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Full Length Research Paper

Local institutions for sustaining wetland resources and community livelihoods in the Lake Victoria basin

Jacob K. Kibwage[1], Paul O. Onyango[2], and Hilary Bakamwesiga[3]

[1]Maseno University, School of Environment and Earth Sciences P.O. Box 333, Maseno, Kenya.
[2]Paul lectures at University of Dares Salaam, Faculty of Aquatic Sciences and Technology (FAST), Tanzania.
[3]Hillary also lectures at Makerere University, Institute of Environment and Natural Resources (MUIENR), Uganda.

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What should policy makers do in deciding between institutions promoting community livelihoods or sustaining wetland resources within an impoverished community? Prioritizing community livelihoods without understanding the impact of local institutions on wetland resources may only aggravate impoverishment. However, prioritizing sustainable wetland resource use may lead to short-term impoverishment with positive long-term effect on both community livelihood and sustainable wetland resources. This paper tries to address this difficulty by assessing local level institutions such as property rights and those that govern extraction of wetland resources in three wetland communities of Lake Victoria. The paper argues that reassessing institutions on 'tenure system' and 'access to' resources are desirable policy objectives that should guide such decisions.

Key words: Sondu-Miriu, Katonga, Simiyu/Duma, wetland sustainability, community livelihoods, local institutions, Lake Victoria Basin.

INTRODUCTION

Wetlands areas are under many uses since time immemorial for socio-cultural and economic benefits to society (Barnabe, 1980; Dungan, 1990). Ramsar convention (This is an intergovernmental treaty, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. For details see www.ramsar.org) identifies them as being among the world's most productive environments and of tremendous economic benefits to society (Ramsar, 1971; Ogunseitan, 2007). Sustainable provision of such benefits to the community justifies the cost of wetland conservation. Nevertheless, rapid urbanization and population growth, among others, have escalated wetland degradation and put the livelihoods of local communities that directly rely on such ecosystems at risk. Many wetlands, especially in the river drainage basins have been degraded in many ways for example they have been converted and drained: for agricultural purposes, dumping of waste from urban sewerage and Industries, sand mining and extraction of clays for brick making, deforestation of swamp forests, overgrazing and nutrient enrichment from agricultural land. Examples may be seen at many of the wetlands along rivers draining into Lake Victoria, such as Katonga and Wamala rivers in Uganda; Mara, Masirori, Ngono, Simiyu, Magogo, Mwame and Mirongo rivers in Tanzania; and Sio, Nyando, Yala, Kuja, Sondu-Miriu and Nzoia rivers in Kenya (NEMA, 2001; Government of Kenya, 1994; LVEMP, 2002; Kairu, 2001). Degradation has led to a decrease in land productivity and increased rural poverty. Management of these riverine wetlands is still at a formative stage however, most wetlands are open access resources and their exploitation largely uncontrolled (IUCN, 1992). The tenure and property rights relating to the wetlands leads to their overuse (Bromley, 1989; Duncan, 1997; Turner, 1994). Nevertheless, well ma-naged wetlands could have many benefits to the society in various ways including but not limited to reducing flood impact, regulating water flow and moderate drought

*Corresponding author. E-mail: jkkibwage@yahoo.com. Tel: +254-722-479061.

effects, recharging ground water, supplying and storing drinking water. Other benefits include: retaining carbon, treating waste water, controlling erosion and sediment, exporting biomass, serving as habitat for wild life, modifying microclimates, serving as recreational and eco-tourism centers, facilitating transport, retaining nutrients and toxins, acting as sources of food, forage, pasture, farm land, wood fuel, building and craft materials, sand, gravel, clay and medicines. Such well-managed wetlands require functioning institutions that do not only promote their sustainable utilization but also community livelyhoods.

In this paper, we view institutions as "regulated patterns of behaviour structured by rules that have widespread use in society" (Larswell, 1997; Leach et al., 1997). We view livelihood to comprise assets (including access to them) and activities, both mediated by institutions and social relations that together determine the living gained by the individual or household (Ellis, 2000; DFID, 2001). For institutions to promote sustainable utilization of the wetland resources and community livelihoods, they must guarantee rights (access, withdrawal, management, exclusion and transfer) (Schlager and Ostrom, 1993) and possession (Onyango, 2000; Onyango and Jentoft, 2007; Swanson and Göschl, 1999) elsewhere Onyango and Jentoft (2007) also argues that institutions should reflect cultural values held by the local communities.

This paper is based on a three-year ongoing research project aimed at analyzing multiple values and institutions for sustaining wetland resource conservation and community livelihoods in the Lake Victoria Basin. The study is being undertaken in three riverine wetlands/ deltas namely: of Katonga (in Uganda), Sondu-Miriu (in Kenya) and Simiyu/Duma (in Tanzania) (Figure 1). Our paper discusses how local institutions affect sustainable wetland resource use and community livelihoods. The paper begins by a discussion of a conceptual framework used to understand institutions within the framework of sustainable wetland resource use and community livelihoods. The paper then presents the methodology used in the study including a brief outline of the study areas. Then the findings are discussed focusing on institutional aspects assessed during the study. These institutional aspects include: land tenure systems; crop farming; livestock farming; extraction of wetland resources for housing and other construction activities; fishing activeties; cultural activities; fuel wood collection; craft industry and pottery; water use; hunting, gathering and extraction of Medicinal Herbs and wild vegetation. This paper is specifically addressing existing formal and informal institutional frameworks for sustainable utilization of wetland resources and promotion of community livelihoods.

Micro policy analysis for sustainable rural livelihood

A sustainable livelihood framework for micro policy (DFID, 2000; Allison and Ellis 2000) was used to understand institutions. This framework allows us to analyse the main factors that affect people's livelihoods and relations between them. It is based on the idea that people live within a vulnerable context in which they are exposed to risks through shocks and trends overtime. Due to this condition, livelihoods are sustained when it can cope with and recover from stresses and shocks and maintain or enhance its assets and capabilities to access the assets both now and in the future, without undermining the natural resource base (DFID, 2001, Allison and Ellis, 2001). The livelihood concept argues that people have assets (natural, physical, financial, human and social) which they need to access and use. For wetland residents, the assets would comprise land and other wetland resources and the means of extraction. Their access to these resources is controlled by among others policies and institutions which would include but not limited to state rules and community based rules. Such policies and or rules comprise traditions and customs, land tenure systems, national environment laws and bye-laws formulated by local people. With regard to institutions, the argument here is that, individuals' relation to others and to the wetland is simply an exhibition of institutions which he/she has internalized. Given the fact that wetlands are a multitude of resources, the wetland users similarly have a multitude of institutions for specific wetland resource and or use. The totality of all these institutions is what modifies the wetland resources within the context of trends and shock to generate livelihood strategies (Allison and Ellis, 2001). These livelihood strategies are simply composed of various activities of the wetland users including but not limited to fishing, farming, livestock keeping, extraction of medicinal plants and cultural activities.

These institutions should contribute to providing a situation where wetland residents can cope with and recover from environmental stresses and shocks. The situation created should enable wetland residents to be engaged in activities that generate adequate standard of living and satisfy other goals such as risk reduction. In other words, guaranteeing livelihood security and not weakening the ability of the wetlands to replenish. A secured livelihood is reflected in the improvement in incomes and assets, food and nutrition, education, participation, water and sanitation, primary health and reproductive health (Linderberg, 2002) and therefore promoting community livelihoods. Thus institutions should enable wetland residents to access these wetland resources in a way that is congruent with meeting their livelihood concerns. On the other hand a sustained wetland resource is reflected in continued availability of wetland products. In the event that livelihoods security is not guaranteed and wetland sustainability is not being achieved, institutions are bound to change. The change may be instigated informally so that it perpetuates the local social and power structure (Onyango and Jentoft, 2007). In other words, local communities generate new

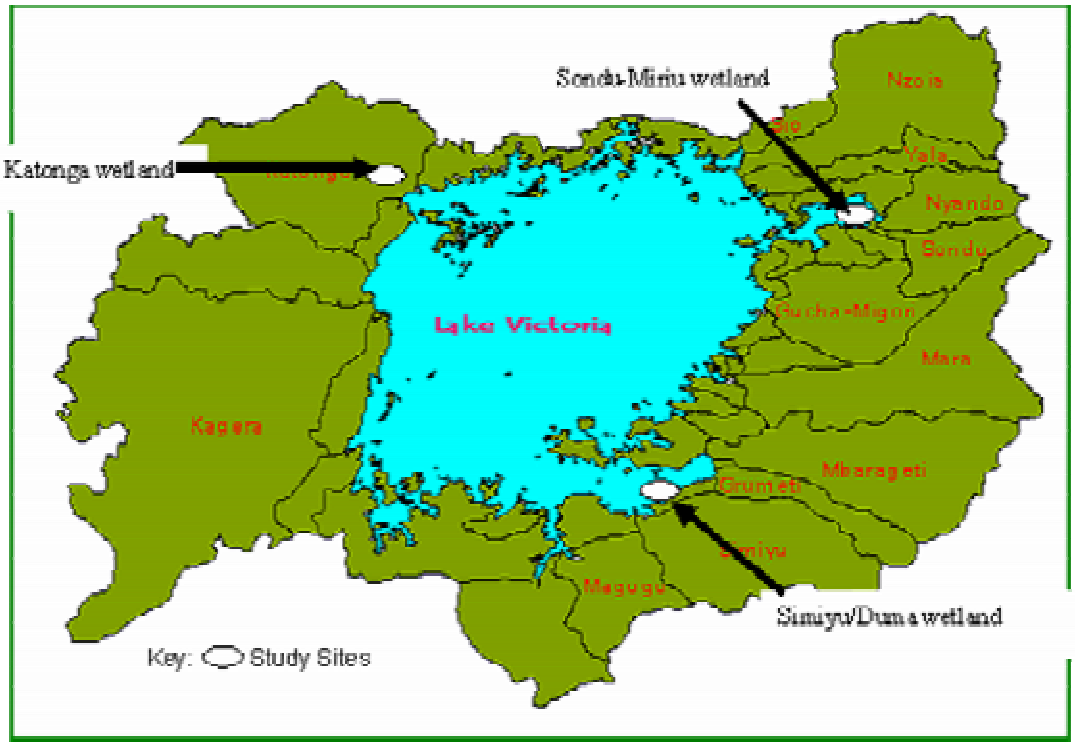


Figure 1. Location of the three country study wetland sites

meaning to the institution congruent with their community values and in this way keep alive their goals (Durkheim, 1974; Hanna and Jentoft, 1996). This framework is therefore used here to assess how institutions promote community livelihood and sustainable use of wetland resources.

METHODOLOGY

Data collection methods

Qualitative research tools such as review of relevant literature, Focus Group Discussions (FGDs), key-informant interviews were used. In the three sites 180 households (i.e. 60 per site) were interviewed. The respondents were randomly sampled from both the left and right banks of the three rivers mouths. 15 key informants were interviewed in each site which included opinion leaders, local level leadership, outstanding men and women in the society. Moreover, 12 FGDs were carried out where 160 residents participated. In addition, the findings were also validated with the local wetland residents, district leaders and authorities mandated with the responsibility of sustaining wetlands in each of the three countries through a regional workshop.

Through the interviews and FGDs, the study in particular investigated on; the permitting authority, the use of wetland resources for various direct values, wetland resources use requirements/ terms for residents and non-residents, disciplinary measures taken when you don't keep the terms given by the permitting authority, taxes/ local levies for using the wetland resources, recent institutional changes observed affecting wetland resource-use activities, household's division of labour on wetland activities according to gender and age, effectiveness of the formal and informal rules and regulations on wetland resource use and management.

Description of study sites

Katonga wetland (Uganda)

The Katonga wetland basin is formed from River Katonga, which follows the border line between Masaka and Mpigi Districts and drains into Lake Victoria. The wetland is located between latitude 32o02'- 30o29'E and longitude 0o08'S - 0o10'N and covers an area of about 2,478 km2. The wetland can be classified as a permanent peat forming freshwater swamp (Dungan, 1990). A tributary system of the river Katonga receives effluent from Masaka District town (NEMA, 2001). At present however, over 90% of the upstream portion of the Katonga river up to the Masaka-Kampala highway has been drained for growing a variety of horticultural crops and Eucalyptus trees. The predominant vegetation of the wetlands consists of Cyperus papayrus. Livestock grazing is also an important activity during the dry season, while fishing activities are carried out throughout the year. The communities living around the wetland mainly comprises of the Baganda but there are also Barundi, Banyankole, Banyarwanda and Bakiga, all from the bantu group.

Sondu-Miriu wetland (Kenya)

Sondu-Miriu wetland is formed from the River Sondu-Miriu which is one of the five major rivers that drain into the Kenyan part of Lake Victoria. The river traverses Kericho, Belgut, Nyando and Rachuonyo Districts. The wetland is located within latitude 00 18'S, and 00 22'S longitude 340 04' E and 340 49'E and covers an area

of about 3400 km2. The wetlands within the river basin can be classified as perennial river wetlands, consisting of permanent rivers, streams and flood plains (LVEMP, 2001; Kibwage et al., 2003; Kairu, 2001). The predominant vegetation is Cyperus papyrus. The river basin consists of 15 main wetland pockets. The main activities in the wetland include fishing, crop farming, and livestock keeping, harvesting of wetland resources and trading (Kibwage et al., 2007; Kairu, 2001). The wetland is currently overexploited. The main community living the wetland is the nilotic Luo.

Simiyu/Duma wetland (Tanzania)

Simiyu/Duma wetland is formed from the River Simiyu which is one of the several rivers that drain into the Tanzania part of Lake Victoria. The wetland is located within latitudes 2o 30'S and 2o 45'S and longitude 33o 15'E and 33o 50'E. The wetland can be categorized as riverine system and consists of two sections, namely, the delta and the flood plain. The Simiyu delta (i.e. floodplain, seasonal and permanent swamps) is situated in Magu district within Mwanza region, and comprises a catchment area of 228 km2. The vegetation cover within this riverine wetland system falls underthe categories of; grass, reeds, shrubs, and some swamp trees. Local community, the sukuma, from bantu group, cultivate rice, sweet potatoes, vegetables, maize, sugar cane and fruit trees mainly for subsistence and cotton as a cash crop. The wetland vegetation has been extensively cleared for agricultural purposes and during grazing of livestock.

RESULTS AND DISCUSSIONS

This section examines the existing local institutions used by wetland residents in the three study sites. Wetlands comprise multitude of resources and what we discuss here is not exhaustive. However, it is worth noting that residents of these wetlands are highly dependant on them. This high dependence makes it very challenging to see 'individualism' in each of the residents. By being a resident, the relation each person develops with the wetland is dictated or defined by the community. Each resident finds him/herself in a situation in which institutions regulating the relation between humans and the wetland are already defined, you either fit or be ready for sanctions. The institutions are internalized and so individual activities are simply the sum of institutions that enables the relation between humans and the wetlands. In this study we therefore dug out specific institutions that are used for specific activities to enable us see the effect on community livelihoods and sustainable wetland resources use. As already pointed out, ten activities were identified and are discussed in this paper.

Land tenure and crop farming institutional aspects

Land ownership is a critical factor in ensuring sustainability or wise use of natural resources and promotion of livelihoods, since it determines the linkage between responsibility and authority over the resource. It also determines the incentive structures for sustainable use. Ownership involves possession (to have power over) and use rights (a claim to a benefit stream that is consciously protected, in most cases, by the state). Exercising possession and use rights together can more easily achieve sustainability of the resource than otherwise (Barrow and Murphree, 1998). However, exercising use rights without possession could result in unsustainability. Unsustainability results because of the characteristics of natural resources of subtractability and excludability. These characteristics create user incentive to maximize utility (Steins 1999) which eventually leads to Hardin's tragedy (Hardin, 1968). We argue here that an institutional tenure system that enables both user rights and possession would be a better option for achieving sustainability of the resource, which would guarantee secured livelihoods as well as sustain the wetland resources.

For the wetlands studied, it was found that the tenure system is the same for Kenya and Tanzania but different for Uganda (Table 1). State land is ownership by the government. Freehold is legal ownership of a property giving the owner unconditional rights, including the right to grant leases and take out mortgages. Communal or customary land tenure is ownership vested on community authority such as the elders and the chief, while state land is simply ownership by the government.The complexities associated with the tenure regimes of the wetlands are directly related to their status as com-mon-pool resources (Ostrom, 1990) even in Katonga where they are owned by the state, local communities still view them as common pool resource (State ownership is perceived as free access to all). One of the major difficulties in the wetlands has been to define and demarcate their boundaries. Despite the definition given by Ramsar Convention, which is:

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (Ramsar, 2006)"

wetland geographical areas are never static, they are ever changing with either dry or rainy seasons. This difficulty explains why for example the two wetlands in Katonga and Sondu-Miriu have been encroached seriously due to pressure from rural rapid population growth and poverty levels. The traditions in Kenya also demand that land must be subdivided among sons no matter the current size is. In Simiyu where ownership is communal, the right to claim benefit from the resources are not accompanied by the responsibility associated with pos-session of the wetland and as such, it is open to ruin (Hardin, 1968). Secondly, perceptions of the resources found in the wetlands present a frustrating atmosphere for their sustainability. The resources are perceived as 'free for all resource'. This is evidenced in the attitudes of the local residents who believe that nobody should be limited in extracting the resources. In general institutions regarding the tenure system have had negative effect on the sustainability of wetland resources and community livelihood.

Table 1. Land ownership institution in the three wetlands.

S/N	Wetland	Tenure/ownership institution
1	Sondu-Miriu	Freehold, Customary, government/gazetted
2	Simiyu/Duma	Freehold, Communal/Customary (Village government), gazetted-state
3	Katonga	State land[1]

Crop farming institutional aspects

Among the activities that support livelihoods in a number of African homes is crop farming. Crops are grown for both subsistence and commercial purposes and so their institutions should have a direct effect on sustainable livelihoods of the communities. On the other hand crop farming involves clearing of wetlands for cultivation land and thus a threat to sustainability of wetland resources. None the less wetland resources should be sustained for improving community livelihoods.

Crop farming is practiced in all the three wetlands at different levels (Kibwage et al., 2008). In Katonga for instance the crops grown include: Sugar cane, sweet potatoes, cabbages, cauliflower, green paper, beans and tomatoes, in Simiyu, the crops were mainly rice, a bit of maize and sweet potatoes while in Sondu-Miriu the crops are sorghum, beans, root crops, vegetables, onions, tomatoes, fruits such as pawpaw and bananas. Except for Katonga wetland, rice grown in Simiyu wetland and onions, pawpaw, some vegetables and bananas grown in Sondu-Miriu are for both subsistence and commercial purposes.

The study found out that using of the wetlands for crop farming depended on tenure system. In Sondu-Miriu and Simiyu where some parts of the two wetlands are communally owned, owners of a piece of land within the wetland have authority to cultivate their areas without asking for permission. In Katonga on the other hand, permission has to be sought in order to cultivate. In Katonga wetlands non-residents are not allowed to farm crops however in Simiyu and Sondu-Miriu wetlands, non-residents could be allowed only if they sought permission from the village government and either hire/rents or given by a friend or relative respectively. There are specific roles assigned to members of a family during cultivation. For instance in Katonga young females and males and women are supposed to dig, plough, plant, harvest and process the harvest and market whereas in Simiyu all the work related to cultivation is shared equally between the men and women. In Sondu-Miriu wetland, there are informal rules governing boundaries with neighbours, each person must keep within his boundary, there are also reserves left for footpaths and no one is allowed to cultivate in those areas. There are clear punishments, such as not being allowed to farm for up to 5 months, to be imposed on those who do not adhere to the rules. This kind of punishment is still acceptable in the community.

These institutions promote production of food both for domestic and for sale especially for the residents of these wetlands and therefore have a direct effect on community livelihood. However, it was established that in Sondu-Miriu wetland, residents owned more than one piece of land within and outside the wetland, where as in Simiyu wetland there was an opportunity of a resident getting additional land to increase his crop farming. This aspect of being able to increase land for cropping has led to the wetland getting encroached and wetland vegetation geting cleared. This has posed a great threat to the sustainability of the wetland resources. Thus crop farming institutions were therefore found to promote community livelihoods but not resource conservation

Livestock farming institutional aspects

Livestock was kept virtually by all the communities found in the wetlands (Kibwage et al., 2008). They keep cattle for meat, milk, skins, ploughing, and as social security, and as safety nets or "banks" during floods or drought, source of income for school fees, and for customary activities like marriages and specific activities during funerals such as terro buru (This is cleansing of a home of a diseased man and sending a way his spirits in peace as commonly practiced among the Luo Community). Donkeys are mainly used for local transport of wetland products among others. Poultry is kept for own consumption and for income generation. There is no control in the number of livestock one can keep.

All livestock owners have free access to grazing areas in the three wetlands except in Katonga wetland, where grazing was free in government controlled parts but not in the areas controlled by individuals. Permission has to be sought from the controller before one can graze his livestock. According to key informants (livestock owners), a charge of Ug Shs. 20,000 (USD 11) is levied by village elders on any person found grazing in another person's plot of land without permission. Non-residents are completely not allowed to graze in the wetland. In Kenya, a land owned by individuals does not include grass found in it. Thus everybody has free access to the grass, however, during wet seasons, livestock have to be accompanied by men or women or they are tethered to restrict their movement because they can damage crops. During dry seasons, livestock are left to move freely without being watched. In Tanzania livestock are always accompa-

[1] According to the Constitution of Uganda 1995

nied by either family young men or hired boys during all seasons. Poultry also move freely as other livestock with no restrictions. Since the movement of all livestock is not restricted, the spread of diseases is very common. In case of any conflict on livestock farming, such a case is handled differently in each wetland. For instance, in Kenya, the case is first reported to the village elders also known as 'mulango' or 'mijikumi'. The village elders assess the extent of the damage and compensation is agreed upon by both parties. The payment can be in terms of seeds or other inputs the complainant may have invested. In most cases, the disciplinary measures are relaxed and a bit lenient because of the existing strong family ties because they believe that "today it is me, tomorrow, it could be you". In Tanzania, the two residents have the first opportunity to reach an agreement, if they cannot, then the case is presented to the Village government for arbitration. Rarely have cases gone beyond this village level, although the next level would be a court of law. There are taxes levied on cattle especially during trade of such animals, this was the case in Tanzania and Kenya.

Due to lack of control on the number of animals one should keep and uncontrolled grazing, over-grazing is a common phenomenon within and around especially Simiyu wetland leading to resource over-use. In fact, Simiyu wetland is over-exploited to the extent that certain periods of the year livestock is zero grazed on non wetland grass. On the whole, the residents regard livestock keeping institutions to strengthen their family ties and brotherly relations. This is yet another case where institutions are directly promoting community livelihoods while having a negative effect on the wetland resource.

Institutional aspects in extracting wetland resources for housing and other construction activities

Wetlands provide resources which are very useful raw materials for housing for example, roofing materials, clay for making bricks and or walls for thatched houses and reeds for making windows and even doors (Kibwage et al., 2008). In the three wetlands, the resources extracted for housing and other construction activities are papyrus, clay, grass, ropes, poles and sand. Papyrus, poles and grass are extracted for animal sheds, fencing, and housing respectively.

Collection of grass, ropes and poles is done by women and children while extraction of sand and clay is done by men in Uganda, while this is not clearly defined in Tanzania. Extraction to these materials differed from wetland to another. For instance, extraction is free except for clay and sand and poles where permission is first sought from the owners of land in case the land is individually owned. Extraction of sand however is not allowed in Simiyu wetland. Moreover in Simiyu wetland no one is allowed to extract any material from the gazetted area of the wetland without permission from the District Natural Resources Officer. This requirement was however not known by the residents. It was also established that before extraction of any wetland resource in Simiyu, one had to plant a tree. In Katonga wetland, extraction was free only to the extent that it does not threaten the resource base.

This open access system especially in Sondu-Miriu and Katonga wetlands possesses great threat to the wetland resources. In fact in Sondu-Miriu, open access to the wetland resources has led to reduction of most construction materials that were plenty in the last decade. The papyrus in particular that were plenty during the 2003/2004 field surveys have almost disappeared within a period of one year. There was a drought that exposed most of the wetland for agricultural cultivation. Rapid human population increase has also accelerated speedy resource decline. The clearance of papyrus and other wetland plants especially by men, has led to extinction of wildlife (sitatunga a former resident of Sondu-Miriu wetland), destruction of fish breeding grounds. In Simiyu and Sondu-Miriu wetlands, housing and other construction materials are disappearing.

Except for Sondu-Miriu wetland, the institutions in place in Katonga and Simiyu showed a positive effect on sustainability of wetland resources although the situation is different in Simiyu wetland.

Institutional aspects in wetland fishing activities

Fishing is one of the most regulated activities in areas adjacent to Lake Victoria including the three wetlands. Riverine fisheries have however not been closely monitored by the fisheries authorities although they have been used to fish for indigenous fish species and for baits. The State regulations governing fishing include restrictions on types of gears, mesh size controls, fishing seasons and closed areas. In fact river mouths are closed for any type of fishing throughout the year in the three countries. The main reason for this closure is because these rivers are breeding grounds for a number of fish species especially during rainy seasons.

At the local level, there are committees which were initially established by the local fishers as beach committees in Sondu-Miriu and Simiyu areas. Fishing committees were set up in order to resolve conflicts, receive visitors to the beaches/villages, maintain law and order in the villages among others. The fishermen involved in these committees indicated that it was the fishermen themselves who decided to protect the fishery resources and that the government only came in later to help them carry out enforcement of regulations on illegal and harmful fishing methods. These committees have now been formed across the entire beaches of the lake and have been renamed Beach Management Units (BMU). At the time of fieldwork in Katonga wetland, the fishermen largely agreed that regulations on correct fishing methods were being enforced by these BMUs, but that it took two

years of tough enforcement for the fishermen to adopt the legal methods.

Other informal regulations include paying of Uganda Shillings 2000/= (equivalent to US Dollar 1.05) per annum to the BMU treasurer and taxes on fish caught. Paying for licenses according to the rates set by each country. There is an informal rule that fishing is carried out at dawn between 5 am up to 8 am in the three wetlands. In Sondu-Miriu wetland some traditional fishing methods, for example, the use of baskets and traps are still allowed. Use of poison or herbs is strongly prohibited by both the local people and the government in the three wetlands. When an individual violates some of the fishing rules and regulations, punishment is administered by either the BMU or the Fisheries Department. Fishing is mainly a men's activity, while women engage themselves in related processing, cooking and trading activities in the three wetlands. In Simiyu wetland, according to the residents, there are no terms required for non-residents to fish, they don't even have to pay in order to fish. The responses on terms required indicate that respondents are not aware some of the fisheries regulations especially on areas allowed for fishing and licensing. It is however clear to the respondents flouting fisheries regulations could lead one to be imprisoned, fined or gears confiscated and burned. Fishing was mainly undertaken between 5 am and 8 am in the morning in the three wetlands. All fishers fishing that always obeyed this regulation.

These institutions on fisheries activities have a direct positive effect on both the sustainable wetland fisheries as well as community livelihoods.

Wetland cultural activities and existing institutional aspects

Cultural activities are founded on community's cultural values which are an important factor in sustaining wetland resources for community livelihoods. Human beings are known to be social beings whose behaviour is embedded within a set of socio-cultural values, norms and knowledge defined by the community in which they belong and where they attain their identities, belief and actions (Kurien, 2001; Hanna and Jentoft, 1996; Granovetter, 1992; Polany, 1957; Coser and Rosenberg 1957). These values define their power structures and are what they bring to and guide their actions as they relate to natural resources such as wetland resources (Hanna and Jentoft, 1996). Understanding of these values is important in sustaining the resources.

In the three wetlands, religion as a cultural activity tends to take a priority among the residents. In Katonga wetland, a religious group believes that by praying in a cultural site within the wetland, the people seek blessings or protection, for or from fish catch, death, sickness, richness, bad wishes to neighbours, and good weather conditions. In Sondu-Miriu wetland, at least every home carries out some minimal cultural activities. The wetland ecosystem formed sacred places where sacrifices were performed before 1980s to avert looming disasters such as drought, damaging floods, wild wave currents in the lake, river drowning of fishermen or local people while crossing the river, etc. The sacrifices however, have since ceased and only prayers are conducted either by the riverside or in the local churches. River water still remains important for baptism especially in denominations, which immerse faithful members in water such as the Seventh Day Adventist (SDA) church and the many African Independent Religious Movements (Roho sects). However, most of the respondents recognized that traditional cultural religious institutions are dying out due to the spread of modern religious beliefs. Other cultural activities include; recreational swimming (men, women and youths/ children) and fishing (men and young boys) in Sondu-Miriu wetland. Bathing which is undertaken in selected places in the Simiyu wetland. For the people to carry out the cultural activities within the wetland site, they do not need permission from any authority. And since there are no cultural resource-use restrictions, most sacred sites have disappeared.

Institutions related to cultural activities have a positive impact on the sustainable wetland resources given the fact that a number of these institutions did not involve extraction of the resources but only use where it is. The keeping of sacred places has a very positive effect to the resources found in the sacred place.

Fuel wood collection institutional aspects

One of the biggest threats to sustainability of wetland resources is fuel wood collection (Kibwage et al., 2008). The use of wood as fuel among the households from the three wetlands is not the same. In Katonga wetland approximately 57% of the households obtain fuel wood from the wetland. In Sondu-Miriu is it 100%, while in Simiyu only 27% actually obtain fuel wood from the wetland. In Katonga wetland there are no rules governing collection of fuel wood. In Sondu-Miriu collection of fuel wood is allowed only in ones' own piece of land although it is possible to collect fuel wood from another resident by permission. Other areas where fuel wood are found are nearby bushes and local markets for Katonga and Sondu-Miriu wetlands. In Simiyu wetland fuel wood can be collected from nearby bushes but energy source is also found from rice husks. Fuel wood collection is mainly the work of women and children in the three wetlands. Splitting of firewood is done by young males, adult males and females. Papyrus' roots remain as the only fuel wood product remaining in Sondu-Miriu wetland after destruction of all other sources. In Simiyu wetland, non-residents are not allowed to extract fuel wood from the wetland. The non-extraction of fuel wood from the Simiyu wetland is out of the fact that the wetland is already over exploited, most of the fuel woods are not there anymore because they have been cut down. In fact most of the

respondents have resorted to planting their own trees which provides fuel wood. Institutions on fuel wood collection have negative effect in sustaining the resources especially in Simiyu and Sondu-Miriu.

Wetland craft industry and pottery institutional aspects

Craft making provides employment and incomes to a number of residents in the wetlands. For instance in Katonga, 63% of the women were involved in handcrafts. In the Katonga and Sondu-Miriu wetlands none were involved in pottery. In Sondu-Miriu and Simiyu, the most common craft items made using the wetland resources are mats which are made from papyrus by both men and women. While in Katonga wetland materials extracted were mainly for making decoration mats, baskets, trays, floor and ceiling mats. About 80% of the women involved in handcrafts were associated with women groups especially the Ninde women group in Katonga wetland. Non residents were not allowed in to extract materials from the three wetlands. In Katonga wetland there are no taxes or levies for collection of crafts making materials, where as in Simiyu wetlands, there are levies on mats made from wetland resources. In Katonga, the women group set up a disciplinary measure for their members to terminate her membership from the women group if the member does not follow any of the rules set by the group. The terminated member would not be allowed to use their name while selling products and attend the annual get together party.

Whereas extraction of wetland resources for making crafts have a positive effect on the community livelihoods, the existing institutions are however inadequate to control the extraction as well as check for the sustainable extraction of the resources.

Wetland water use institutional aspects

There are no regulations in the three wetlands on the use of water except in Katonga where there is a by-law that livestock should not be allowed on the water points meant for extraction of water for domestic use. The bye-law is so serious that a failure to implement it, would lead to the animals being confiscated and taken to the community leader's home. The owner would pay a fee to get the animals back. Two young men who lived near the water points were assigned the work of enforcing this bye-law. Water was however used for domestic purposes in particular by all the residents of the three wetlands and for rice cultivation and small irrigation for vegetable growing in Simiyu and Katonga and Sondu-Miriu wetlands respectively. Collection of water for domestic use was mainly by the women and children and access to it was free to all for both the residents and non residents in the three wetlands. The major effect of a non regulated water access was making the water dirty after collection and possible contraction of water borne diseases. Local residents also feared attacks by snakes and other dangerous animals such as Hippos from the lake.

If the bye-law in Katonga wetland would be used as an example of effective local institution, then local institutions would have a positive effect on the sustainability of wetland resources and community livelihoods.

Institutional aspects in wetland hunting, gathering (fruits and wild vegetables) and extraction of medicinal herbs

Most of people in the three countries have a belief that there are certain diseases which cannot be treated by the conventional hospital drugs and that such diseases are only treated by herbs. Diseases of this nature are mainly those of stomach upsets. A few residents of these wetlands admitted that they are involved in extraction of medicinal herbs from wetlands. Gathering of wild vegetables is undertaken by all households in the three wetlands. Both gathering and extraction of medicinal herbs are completely free access to everyone whether a resident or non-resident. However non-residents have to be known by some residents as a preventive measure in case they are asked for identification by authorities.

In Sondu-Miriu wetland, women gather indigenous wild greens such as Dek, Osuga, Awayo, Atipa, Ododo to supplement household food and income needs. If the vegetables are gathered from riverbanks or open spaces, it is free and no permission is required for gathering by both residents and non-residents. Collection from private farms requires some permission from the landowner. There is generally lack of market for wild vegetables in the wet seasons. Collection of wild edible fruits has disappeared due to the open-access system. There is also free access to natural medicinal resources within the wetland. Extraction of herbs, preparation, processing and their administration to the sick, are all done by either adult males or adult females. Sometimes, payments are done for the medicinal herbs in terms of tokens to whoever is offering the services. The herbs are scarce in the wetland due to destruction of the vegetation in the wetland especially through clearing and burning of land in order to expand the area for cultivation and human settlement. There exists no authority or institution to protect or control utilization of such important wetland resources. Disputes related to extraction of wild vegetables and medicinal herbs are handled at the Village Elders Committee level. The free access system is res-ponsible for the fast disappearance of important herbs, hence dependence on modern local medical facilities. Most people are also moving from the wetland to the upper hills in search of medicinal herbs. Christianity also encourages the local people to utilize the existing hospital facilities rather than depend on traditional herbs. Hunting is absent in the three wetlands. The gathering of medici-nal herbs is a free for all exercise. This institution has a negative effect

Table 2. Summary of effects of local institutions on sustainability of wetland resources and community livelihood.

S/N	Institutional aspects	Effect on sustainability of wetland resources (SWR) and community livelihoods (CL)		
		Kenya	Tanzania	Uganda
1	Land Tenure system	Negative to both	Negative to both	Positive to both
2	Crop farming	Positive to CL	Positive to CL	Positive to CL
3	Livestock farming	Positive to CL	Positive to CL	Positive to CL
4	Extraction of wetland resources	Negative to SWR	Positive to SWR	Positive to SWR
5	Fishing activities	Positive to both	Positive to both	Positive to both
6	Cultural activities	Positive to both	Positive to both	Positive to both
7	Fuel wood collection	Negative to SWR	Negative to SWR	Negative to SWR
8	Craft industry and pottery	Negative to SWR	Negative to SWR	Negative to SWR
9	Water use	Negative to SWR	Negative to SWR	Positive to SWR

on the sustainability of plants that provide these herbs.

Lessons learned and Conclusions

From the above assessment, local institutions show varying effects on sustainability of wetland resources and community livelihoods. The summary in Table 2 show two areas where institutions had positive effect to sustainability of wetland resources and community livelyhoods. Two other areas had a positive effect to community livelihoods and not resource sustainability and four areas had a negative effect to sustainability.

Overall, negative effects override positive effects. Does this imply that local institutions have negative effect to sustainability of wetland resources and community livelyhoods? We do not answer this question here, because it was not our focus, but live it for an empirical research. However, we draw some lessons from this overall effect.

a). Human relations with their environment, especially a multi resource ecosystem like wetlands, are grounded on 'tenure system' and 'access' to resources. From the ten institutions, there were several instances where permission is required before access to and or use of a resource. This seeking of permission (which has a connotation of restriction) has to do with access and ownership (tenure). Restriction to use a resource has two different effects, one, it has the effect of users designing informal institutions to exploit the resource. This takes place in a situation where restriction threaten resource users livelihood. On the other hand, restriction can generate a positive effect because 'no use' or 'use to certain level', which accompanies the restriction would allows exploitation at a rate that enable replenishment. May be this is why institutions in the Katonga wetlands (State owned) had more positive effects than the Sondu-Miriu and Simiyu wetlands. In this case (Katonga), state land guaranteed access and interestingly ownership of resources that residents were access to.

b). Institutions constitute community members' relation/behavior to their environment. From the time wetland residents' wake up to the time they go back to bed, their lives are a demonstration of institutions. Relation to the wetland guide social gatherings, economic activities and religious life. In other words, the behavior of a wetland resident is the sum of institutions of each activity they do in relation to the environment/wetland. This is the why institutions are very important to community livelihoods and sustainability of wetland resources.

c). Institutions within wetlands should address the diversity in such ecosystems for their sustainability. Wetlands ecosystem is very diverse, we have presented about ten in this paper, and people live within such an ecosystem. The diversity presents a complexity that managers should be aware of when designing sustainable management regimes. Such management regimes would guarantee sustainability when institutions so designed take cognizance of the diversity.

d). Institutions in wetlands within a bigger ecosystem like the Lake Victoria Basin require harmonization. Activities that take place outside the Lake Victoria eventually have an impact on the lake itself. Any negative impact on the lake's resources will subsequently affect activities in its basin, in this case its wetlands among others. In situations where the lake is a shared resource, like Lake Victoria, and one country has high negative impacts than the other it is to the interest of both to harmonize its institutions to avoid spread of the negative impacts across board.

Sustainable wetland management regimes, requires institutions that address tenure system because use of wetland resources are grounded on it. In brief, the change in land use and existing management systems of wetland areas, such as those in the Lake Victoria Basin, requires further empirical research to determine environmental and economic sustainability of the various management regimes that exist. Wetland resources under conditions of open access will remain under threat of overuse and

even extinction if property rights are not addressed. Therefore, management regimes for wetlands shared by various states, institutions and communities require harmonization to achieve sustainability in the Basin.

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