that government had not done much to save the wetland from human induced degradation emanating from the effects of poor land use practices (Table 2).

However, 25.4% of the respondents (n = 80) indicated that District Natural Resources Officer in collaboration with partners in conservation had carried out a series of awareness and sensitization meetings at village and parish level as well as conducting live radio talk shows on the conservation of the wetland. Another 24.8% of the respondents (n = 78) said that government officials especially the District Fisheries Officer and Guards were carrying out law enforcement operations aimed at arresting fishermen with no license.

About 11.4% of the respondents (n = 36) mentioned tree planting on the slopes of surrounding hills and on the edge of the wetland as a major Government intervention to control effects of poor land use practice especially soil erosion. Digging of trenches was mentioned by only 0.3% of the respondents (n = 1) while (1.6%) of the respondents (n = 5) said that government officials had appealed to residents to stop wetland encroachment (Table 3).

The cross tabulation of response on the government's interventions to address the threats to conservation of Lake Nakivale Wetland against the form of land use revealed that most of the residents who said that government had not done much to save the wetland were settlers who were not fully engaged in any meaningful economic activity. Eight out of fifteen such settlers (53.3%) who participated in the household survey thought that government had done nothing. This was followed by crop farmers (41.6%) and residents running shops in urban centres (36.4%).

The same opinion was held by 24.2% of residents who practiced both crop and livestock farming and 22.2% of residents who were engaged in fishing activities villages (Table 4). On contrary, all respondents who were involved in cattle keeping only confirmed that government was implementing some interventions to address the threats to conservation of Lake Nakivale wetland.

As far as the interventions the residents were undertaking to address the threats to the conservation of Lake Nakivale Wetland are concerned, 35.6% of the respondents (n = 112) said they were participating in the implementation of some interventions to save the wetland against the effects of poor land use practices. However, 24.1% of the respondents (n = 76) were not aware of any action that was being carried out by the local people to address the threats and other 40.3% of the respondents (n = 127) indicated that local people were not doing any significant action to address the threats to the conservation of the wetland emanating from poor land use practices.

The cross tabulation of local people's initiatives with the form of land use practices shows that 107 out of 197 of the respondents involved in crop farming (54.3%) were engaged in trees planting, observing and respecting the mandatory 200 m strip of land next to the wetland by keeping it uncultivated (protected zone) and digging trenches.

However, 45.7% of their colleagues (n= 90) said that they did not have any significant intervention they were imple-

Table 1. Major threats to the conservation of Lake Nakivale wetland.

Major threat	Frequency	Percent (%)	Cumulative percent (%)
Drainage of wetland to grow crops	217	68.9	68.9
Deforestation	58	18.4	87.3
Siltation of Lake Nakivale and other surrounding water bodies	19	6.0	93.3
Overexploitation of wetland resources	16	5.1	98.4
Burning of wetland	5	1.6	100
Total	315	100	

Table 2. Cross tabulation of response as to whether the wetland is more conserved and the ownership of garden in or close to the wetland.

Wetland now more conserved	Ownership of gardens in or close to the wetland		
	Yes	No	Total
Yes	4	5	9
No	44	266	306
Total	44	271	315

Table 3. Major Government's interventions (based on one view per respondent).

Government intervention	Frequency	Percent (%)	Cumulative percent (%)
Nothing	115	36.5	36.5
Sensitisation of residents	80	25.4	61.9
Law enforcement	78	24.8	86.7
Tree planting	36	11.4	98.1
Consultative meetings	5	1.6	99.7
Digging of trenches	1	0.3	100
Total	315	100	

menting to address the effects of poor land use practice. About 61.3% of the respondents involved in mixed farming (n = 38) indicated that local communities were implementing some intervention to protect the wetland compared to 38.7% of their colleagues (n = 24) who said that local people were not doing anything viable to address the threats to conservation of the wetland (Table 5).

Local people's awareness about the conservation status of Lake Nakivale wetland

Only 106 (33.7%) of the respondents who participated in the household survey were aware of the current status of Lake Nakivale Wetland as a Ramsar site. About 66.3% of the respondents (n = 209) neither knew that Lake Nakivale Wetland was now of international importance nor understood the principle of sustainable utilization (the concept of "wise use") of wetland resources. Similarly, the

people who knew the international status of the wetland had heard about the Ramsar Convention concept of "wise use" of wetland resources.

Local institutional arrangement

The majority of respondents (67.6% of the respondents/n = 213) indicated that residents were organized through local councils and refugee welfare committees. Resource users' groups as a form of organization through which local people address threats to the conservation of wetland were mentioned by 15.9% of the respondents (n = 50).

About 9.5% of respondents (n = 30) mentioned the existence of community based conservation associations. These associations were being encouraged and guided by the District Natural Resource Officer and partners to be well organized community institutions with capacity to initiate and implement soil and water conservation projects

Table 4. Cross-tabulation of government's interventions and the form of land use.

Government intervention	Form of land use							Total
	Crop farming	Mixed farming	Business shops	Cattle keeping only	Settlement only	Settlement and fishing	Others	
Law enforcement	48	19	5	2	1	2	1	78
Tree planting	20	11	0	0	2	1	2	36
Trenches	1	0	0	0	0	0	0	1
Meetings	2	1	1	1	0	0	0	5
Sensitisation	44	16	8	1	4	4	3	80
Nothing	82	15	8	0	8	2	0	115
Total	197	62	22	4	15	9	6	315

Table 5. Cross tabulation of people's intervention and form of land use.

Local people's intervention	Form of land use							Total
	Crop farming	Mixed farming	Business centres	Settlement alone	Settlement and fishing	Cattle keeping	Others	
Not known	51	7	9	7	0	1	1	76
Tree planting	41	21	7	4	2	1	2	78
Trenches	2	0	0	0	0	0	0	2
Observe 200 m strip	13	10	1	2	4	1	1	32
Nothing	90	24	5	2	3	1	2	127
Total	197	62	22	15	9	4	6	315

as well as, supporting the implementation of wetland conservation programme. However, 7% of the respondents were either not aware of the existing institutional arrangement at local level or recognize efforts by the local council and refugee welfare committees to conserve the wetland.

On the selection of leaders of the local institutions, 70.8% of the respondents (n = 223) indicated that leadership role is taken up by community members after passing through electoral process that involves the voting exercise and based on the principle of the winner takes it all. However, this did not apply to the determination of leadership of wetland resource users' groups such as traditional herbalists and handcraft makers whereby leaders are identified and selected based on the level of their skills, expertise and resource use knowledge.

Although, effective management of Lake Nakivale Wetland requires concerted efforts, effective communication and information flow between government officials and the leaders of local councils, community based institutions as well as local people; it was established that 50.8% of the respondents (n = 160) did not know the existing formal mechanisms for interaction between government officials and local communities. Another 42.2% of the respondents (n = 133) were interacting with the district leaders either by providing reports on the progress

of the implementation of wetland conservation interventions or paying resource use permits.

Meetings as a form of interaction between community leaders and the district and sub county officials was mentioned by 2.2% of the respondents (n = 7). About 4.8% of the respondents (n = 15) had participated in the development of community based wetland management planning process which brought most of the stakeholders together to come up with the ways and means of conserving Lake Nakivale Wetland.

Management of Lake Mburo - Lake Nakivale Ramsar site

Uganda acceded to the Ramsar Convention on 4th March, 1988 and the Convention entered into force for Uganda on 4th July 1988. Therefore, it became an obligation for Uganda to domesticate the Convention by reviewing the existing laws and policies to accommodate the Convention's requirements. In Uganda, the legal framework for managing the Wetlands of International Importance stems from Ramsar Convention Text, Resolutions and Decisions of the Conference of Parties and as domesticated in the relevant laws.

Article 3.2 of the Ramsar Convention on Wetlands obliges

each Contracting Party to put in place mechanisms for being informed at the earliest possible time if the ecological character of any wetland in its territory included in the list has changed, is changing or is likely to change in the near future. In this case, ecological character is defined under Resolution IX.1 to refer to the combination of the ecosystem components, processes and benefits/services that characterise the wetland at a given point in time.

The change in ecological character is human induced adverse alteration of any ecosystem component, process and/or ecosystem benefits or services. Therefore, Uganda as one of the Contracting parties is expected to manage Lake Nakivale Wetland in a manner that the ecological character (which is an indication of "health" of the wetland), is maintained.

This, in turn, ensures that essential ecological and hydrological functions which enable the wetland to provide its products, functions and its attributes (goods and services) are enhanced. Human use of the Ramsar site's resources and the effects of external threats emanating from poor land use practices alter its ecological character. According to Ramsar Convention Secretariat (2007a), Ramsar Convention on Wetlands has put in place the following tools to ensure that ecological character of the wetland is maintained:

Ramsar Information Sheet that is used by the Contracting Parties to describe specific site at the time of designating it a Ramsar site tools for monitoring ecological character and development of management plans for Wetlands of International Importance. The management plan is expected to cover issues such as impact of human activities on the ecological character of the wetland, the economic and social values of the site and the cultural values associated with the site.

The plan should also include a regime for regular and rigorous monitoring to detect changes to ecological character as per Resolution VII. 10, and other management actions covered by the integrated package of Convention tools include Wetland Risk Assessment and the impact assessment for activities associated either within the site or external to it. It was a requirement for Contracting Parties to verify the data which they provided on Information Sheets on Ramsar Wetlands at the time of designation, every six years.

In other words, on every second meeting of the Conference of Parties, Contracting Parties are expected to provide the Secretariat with updated Information Sheets if necessary. It is important therefore, for Parties to assess changes in ecological character of a listed site against the baseline status presented in the Information Sheet on Ramsar Wetlands, at the time of designation for the list. In case, the Ramsar site is found to be facing serious problems in maintaining their ecological character, Contracting Party can place it on a special list, referred to as Montreux Record so that technical assistance to facilitate the concerned country solve the problems can be provided.

In addition, the Contracting Parties were required to appoint an authority responsible for planning and management of Ramsar sites. In this case, the Wetlands Management Department in the Ministry of Water and Environment is the designated authority that coordinates the implementation of the Convention at national level.

The study established that Ramsar Information Sheet, justification for designating Lake Mburo- Nakivale Wetland System a Ramsar site, a detailed map and the description of ecological character were provided at the time of designation of the site in 2006. Ecological and Socio-economic baseline survey was carried out by Nature Uganda in 2009. Furthermore, IUCN in collaboration with the district local government authorities supported the drafting of community based management plan for Lake Nakivale; however, Uganda was yet to submit an update on the current ecological character of the wetland.

Legal and institutional framework

Legal framework

It was established that national and international legal framework for managing wetlands of international importance (Ramsar sites) was in existence. At international level, convention on Wetlands (Ramsar Convention) is an intergovernmental treaty that provides the framework for national action and international cooperation for conservation and wise use of wetlands and their resources. It was adopted in the Iranian City of Ramsar in 1971 and came into force in 1975.

When it comes to national level, the conservation of wetlands was enshrined in the Uganda Constitution of 1995. The National Objective and Directive Principles of State Policy Objective XIII provides for the protection of natural resources, wetlands inclusive. Objective XXVII (i) calls for the State to promote sustainable development and public awareness of the need to manage land, air and water for present and future generations.

Article 39 of the Constitution enshrines the right of every Ugandan to a clean and healthy environment. It is therefore, presumed that failure by the government and stakeholders to control the destruction of Lake Nakivale Wetland compromises its ability to provide wetland resources and services like clean air and may be taken to imply the violation of the constitutional right for citizens to access clean air and environment.

Article 237(2) b of the constitution gives the government or local government the mandate to hold in trust for the people and protect natural lakes, rivers, forests, wetlands, game reserves, national parks and any land to be reserved for the ecological and touristic purposes for the common good of all citizens. In the same spirit, Article 245 of the Constitution gives powers to the Parliament of Republic of Uganda to make laws to protect and preserve the environ-

ment. The Local Government Act, 1997 empowers district local government to play a decentralised role of managing wetlands in their areas of jurisdiction.

The National Environment Management Act (Cap. 153) of 2000 provides a legal framework within which wetlands conservation can be enhanced. Section 3 of the Act obliges every person to maintain and enhance environment and at the same time protect the rights to healthy environment. The restricted use of wetland is provided for under Section 36(i) but at the same time, prohibits forms of wetland disturbance which include among others; wetland drainage, reclamation and putting up structures on wetland.

Section 37 provides for the establishment of guidelines for identification and sustainable management of all wetlands. This is further strengthened by Section 37(2) which gives the National Environment Management Authority (NEMA) mandate to compile a national register of wetlands of local, national and international importance as ecosystems and habitats of species of fauna and flora.

The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, Statutory Instrument No.3 of 2000 allows the traditional uses of wetlands under regulations 11(2). Harvesting of resources like papyrus, medicinal plants, reeds and trees, fishing as well as, collection of water for domestic use are allowed. Hunting is allowed subject to the provision of the Wildlife Act (Cap. 200) of 2000 which provides classes of wildlife use rights, hunting being class A.

However, the tricky part of Section 11(2) of the Regulations is that, it allows the cultivation of wetlands within an area not more than 25% of the total area of the wetland. This is perhaps the most controversial part of the regulations which may be abused especially in a situation where the capacity of district local governments to effectively monitor and control human activities is very weak.

Nevertheless, the regulations provide for sustainable utilization of wetland resources, mandatory environmental impact assessment and integration of "wise use" concept into management plans of wetlands as well as awareness and information dissemination campaigns. Every landowner, occupier or user adjacent or contiguous with the wetland is obliged to prevent degradation or destruction of the wetland and maintain ecological and other functions of the wetland.

The Second schedule of the regulations provides a list of regulated activities that require the issuance of a permit granted by NEMA, in consultation with the lead agency. The activities listed include brick making, recreation activities, cultivation, drainage, commercial exploitation of wetland resources, sewage filtration as well as, fishing using fish gears and weirs, fish farming and aquaculture. Other activities regulated under the Second schedule are; construction of transport and communication facilities such as roads, railways, telephone lines, burning as well as any other exploitative activity which is of commercial or trade

nature such as harvesting of papyrus for commercial purposes.

Another relevant law as far as the wetland conservation is concerned is the Land Act (Cap. 227). Sections 44(4) of the Land Act prevents the government or local government from leasing out or otherwise alienate wetlands. This is important legal provision that makes it difficult and ultimately illegal for government or local government to issue the land title in respect to wetlands.

Institutional framework

The institutions legally mandated to manage wetlands in Uganda were found to be based at national and local level (district and sub-county level). The national institutions were NEMA that is responsible for the management of environment and approving environmental audit for development works that take place in Wetlands. The Wetland Management Department (WMD) in the Ministry of Water and Environment coordinates the management of wetlands in the country. WMD was also the designated authority in the country responsible for coordinating the process of developing management plans and monitoring the changes in ecological character of wetlands. In case of Lake Nakivale Wetland, WMD in collaboration with partners in conservation coordinated the implementation of baseline survey exercise in 2009, development of community based management plan and restoration some sections of Lake Nakivale shoreline.

At district level, Isingiro District Local Government Council (DLGC) was mandated to develop environmental management bye-laws. The District Environment Committee and the District Natural Resources Officer who was also holding the portfolio of the District Wetland Officer were responsible for guiding the district council to take appropriate decisions. At sub-county level, the councils with the guidance of the Local Environment Committees were supposed to come up with ordinances that promote the conservation of the wetland.

It was noted that Lake Mburo- Nakivale Wetland System is partly a national park (Lake Mburo National Park) where public access to park resources was more regulated than the section of Lake Nakivale Wetland. Besides the strict regulations regarding community access to wetland resources within the national park boundaries, Lake Mburo National Park was manned by armed park rangers who on a daily basis were carrying out regular field patrols aimed at curbing illegal activities such as poaching.

Stakeholders analysis

The study established that there were different stakeholders who were playing different but complimentary roles to conserve the wetland (Table 6).

Table 6. Key stakeholders in the conservation of Lake Nakivale wetland.

Category	Stakeholder	Roles	Level of influence
Central Government	Wetland Management Department (WMD) in the Ministry of Water and Environment	Policy guidance, coordinating planning process and monitoring the changes in ecological character of the wetland.	High
	Fisheries Department in the Ministry of Agriculture, Animal Industry and Fisheries	Policy guidance on the exploitation and restocking of fisheries resources.	Medium
	Ministry of lands	Development of the National Land Use Policy and in collaboration with IDLG Land Board Survey the Refugee Settlement land and provide technical guidance on land use planning.	Medium
	The office of the Prime Minister	Overseeing the implementation of self reliance policy whereby refugees are encouraged to grow crops. Taking care of victims of environmental disasters that may emanate from effects of poor land use practices on the wetland ecosystem.	High
	National Environment Management Authority	Approval of environmental audit for developments within the wetland.	High
	National Fisheries Resources Research Institute	Conducting research studies on the fisheries resources and disseminating scientific information and research findings to the stakeholders.	Medium
	Uganda Wildlife Authority	Management of wildlife within and outside Lake Mburo-Nakivale Wetland System. Part of the wetland system falls within Lake Mburo National Park.	High
District Local Government	District Natural Resource Department	Implementation of the wetland management plans and guiding the enforcement of ordinances, bye-laws and the environment management laws.	High
	District Agriculture Officer	Promotion of soil and water conservation measures and modern agricultural methods	High
	District Environment Officer	Providing guidance on environmental audit and spearheading sensitisation and awareness raising campaigns.	High
	District Fisheries Officer	Enforcement of fisheries regulations, controlling the harvesting/exploitation of fisheries resources.	Medium
	District Planner	Providing technical input in the planning process and guiding the land use planning process and infrastructure development around the wetland system.	Medium
	Community Development Officer	Mobilisation and sensitisation of local people.	Medium
	District Forest Officer	Providing technical guidance on the tree planting campaigns and selection of good tree species.	Medium
	District Land Board	Land surveying and resolving land disputes within the study area.	Medium
	Isingiro Town Council	Formulation of ordinances on waste management and pollution.	Medium
	Isingiro District Local Government Council	Formulation of environment management by- laws and providing political support.	High
Sub county Local Government	District Environment Committee	Guiding the district council to take decisions on environmental issues.	High
	Sub county council	Making ordinances.	
International agencies	Sub-county Environment Committee	Guiding Sub county councils to make decisions on environment issues.	High
	UNDP	Providing financial support and lobbying government to protect the wetland.	Low
	GEF	Providing financial support and lobbying government to protect the wetland.	Low
International NGOs	UNCHR and other agencies working with refugees	Involvement of refugees in environment management, conservation of the wetland and energy saving technology.	High
	IUCN	Soliciting funds and lobbying international agencies to support the conservation of the wetland.	Low

Table 6 Cont.

National NGOS	Nature Uganda	Monitoring of birds in particular and biodiversity in general.	Medium
	Uganda Wildlife Society	Advocacy and public awareness.	Medium
Village level	Community Based Organisations and Resource Use Groups	Ensuring that residents utilize wetland resources sustainably and the rest of community members are mobilised to participate in wetland conservation programs.	High
	Local councils	The chairmen of local council 1 play a key role of mobilizing residents to participate in government programs.	High

The central government institutions were playing mainly the role of policy making. The district and sub-county departments in charge of natural resources were responsible for the implementation of wetland management policies. The district and sub-county local councils were mandated to make bye-laws and ordinances respectively that may regulate the utilisation of wetland resources, promote soil and water conservation measures and protect the wetland against fires.

The international agencies such as UNDP and GEF were providing technical support to the district and local communities to effectively manage the wetland. The technical support includes the financial assistance and capacity building. UNHCR in collaboration with the Office of Prime Minister was responsible for issues concerning the refugees living in Lake Nakivale Refugee Settlement.

Therefore, UNCHR was one of the key stakeholders because refugees like nationals depended on Lake Nakivale Wetland resources such as fish, building and handcraft materials and fuel wood for their livelihoods. By the use of the Refugees Camp Commandants and Refugee Welfare Committees (an equivalent of village local councils), the refugees were able to conserve the Lake Nakivale shores unlike the nationals who had cultivated crops up to the shores lines and in some instances beyond without respecting the mandatory

200 m strip along the wetland edge (protected zone).

In 2009, IUCN supported Isingiro District and local communities to develop a community based management plan for Lake Nakivale. The agency played a very important role of soliciting funding from international agencies to support wetland conservation programmes.

The national NGOs performed the advocacy role and were trying to make the public aware of the threats to conservation of Lake Nakivale Wetland. Nature Uganda in collaboration with Lake Mburo National Park management was spearheading the monitoring of the bird distribution abundance within the wetland system. At village level were Local Council chairmen and Refugee Welfare Committees Chair persons who are important officials that mobilize residents to participate in wetland conservation program.

Assessment of financial allocation to Isingiro district key sectors

Although, the assessment of budgetary allocation to the key sectors of Isingiro District Local Government (IDLG) indicates that budget for the sector of natural resources progressively increased from Ug. Shs 10, 392, 540 (US \$ 4,157) in 2006 to 2007 to Ug. Shs 278, 966, 886 (US \$ 111, 587) in

2011 to 2012 financial year and the sector remained the least funded. It is followed by production and finance sector.

The most funded sector was education with its budget allocation having been increased from about 6 billion shillings (US \$ 2, 400, 000) in 2006 to 2007 to approximately 7.5 billion shillings (US \$ 3, 000, 000) in 2011 to 2012 financial year. The production sector which hosts the Agriculture Department that is responsible for promoting modern agricultural methods and soil and water conservation techniques was found to be poorly funded (Figure 1). This, in turn, left the problems of effects of poor land use practices unattended by the sector.

When the average annual budgetary allocation to various sectors was calculated, it was established that natural resources sector received an average of Ug. Shs 147, 976, 246 (US \$ 59, 190) which is 1.2% of the total average budgetary allocation of all key sectors as compared to education sector which took Ug. Shs 6, 637, 120, 708 (US \$ 2, 654, 848) which is 54.8% of the budget. The works sector received (14.9%), health (12.7%), administration Ug (8.6%) and finance (4.6%).

Staff in natural resources department

Assessment of manpower establishment in the Natural Resources Department of IDLG revealed a



Figure 1. Digging of a trench on steep slope of Rwendama Hill in a white T-shirt and hat holding a stick is the District Natural Resource officer and in a black jacket holding a notebook is the author.

serious shortage of staff. The District Natural Resource Officer was at the same time playing the role of other technical officers. For instance, he was at the same time, holding the portfolio of the District Wetland Officer and the District Environment Officer who were not yet recruited by the district. He had no any other staff to assist him in matters of wetland conservation.

The department was also not well facilitated in terms of transport and field equipment. At the time of preparing this manuscript, United Nations Development Program (UNDP) had just donated a vehicle to the department to facilitate the officer in monitoring the implementation of Community Based Wetland Biodiversity Conservation (COBWEB) Project activities and coordination of initiatives and inter-

ventions aimed at the protection of Lake Nakivale and associated wetland system.

Management interventions

The household survey established that the following interventions were being implemented by the district with support from international agencies such as UNDP, Global Environment Facility (GEF), and International Union for the Conservation of Nature (IUCN) as well as, national non-governmental organisations (NGOs) notably Nature Uganda and Uganda Wildlife Society to minimise the effects of poor land use practices on the wetland system:

Digging of trenches on the steep slopes of Rwendama Hill to reduce soil erosion from overgrazed and degraded hills around the wetland that leads to the siltation of Lake Nakivale,

Protecting the mandatory 200 m strip of land (referred to as protected zone) in accordance with regulation 30 (1) of the National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, Statutory Instrument No. 3 of 2000, carrying out baseline surveys in the field of ecology, socio-economics and attitude changes, and Implementing Community Based Wetland Biodiversity (COBWEB) Conservation project initiatives.

Digging of trenches on the steep slopes

It was observed during the field survey that in order to address the threat of the siltation of Lake Nakivale, Isingiro District with the support from IUCN was facilitating local people of Rwendama village in Kamuri Parish to construct trenches along the contours to reduce soil erosion on steep slopes and ultimately minimize the deposition of soil and other earth materials into the lake (Figure 2).

The District Natural Officer was responsible for coordinating the digging of trenches and to ensure that they run along the contour and earth materials were deposited on the upper side of the trench to reduce the speed of running water. The Local Council 1 Chairmen were responsible for mobilising residents to participate in the digging of trenches.

Enforcing the protected zone

The study established that Isingiro District with the support from UNDP was trying to protect Lake Nakivale shoreline by requesting as well as, forcing residents to ensure that mandatory 200 m protected zone was respected. The district had planted over 100,000 tree seedlings of *Grevillea* species along the outer 50 m of the protected zone, leaving the first 150 m strip untouched to allow it regenerate naturally. At the time of compiling this manuscript a stretch

of about 5 km out of over 60 km shoreline along the Lake Nakivale Refugee Settlement land had been planted with tree seedlings.

Baseline surveys

In 2009, the district was supported by Nature Uganda to carry out ecological, socio-economic and attitude change baseline surveys. The surveys were expected to act as a benchmark for future monitoring of the trend/changes in ecological character of Lake Nakivale Wetland as required under Article 3.2 of the Ramsar Convention.

Community Based Wetland Biodiversity (COBWEB) conservation project

The study established that in 2010 the partners in conservation launched a four year Community Based Wetland Biodiversity (COBWEB) Conservation Project in order to address some of the key threats to the conservation of Lake Nakivale Wetland such as wetland reclamation, over-exploitation of resources and deforestation. The ultimate goal of the project was to extend wetland protected areas through community conservation initiatives. COBWEB is a project of UNDP but co-financed by GEF, IUCN, Nature Uganda and Uganda Wildlife Society.

The project was focused at establishing and strengthening community based regulations, sustainable wetland resource use without loss of biodiversity functions and integrating community conservation models into national and protected areas planning process. The study established that COBWEB project facilitated Isingiro District Administration to manage Lake Nakivale shoreline (protected) zone in villages of Nshangye, Zuru, Kahwengye, Kakoma and Nyarugugu. Other interventions funded by the project include: 1) The development of management plan for Lake Nakivale Wetland; 2) putting up Rukinga landing site Fish Regulatory Centre where the fishing community has been facilitated to monitor the exploitation of fisheries resources; 3) equipping the fishing monitoring team with fishing gears (boat engine and life jackets), 4) developing community groups into strong community based organization with ability to participate in wetland conservation programs and 5) providing a vehicle to the District Natural Resources Officer to facilitate him to supervise the implementation of project activities.

DISCUSSION

Conservation threats

It was evident from the study that Lake Nakivale Wetland

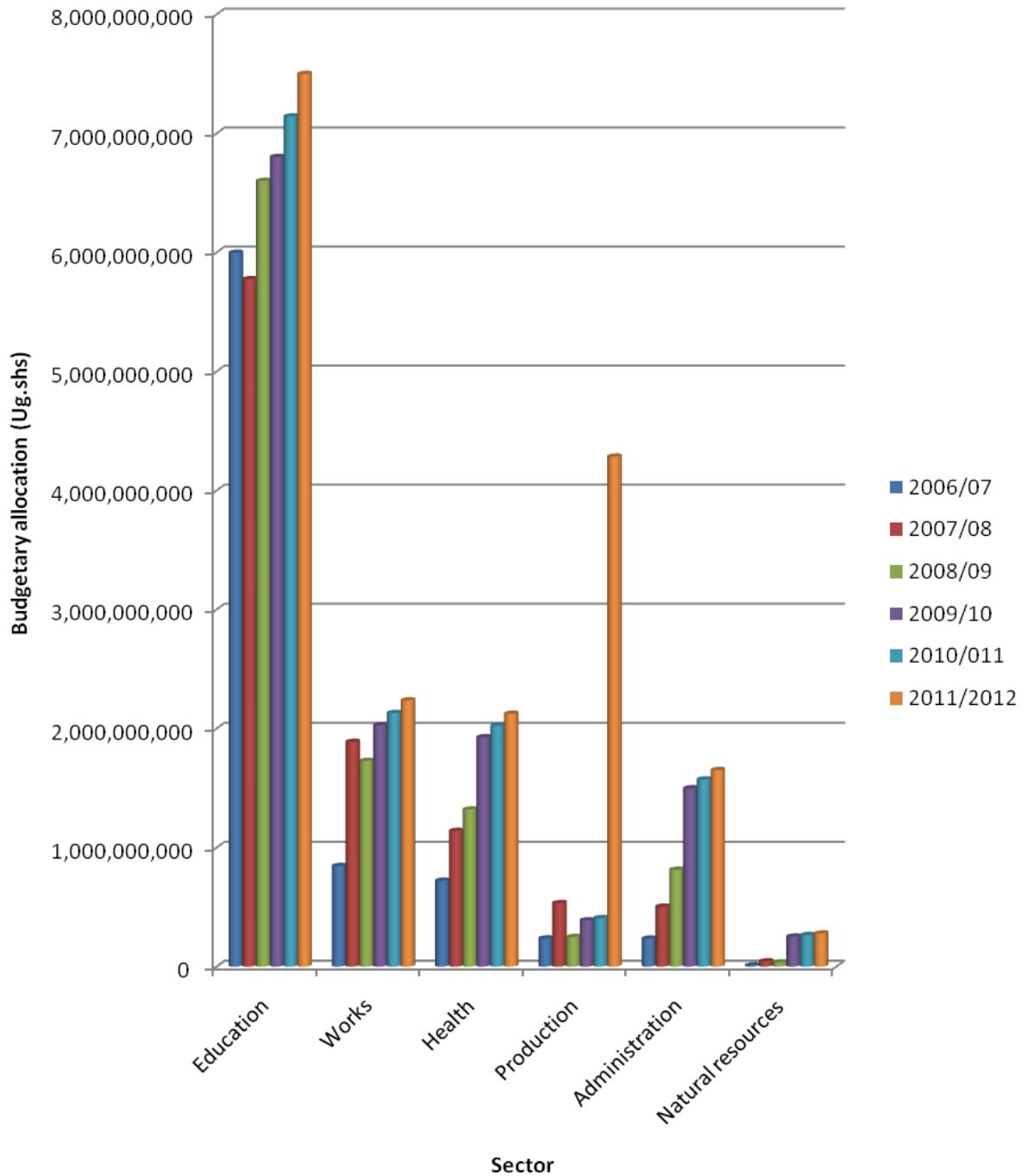


Figure 2. Budgetary allocation to key sectors of Isingiro District (IDLG, 2009).

was now more degraded than what it was 15 years ago. This was confirmed by 97.1% of the respondents. The major causes of degradation are mainly poor land use practices and poor agricultural methods (Folmer, 1998; Davari et al., 2010; Oppermann, 2010). For instance, the conversion of wetland ecosystem into crop fields was considered by the respondents as the worst conservation threat to the conservation of Lake Nakivale Wetland

because it was directly responsible for wetland reclamation, wildlife habitat loss and scarcity of some of the vital wetland resources such as medicinal plants.

Similarly, the poor traditional farming practices such as clearing and burning of vegetation residues in the crop fields before planting seasons were encouraging the loss of soil fertility (Atreya et al., 2005; Bationo et al., 2006), exposing soils to erosion as well as, acting as a source of fire

that burns the wetland during the dry season. However, apart from the burning of trash in agricultural land being a source of fire, the fishermen who catch mudfish sometimes intentionally set fire on the wetland especially towards the beginning of rain season so that it is easy for them to trap the fish as soon as it rains.

Soils eroded from agricultural fields on the fringes of Lake Nakivale Wetland were finding their way into Lake Nakivale leading to its siltation. Overgrazing by livestock especially on the steep slopes of hills around the wetland is a serious problem that stimulates land degradation by making soils more susceptible to soil erosion. The study established that over-exploitation of wetland resources was not only a serious threat to the conservation of Lake Nakivale Wetland but an indictment against the Ramsar Convention's concept of "wise use" (Ramsar Convention Secretariat, 2010).

When Pearson Chi-square test (X^2) of response as to whether Lake Nakivale Wetland was more conserved today than 15 years in relation to the ownership of a garden in the wetland applied, observed significance level of $0.007 < 0.05$ was obtained. This indicates the hypothesis that two variables (response as to whether the wetland was more conserved now than 15 years ago and the ownership of crop gardens in and close to the wetland are independent is rejected).

In the same way, when the two variables (people's initiatives to address the threats and the form of land use they practiced) were subjected to Pearson Chi-square, observed significance level of $0.017 < 0.05$ was obtained. This implies that hypothesis that two variables (response as to whether local people were doing something to address threats and the form of land use residents were engaged in) are independent is rejected.

Assessment of the level of awareness about the government's and residents' efforts or interventions aimed at addressing the threats to the conservation of Lake Nakivale Wetland showed high level of ignorance amongst the respondents. The findings revealed that although, the government (with support from international and national agencies) had attempted to address some of the threats to conservation of Lake Nakivale Wetland, a significant proportion of the residents who participated in the household survey (63.5% of the respondents/ $n = 200$) were not aware of any government intervention in that regard.

This could be attributed to the small scope in terms of area and number of residents already covered by the government conservation programs. For instance, government efforts were concentrated mainly in the villages of Kahwengye, Kakoma, Nshangye, Nyarugugu, Rwendama and Zuru, leaving out over twenty villages. Limited financial and technical capacity could perhaps be the reason as to why interventions were covering a small area. Similarly, a small percentage (35.6%) of the respondents ($n = 115$) were aware of local people's contri-

butions and interventions to mitigate the effects of poor land use practices on the wetland and other conservation threats.

The study revealed that level of awareness of the respondents about government and residents' interventions depended on the form of land use the respondents were engaged in. Where people were less informed of conservation effort to restore and conserve the wetland, their land use practices were found to be more destructive than where land users were informed. For example, cattle keepers and fishermen were the most informed categories of respondents about government's and residents interventions to address the threats to the conservation of Lake Nakivale Wetland.

This could also be attributed to the fact that these two groups of residents were already feeling the effects of poor land use practices as pasture and fisheries resource were now more scarce than what it was 15 years ago.

Community based institutions

This study established that at village level, the Village Local Councils headed by the chairmen and Refugee Welfare Committees were important institutions that could be used to mobilize residents (nationals and refugees) to participate in wetland conservation programs.

It is noteworthy however, that for these institutions to effectively and efficiently play this role, the government and partners in conservation must invest in building their capacity (Karl and Kirsch, 2007) to understand the conservation values of Lake Nakivale Wetland. They must be helped to understand their roles and responsibilities in saving the wetland against human induced destruction.

Linked with the aforementioned institutions are the resource users' groups such as herbalists and fishing village Beach Management Committees.

These groups can also be of great use especially when it comes to the conservation of specific wetland resources of their interests. Members of these groups are traditional specialists in resource use with rich indigenous knowledge on specific wetland resources. However, to make these informal institutions play an active role in management of the wetland, they must be helped to be more organised; in other words, their capacity must be strengthened; their existence formalized by guiding them to register and operate as registered Community Based Organizations (CBOs) and trained in group dynamics, natural resource management and record keeping.

The study shows that information flow from district leaders to residents in some villages was weak and inadequate and at most, there was total communication breakdown between the district officials and local institutions. This was more evident in villages where the District Natural Resources Officer and partners in wetland conservation had not yet implemented wetlands conserva-

tion interventions.

In these villages, the residents exhibited high level of ignorance about government's (IDLG) wetland conservation programs. Therefore, it may be important for Isingiro District Local Government in collaboration with Wetlands Management Department in the Ministry of Water and Environment to develop and implement a comprehensive communication and public education program aimed at promoting information sharing amongst stakeholders (local people being one of the key stakeholders) and educating the residents about the values of wetlands.

It is also in the interest of wetland conservation, that Isingiro District Local Government Administration, through the office of District Natural Officer to create mechanisms for formal interaction with the wetland resource users in particular and residents in general. The interactions can be in form of regular planning and information sharing meetings with resource users held at either village or parish level.

However, the major limitation of the intervention is that it was still in its initial stages; it had not yet covered a wide area and was labour intensive.

Management of Lake Nakivale wetland

The analysis of the existing legal framework reveals the existence of adequate relevant legal provisions necessary for conservation of wetlands in Uganda. The current legal framework provides a favourable environment for Isingiro District Local Government and Wetlands Management Department to ensure that Lake Nakivale Wetland is conserved.

In addition, the Government of Republic of Uganda has already domesticated Ramsar Convention into the existing policy, legal and institutional framework. However, the major challenge has been lack of capacity at district and village level to enforce the wetlands conservation laws and regulations. For instance, in 2006, there were some individuals who illegally secured land titles to privately own some sections of Lake Nakivale Wetland contrary to Section 44 of the Land Act, 1998. Good enough, the District Land Board in collaboration with Uganda land Commission later cancelled the land titles.

Ineffective law enforcement could be attributed to inadequate trained and skilled manpower, insufficient funds and to some extent lack of the political will from local leaders. For example, the Natural Resources Department which is responsible for wetlands conservation receives the least budgetary allocation as compared to other sectors. The sharp rise in the department's budget from tens of millions shillings in 2007/2008 financial year to over 278 million shillings in 2011/2012 budget was possible because of donor support. The department received a budgetary support from the UNDP COBWEB project. Even so, the

budgetary allocation to the Natural Resources Department remains the lowest at 1.2% of the total budget for the key sectors in the district.

Nevertheless, Isingiro District Local Government and partners have succeeded in implementing some interventions such as digging of trenches, involving the resource users in the monitoring of fishing activities and enforcement of protected zones to save the wetland and water bodies against siltation.

However, the major weakness of this effort is that such initiatives were being implemented at a small scale to the extent that they can as well be described as "a drop of water in an ocean". What is worse, the current interventions do not adequately address the challenge of poor land use practices, the main underlying cause of destruction of Lake Nakivale Wetland. The interventions are too restricted and inadequate to match the magnitude of the human induced wetland destruction and the effects of poor land use.

It is crucial that efforts are made to involve as much as possible all residents around Lake Nakivale Wetland regardless of their ethnicity, nationality and economic status to conserve the wetland, adopt modern agricultural techniques that promote soil and water conservation and mitigate the effects of poor land use practices. Investment in capacity building (Frenken and Mharapara, 2001; Boere et al., 2006) for the district to effectively enforce wetlands conservation laws, regulations and bye-laws is of paramount importance in ensuring that Lake Nakivale Wetland is protected against external threats arising out of poor land use practices.

Owing to the fact that implementation of interventions to conserve Lake Nakivale Wetland has provided opportunity to pilot new initiatives such as digging of trenches on hilly slopes, it is crucial to use adaptive management which is known to be a formal, systematic and rigorous approach to learning from the outcome of management action (Nyberg, 1999) and allows information sharing (Bino et al., 2003). However, this requires rigorous monitoring of the implementation of interventions, draw lessons and undertake necessary changes to improve the management of the wetland systems.

Conclusion

The results indicate that Isingiro District Administration with financial support from partners in conservation has done commendable task of implementing some interventions to address threats to the conservation of Lake Nakivale Wetland. However, the major limitation of these initiatives is that they were not specifically focusing on addressing the problem of poor land use practices, which is the key root cause of the current destruction of the wetland. Inadequate information flow and communication breakdown between the district officials and residents has not created a good environment for the well intended

interventions to be publicized and replicated to other areas.

The Department of Natural Resources being the least funded unit in the district has two implications; first, the issues of natural resources conservation (wetlands inclusive) may not be considered as priority by the decision makers at the district level. Second, the sustainability of the current donor supported interventions to address the wetland conservation threats after COBWEB Project ceases is likely to be in balance. This calls for the need to build the capacity of Isingiro District Local Government Authority to effectively support wetlands conservation initiatives with or without external assistance.

Finally, results from the analysis of the current legal and institutional framework indicate that there are adequate legal provisions, institutions and stakeholders capable of addressing both internal and external threats to the conservation of Lake Nakivale Wetland. However, the problem lies with weak enforcement of the wetland conservation laws and regulations. The political will to support relevant institutions mandated to enforce the laws, regulations and bye-laws is also weak, perhaps due to the problem of conflicts of interests and the fear by local politicians to lose votes during the future elections if they supported the eviction of residents who have encroached the wetland.

Based on the aforementioned premise, it is recommended that capacity of staff in the Natural Resources Department should be strengthened to effectively execute wetland conservation program, develop communication and conservation education strategy, monitor the implementation of wetland conservation initiatives and enforce the existing environment management law and regulations. Above all, adaptive management approach appears to be the right way to go, if the wetland managers are to use lessons drawn from the existing initiatives to improve the conservation of Lake Nakivale Wetland.

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