

EFFECTS OF URBANIZATION ON WETLAND MANAGEMENT IN MBARARA MUNICIPALITY, SOUTH WESTERN UGANDA

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ABSTRACT : This study is carried out to establish the effects of rapid urbanization on the Management of wetlands and their associated resources with specific reference to Mbarara Municipality, south-western Uganda. A sample of 100 participants from three divisions of Nyamitanga, Kakoba and Kamukuzi were used in this study. A descriptive research design was used and data was collected using interview schedules, interview guide and observation checklist. This was further reinforced by the documentary analysis. The study showed benefits and a majority of the participants are knowledgeable about direct wetland benefits but less knowledgeable about the indirect values and functions of wetlands. The study revealed that urbanization has significantly contributed to the over exploitation of wetland and their resources, destabilization of the eco-systems and increase in flood frequency. All these have been due to the desire for industrialization, setting up institutions such as schools, hospitals and other projects so as to provide social services, and construction of residential houses for human settlement. It was further established that there is lack of co-ordination of environmental management issues and a lot of laxity in the enforcement of environmental laws. The study further revealed that wetland drainage is ongoing while wetland restoration is very slow. The study showed cultivation in the wetlands as the main activity that is not consonant with wetland conservation and management. The study further revealed that sustainable activities like fishing is less popular than the destructive activities. Furthermore, it established that the user's community's positive attitudes towards wetlands were high but this was being undermined by local politics in the area. Regarding the poor as agents of degradation, the study established that both the rich and the poor were responsible for wetland degradation. The study established a strong link between politics and wetland mismanagement and the policy in place does not address the concerns of wetlands adequately. This is because the policy recommendations are focused on wetlands as such and fails to address related external factors that cause wetland degradation and keep them so, like capitalism where economic gains and commercialism are highly advanced for development without due consideration of wetland conservation and management. Based on the findings of the study, it was concluded that urbanization has greatly contributed to the destruction of wetlands and the present land use patterns has failed to maintain the ecological character and biological diversity.

Keywords – Environmental conservation, environmental degradation, urbanization, wetland management, Mbarara-South Western Uganda

I. INTRODUCTION

According to Byamugisha (1994) urbanization refers to the process whereby an increasing proportion of the total population becomes concentrated in towns. It is a process of town growth in an area. This is determined by population size, population density and function, legal, administrative, social and economic considerations. African towns are for the most part nascent, only a few being a century old and small by world standards. By 1990, Africa had only 22 out of 276 towns in the whole world with a population of one million and above. However, African towns are growing faster than the towns in the other major world regions with the large cities often doubling their size every fifteen years (Nyakaara, 1996). Towns in the world in general are growing at an average rate of 3% per annum. While towns in the developed countries experience an annual growth rate of less than 1% 1962 and 1969, Rate of 7.4% (Department of physical planning, 1992). Many urban centers in Uganda developed rapidly after independence in 1962 and urban populations have been growing

steadily. For example, the 1959, 1969 and 1980 population census results indicated an increase in the urban population as shown in the table below.

TABLE 1: UGANDA'S URBAN POPULATION BETWEEN 1959-1980

YEAR	TOTAL POPULATION	%URBAN
1959	6,536,531	4.8%
1969	9,535,051	7.8%
1980	12,636,179	8.7%

Source: Department of lands and surveys (1971:25).

In 1959, Uganda had 35 urban areas with a total population of 276,211 persons. Ten years later, the urban areas had increased to 58 with a total population of 634,592 persons. By 1980, there were 96 urban areas with a population of 938,287, which increased to 150 in 1991 with a population of 1888,622 persons (MOFEP, 1995:46) such rapid urban growth experienced among many African countries in general and Uganda in particular was due to natural population growth, search for employment outside agriculture, limited agricultural land and desire for trade (Kamuggah and Kabagu, 1992). Stren (1994) argues that urbanization in Uganda started in the early twentieth century with the established of economic and administrative centers all over the country and increased tremendously in the 1950's. These economic centers created "pressure zones", a phenomenon punctuated by heavy demographic shifts from rural to urban areas.

Mbarara town which is the centre and headquarters of Mbarara district derives its name from a local dominant grass known as "Emburara". This grass is common in Kashari country where the town lies (see map 1). Such local names were distorted by colonial administrators who could not easily pronounce them. The town is located in Mbarara District in south western Uganda, about 256km from Kampala the capital city of Uganda (see map 2). Mbarara town is situated on five hills of Kakiika, Ruharo, Kamukuzi, Nyamitanga, and Bihunga. These hills vary both in size and altitude and are separated by long valleys and flat plains. The growth and development of Mbarara town started in the pre-colonial era when king Ntare V. Rusingiiza of Ankole Kingdom established his capital at Muti. Muti then covered the present centre of the town, and it is said that the King's reception hall stood where the present post office stands in the central business district. The King later moved his capital across the Rwizi River to Katetete around 1893 due to the disastrous small pox epidemic that hit the area (Muhanguzi, 1991). Katete is now a suburb in Nyamitanga Division. King Ntare was later succeeded by King Kahaya II. This king was influenced by colonial administrators who arrived in 1898 to change the capital of the kingdom from Katete to Kamukuzi. The colonial administrators were led by D.J.D. Macclister who arrived in that same year.

Because Mbarara was the Headquarters of the Kingdom, it attracted chiefs who were allowed to stay near the king. The colonial administrators reside in the adjacent area (Boma) and brought in to the kingdom soldiers and Nubian troops to guard them. Thereafter, bureaucrats, Missionaries and commercial traders began to arrive including Arabs Indians. This promoted commercial activities and shops sprung up in the Muti areas. The expansion of this trade made Mbarara town to grow in to a large urban centre, which in 1956 – 57 under the British civil administration at Kamukuzi was recognized as a township. In 1974, Mbarara town attained the status of a Municipality - the administrative parishes of Kamukuzi and Kakoba having been made Division (see map 4). The period coincided with the establishment of provinces in the country and as result, Mbarara become the provisional headquarters of the southern province. Wetlands in Uganda cover almost 30,000 square Kilometers, or some 13% of the total area of the country. They include areas of seasonally flooded grassland, swamp forest, permanently flooded papyrus, grass swamp, lake edge, bamboos and artificial wetlands. They also include areas with impeded drainage (The wetlands sector strategic plan 2001, 2010, 2001). Wetlands have intrinsic attributes, perform functions and services, and produce goods. Some of these are of primary local interest, but others have a regional, national, or international importance. Together they represent considerable ecological, social and economic value.

Ecological attributes and functions are those that wetlands perform without immediate human intervention like maintenance of the water table; flood control; habitat for animals and plants. Many people are unaware of the existence, let alone the importance of these attributes and functions. The socio-economic goods and services of wetlands involve:- immediate human interaction with the wetlands. Human activities based on natural wetland resources generate a wide range of products that are consumed locally or traded over hundreds of kilometers. Many people living in communities neighboring wetlands are a significant extent dependent on their well being on wetlands products.

Table 2: values of Wetlands

Direct values	Indirect values	Option values	Non-use values
Production and consumption goods and services such as: • Fish	Ecosystem functions and services such as: • Water quality	Premium placed on possible future uses and applications such as;	Intrinsic significance in terms of; • Cultural

<ul style="list-style-type: none"> • Fuel wood • Building poles • Thatch • Sand, gravel, clay • Water • Wild foods • Medicines • Agricultural/cultivation • Pasture/grazing • Recreation • Transport 	<ul style="list-style-type: none"> • Water flow • Water storage • Water purification • Water recharge • Flood protection • Nutrient retention • Micro climate regulation • Shore stabilization • Biodiversity and habitat provision. 	<ul style="list-style-type: none"> • Pharmaceutical • Agricultural • Industrial • Leisure • Water use • Gene pool 	<ul style="list-style-type: none"> value • Heritage value • Bequest value
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Source: *The Wetland sector strategic plan 2011 – 2010, popular version, Kampala 2001.*

The rate of growth in cities in LDC's is high and threatens the existence of wetlands. As the population and the peoples expectation increase the pressure on wetlands and their resources has also increased. Due to poverty, meeting short term, immediate, and personal needs like food, water, shelter, school fees and others, have taken priority over protecting the attributes that provide longer term, indirect and storage and recharge, micro climate regulation, biodiversity conservation and others. According to Todaro (1989), at least sixty percent of the population increase in these cities is a result of natural increase while forty percent results from rural urban migration. The growth of these cities often present the starkest and most dramatic picture of environmental damage as a result of the scramble for natural resources by the ever increasing number of people in them. Mbarara Municipality as a study area is a fast growing urban center of modern times endowed with wetlands stretching across three divisions of the Municipality:- Kakoba, Nyamitanga and Kamukuzi. The expansion of the town by construction of residential houses, opening up new factories, schools and other developments have totally affected wetlands yet wetlands are supposed to be preserved and conserved and sustainably used. Wetlands in Mbarara are mainly swamps and swampy forests which are seriously under threat due to town expansion and development.

The expansion of the town is basically due to rural-urban migration and being a hinterland to major towns of Uganda especially, Kabale, Kasese, Ntungamo, Fortportal and Bushenyi. This has called in municipality of ethnic groups with diverse cultures and practices. According to 1991, population and housing census report, Mbarara Municipality was esteemed to be 50000, but of recent it predicted to be even more than 80000 people. This explains why there is pressure on wetland areas especially to people looking for cheap plots of land, and materials for construction in form of bricks and sand. It is on the above basis that this particular study was conceived with primary objective of investigating how rapid urbanization is likely to affect the management of wetlands in Uganda with particular reference to Mbarara Municipality, South Western Uganda. Mbarara Municipality has a lot of wetlands in form of papyrus swamps, swamp forests, flood plains and artificial wetlands. Most of these wetlands follow the topography of the area and the drainage system of the area and the natural influencing factor of these wetlands is River Rwizi which has created multiple features like an oxbow lake near Mbarara Hospital and various flooded areas creating swamps and swamp forests. It is important to state that despite government's effort to preserve wetlands, in Mbarara Municipality, urbanization process has continued to reclaim these places for socio-economic gains. This implies that in the near future wetlands may be depleted once and for all with negative consequences like over flooding of the town. The research investigated all these anomalies and came out with suggestions to overcome the problem.

II. STATEMENT OF THE PROBLEM

During the 1980s, a new policy was initiated and adopted in the 1990s. This was the National Policy for the Conservation and Management of Wetland Resources, (1995). The policy acknowledges the vital intrinsic natural functions of wetlands and their values. The policy seeks to restore, conserve and sustainably manage the wetlands for the benefit of all. Despite the formulation of this policy, the degradation of the wetlands seem to have continued unabated in form of brick making, construction, crop growing, and alike. Therefore this study intended to fill this apparent gap and the point of departure in this study was to examine the effect of urbanization on wetland management in Mbarara municipality.

General objective

The general objective of the study is to investigate the effects of urbanization on the management of wetlands and their associated resources in Mbarara municipality.

III. LITERATURE REVIEW**Global environmental concern**

In the wake of 1992 United Nations Conference on Environment and Development (UNCED), the natural environment and the environment movement are topics of increasing significance. International, national and, local environmental issues and disasters have led to increasing public concern. People are beginning to realize the negative consequences related to environmental degradation. These issues had previously been taken for granted (Muhumuza 1997). To date environmental problems have become key issues. Many scholars have identified global environmental problems that include pollutions in the air, food and water, which can damage human health. Others include shortages of human resources essential to human health, physical hazards like floods and land slides and damages to natural resources or species and ecosystems (Stuart et al, 1990). The world is in the midst of a massive urban transition unlike that of any other time in history. Within the next decade, more than half of the world's population, an esteemed 3.3 billion will be living in urban areas. This has a vast implication for both human well-being and for the environment. As recently as 1975, just over one third of the world's population lived in urban areas. By 2025, the population will have been almost two-thirds (United Nations, Urbanization prospects report 1995:p132-139).

The most rapid change is occurring in the developing world where urban populations are growing at 3.5 percent per year as opposed to less than one percent in the developed region: cities are also reaching unprecedented sizes. For instance Tokyo, 27 million people, Sao. Paulo, Brazil, 16.4 million, Bombay, India 15 million, and so on placing enormous strains on the institutional and natural resources that support them (John-Darnton, 1994). Global causes of environmental problems have been found to arise from population growth, economic activity and poverty (Margulis, et al 1995). Population pressure in rural areas forces people into exploiting more fragile natural ecosystems. Hardoy and Satter, (1994), argue that population pressure in urban areas results into inadequate urban waste management, air and water pollution shortage of clean water, land degradation and congestion. According to Margulis (1995), all human activity depends directly or indirectly on the use of natural resources. The expansion of economic activity coupled with population growth threatens the world's stock of renewable resources.

Current population trends are cause for both optimism and concern. Some developed countries are moving rapidly towards population stability but other countries are experiencing rapid population growth; usually accompanied by high levels of poverty, limited progress for women and high levels of internal and international migration. Over all the world is increasing by more than 86 million people per year. Such rapid growth places enormous pressure on natural resources, urban infrastructure and services, governments at all levels especially in the poorest countries where growth is most rapid. (Munasinghe 1993). Global population will continue to grow for many decades to come, reflecting the democratic inertia of countries which a large fraction of the population has not yet reached child bearing age. In the United Nations medium projection report, world population reaches about 10 billion by the middle of the next century before gradually leveling off. Much of that growth occurs in the next decades and is concentrated in a few regions such as Africa and Asia. In these projections, fertility is assumed to decline from current levels in developing regions of the world.

It is also important to note that cities embody the diversity and energy of human pursuits. They are in many ways remarkable engines of economic and social progress, cities offer employment opportunities, entertainment and other amenities, and potential efficiency not found elsewhere as well as advantages in the delivery of education, health, and other social services. On average urban dwellers have higher incomes and live a health, easier lives than rural counter parts, although these advantages are often shared by all urban inhabitants. However cities also play a central role of in degrading the physical environment and in shaping the social environments in which most of the world's people will soon live. Dysfunctional urban environments have high costs making more difficult the economic growth needed to improve the living standards and helping to perpetuate inequities. The developed world is already largely urbanized. In the developing world the rapid urbanization now under way will increasingly concentrate both population and economic growth in cities intensifying the problem of urban environment.

Wetland serves as spawning grounds for many aquatic species as well as habitat for water fowl and other wildlife. In addition they filter out many water borne pollutants and provide extensive flood protection. Other activities like hunting and fishing, shifting cultivation including the growing, grazing, brick making and harvesting raw materials for building houses have been taking place since the time of immemorial. According to Tadaro (1989), cities like Accra, Lagos, Nairobi, Kampala and others are growing rapidly at a rate of seven percentage per annum. Indeed the disappearance of the wetlands from the scene in these cities poses a serious problem, not only to the future urban generation but also to the entire peri-urban communities who either

directly or indirectly and consciously or unconsciously use them for deriving their livelihood. Urban environment conditions are to the health and quality of life of a city's inhabitants and pose significant costs on economic and social development. The impact of urban areas on the surrounding environment is also an issue of growing concern. It is further predicted that more than half of humankind will live in urban areas by the end of the century and 60 percent by 2020.

In most nations, cities generate a majority of the economic activity, ultimately consume most of the natural resources and produce most of the pollution and waste. Thus, urban environmental issues although often overlooked, are important both locally, and on national and global scales. Neglect of the issues could compromise large economic, social and environmental goals in both developed and developing countries. A case in point is East Calcutta, India where 4000 hectares of lagoons and swamps that had been used to raise fish were filled with soil to provide sites for 100,000 middle class families resulting in an estimated annual loss of 25000 metric tons of fish and contributing to local flooding problems (World Resource Institute, 1996:62). According to Todaro (1989), population is increasing in cities at a faster rate as a result of natural increase (60) and 40 percent out of rural –urban migration. Multby (1986), like Taodaro, predicts that, all these have resultant pressure on available natural resources in general and wetlands in particular. They contend that this will affect the cities where demand for accommodation will not only lead to increased wetlands reclamation but also extraction of construction materials such as sand, brick, poles, papyrus and elephant grass which are exclusively got from wetlands. Multby (1986), further asserts that, wetlands have supported the lives of millions of people throughout the world for a long period of time. They cover 6 percent of the world's total surface, occur on every continent and exhibit enormous biological diversity, which is essential for aspirations of the present and future generation. The East African region is also blessed with numerous wetlands, which have played a significant socio-economic, socio-cultural and ecological roles for the adjacent local communities and the general public (Were and Soper, 1986).

The post-colonial period and wetlands

As already mentioned, there was no change in policy and laws in regard to wetlands from 1962 to 1985. The Acts previously cited were actually ordinances only baptized Acts after independence. During this period land could be held under customary, Mail/free hold or leasehold. It was only in the later that the Land Commission granted a lease to the owner with conditions regarding development and control of land use supervised. The former two where the wetlands fall were just left on the mercy of developers. During the military regime, the 1957 Land Reform Decree was passed. It converted to all land to public land administered to leasehold. This was a tremendous change as wetlands are on public land whose utilization necessitates authority from the Land Commission. Unfortunately, however, Tukahirwa (1992) notes, the decree was not implemented. This was possibly due to a number of practical problems, like lack of funds, political instability, and change of governments.

The Period 1986 saw a change of government in Uganda. The N.R.M took over power and the outlook to the environmental matters has since changed. The regime started by initiating constitutional reform. It started by soliciting from the public and other stakeholders views that culminated in the formulation and adoption of the 1995 Uganda Constitution. Under this new constitution, chapter 15 deals with land and environment. Article 237 concerns lands ownership which can be customary, freehold, Mailo or leasehold. Article 238 concerns the formation and composition of Uganda Land Commission, Article 239 specified the functions of the Land Commission, 240, deals with land boarders, 241, deals with functions of district land boarders, 242 concerns land use, 243 land tribunals and 244 concerns mineral save for murrum, clay sand or any other commonly used for building or any other similar purpose. Article 245 specifically addresses itself to the protection and preservations of the environment. It calls upon the parliament by law to provide for measures intended to;

- a) Protect and preserve the environment from pollution and degradation.
- b) Manage the environment for sustainable development and;
- c) Promote environment awareness.

With the constitutional backing in place, the Uganda government in the same year put in place. The National Environment Statute 1995. Notable in the statute is the establishment of the National Environment Authority (NEMA) which is entrusted with the following instructions.

- a) To coordinate the implementation of Government Policy and decision of the policy committee.
- b) To ensure the integration of environmental concerns in the overall National planning through coordinating with the relevant ministries, department and agencies of governments.
- c) To liaise with the private sector intergovernmental agencies of states on issues relating to the environment.
- d) To propose environmental policies and strategies to the policy committee.
- e) To initiate legislative proposals, standards and guidelines on the environment in accordance with the statute.

- f) To review and approve environmental impact assessment and statement submitted in accordance with the statute or any other law.
- g) To promote public awareness through formal, non-formal and informal education about environmental issues.
- h) To undertake such studies and submit such reports and recommendations with respect to the environment as the government or policy committee may consider necessary.
- i) To ensure receive the observance of proper safe guards in the planning and execution of all development projects, including those already in existence that have or are likely to have significant impact on the environment determined in accordance with part (v) of this statute.
- j) To undertake research and disseminate information about the environment.
- k) To prepare and disseminate information about the environment,
- l) To mobilize, expedite and monitor resources for environmental management.
- m) To perform such other functions as the government may assign the authority or as incidental or conducive to the exercise by authority of any or all of the functions provided for under this statute.

Addressing specially to wetland concerns in the same year was establishment of The National Policy for the Conservation and Management of Wetland Resources. The aim of this policy is to promote the conservation of Uganda's wetlands in order to sustain their ecological and socio-economic functions. The policy is aimed at achieving the following;

Establish the principles for optimal use of wetland resources and practices that reduce wetland productivity, maintain biological diversity of wetland, maintain wetland values and functions, integrate wetland concerns in planning and decision making. The policy calls for no drainage to wetlands. Sustainable use to ensure wetland benefits are maintained in the foreseeable future, equitable access to wetland resources and optimum diversity of uses and users plus application of EIA procedures before developing any wetland. The policy sets strategies on drainage of wetlands, environmentally sound management, sustainable use of conservation of wetlands, water supply and effluent treatment, tenure and use, installation of degraded wetlands, environmental impact assessment and monitoring, public awareness, research and inventory, capacity building, international cooperation, wetland legislation and institutional arrangements. The policy defines the roles and responsibilities of district authorities in controlling activities within wetlands and outlines procedures to be followed.

To achieve the desired results from the policy, it was imperative to have a law in place to facilitate the policy enforcement. Accordingly, therefore, wetlands in Uganda are protected by law under clauses 37 and 38 of the national environment statute, 1995 Clause 37 contains restrictions on use of wetlands while as Cause 38 is concerned with the management of wetlands.

Clause 37 restrictions on use of wetlands, the statute states that "without written approval from NEMA it is an offence for any person to;

Section I:

1. Reclaim or drain any wetland,
2. Erect, construct, place alter, extend, remove or demolish any structure that there is fixed in, on, under, or over any wetland,
3. Disturb any wetland by drilling, tunneling in a manner that has or is likely to have an adverse effect on the wetland,
4. Deposit in, on, or under any wetland any substance in a manner that has or is likely to have an adverse effect on the wetland.
5. Destroy damage or disturb any wetland in a manner that has or is likely to have an adverse effect on any plant or animal or its habitant.
6. Introduce or plant any exotic or introduce plant or animal in a wetland.

Section II

The authority may in consultation with the lead agency and upon an application to carry on any activity referred to in sub-section I, make any investigation it considers necessary including an EIA referred to in section 20, to determine the effect of that activity on the wetland and environment in general.

Section III

The authority shall in consultation with the lead agency and by statutory order, specify the traditional uses of wetlands which shall be exempted from the application of subsection I

Clause 38 Management of Wetlands

- i. The Authority shall in consultation with the lead agency establish guidelines for the identification and sustainable use of wetlands in Uganda.
- ii. The Authority, with the assistance of the local environment committees, district environment committees and lead agency, identify wetlands of local, national, and international importance as ecosystems and habitat of species of fauna and flora and compile a national register of wetlands.

- iii. The Authority may in consultation with the lead agency and the district environmental committee declares any wetland to be a protect wetland thereby excluding or limiting human activities in the wetland.

The government has gone a step further and specified the ownership of wetlands in its land Act of 1998. Irrespective of any land ownership be it customary, mailo, leasehold or freehold wetlands belong to the people and are held in trust for the people by the government. This implies that if on anyone's land there happens to be a wetland the owner of such land has no right to do anything he pleases on it or stop any one else from accessing its natural resources. Due to drainage excavation of sand, clearance of wetlands for industrial development and institutions set up, brick making and so on, wetlands have as a result lost their natural functions of micro-climate stabilization, hydrological, floods control, biodiversity and habitat provision, water recharge, water storage, regulating water flow and quality. Some areas like Kyamugolani Valley area have experienced serious floods which threatens the lives of the people living in the area.

IV. METHODOLOGY

Introduction

This chapter presents the methodology used to carry out the study. The study was designed to establish the effects and implications of urbanization on wetlands management in Uganda with specific reference to Mbarara Municipality, southwestern Uganda. This chapter focuses on study area, study population, sample selection, sample size, data collection, research instruments, research procedure, data analysis, and limitations of the study.

Research design

A descriptive research design was adopted and mainly employed qualitative techniques for data collection and analysis. The descriptive research design was seen as the most desirable because research was based on observation, description and interpretation of physical conditions of the wetlands which are attributed to the expansion of the Municipality as they existed in the selected sites. This means statistical methods such as chi-square, Pearson product moment correlation, coefficient and spear man rank order correlation coefficient were not employed. Tables were used to summarize the responses from the respondents and the key informants to the proportions and percentages for better descriptions of the phenomena, which were observed during the field work.

Study area

This study was conducted in Mbarara Municipality, south western Uganda. Divisions of Nyamitanga, Kakoba and Kamukuzi which constitute the municipality were covered. Mbarara Municipality is a proximately 7000sq. meters (Approximately 4800.hectares), it extends from the centre, 5 kilometers NW up to Natural Agricultural Research Organization (NARO) centre, formerly Mbarara stock farm a long Fort portal-Bushenyi road, 4 kilometers up to Ruti trading centre along Kabale road, and to the south 5 kilometers up to Kaburangira hills beyond Kakoba National Teachers college.

This particular area was chosen because of the following reasons;

- i. Mbarara Municipality has many wetlands sites as a result of River Rwizi which passes through the area. As a result many flood plains, papyrus swamps, oxbow lake features (near Mbarara hospital) and swampy vegetation are witnessed.
- ii. Mbarara Municipality is also growing at a high rate, and of recent new factories, schools, residential houses and commercial buildings are being constructed. These have had a bearing effect on wetlands as the pressure for raw materials in form of bricks, sand, and area for expansion have intensified. This also provided a good ground for the study.
- iii. Mbarara Municipality with all its wetlands sites was more accessible to the researcher.

Study population

The study population was constituted by all the wetland sites in Mbarara Municipality such as Rwetondo, Kiswahili, Lugazi, Kisenyi, all in Kalwaba Division then Kyera, Rwizi, Karugangama, Kyajuma, Kateete, Nyakaizi, Ruti and Nsikyee in Nyamitanga Division, and Biafura, Kiyanja, Kakyeka, Kakiika, Mankenke, Ruhalo and Nkonkonjeru in Kamukuzi division, and the members of the adjacent communities whose activities directly or indirectly and consciously or unconsciously affect the ecosystem of the wetlands.

Sample selection

In the study, a purposive sampling technique was used at all stages. This techniques was adopted because this was a small study whose area, population and sample could easily be determined. Purposive sampling was further used because the researcher found it necessary to choose respondents who have direct knowledge on the wetlands hence the selection of key informants like District Environment officer, divisional town clerks and people living near wetland area. Otherwise other methods like random sampling would have been used to collect the data. Key informants were included in the study to assist in the discussion and interviews. Other respondents who directly depend on the wetland in form of sand excavators, brick makers and

others were sampled because they benefit directly from the wetlands and therefore are being affected by the policy and the status of the wetlands. This group was taken to be the target population.

According to the study, three divisions of the Municipality with their wetland sites were covered. These were divisions of Nyamitanga, Kakoba and Kamukuzi. Ninety respondents and ten key informants were purposively selected to take part in the study since the study would only achieve its objectives by involving subjects who have lived in the study area for the last two and half decades.

Sample size

The study involved 100 participants, Kakoba division 30 respondents, Kamukuzi division 30 respondents and Nyamitanga, 30 respondents. These three divisions were considered because almost all major wetland sites have been destroyed like Kyera swamp in Nyamitanga, Mankenke valley swamp, Kakyeka swamps in Kamukuzi and Kiswahili swamps in Kakoba key informants were obtained from each of environmentally related authorities like district environment officer, Municipal Environmental Officer, Assistant Town Clerk of all three divisions, and Local Council III Chairpersons of all the three divisions and two from Uganda investment Authority (UIA) – Mbarara branch. This is further illustrated by the following tables.

Table 3: The number of sample divisions, names of wetland sites and respondents

No	Name of Divisions	Nature of wetlands	No. of respondents
	Kakoba	Rwentondo Valley Swamps <ul style="list-style-type: none"> • Kiswahili Valley Swamps • Kisenyi • Lugazi 	30
	Kamukuzi	<ul style="list-style-type: none"> • Biafura swamps • Kiyanja Lake vegetation • Kakyeka swamps • Mankenke valley swamps • Ruharo valley swamps • Nkokonjeru 	30
	Nyamitanga	<ul style="list-style-type: none"> • Kyera swamps • Rwizi valley swamps • Kateete swamps • Nsikye valley swamps • Ruti swamps • Nyakaizi • Karugangama • Kyajuma 	30
Total	3	18	90

These were 90 respondents in number and their distribution by divisions are as shown on table 3 above.

Table 4: The distribution of the key informants

Selected environmentally related authorities/bodies	No. of key informants from each of the authority bodies
District environment officer	1
Office of the Town Clerk	3
LC III Officials	3
Municipal environment officer	1
U.I.A	2
Total	10

These were 10 respondents in number and their distributions by divisions are as shown on table 4 above.

Data collection

Data for this study was collected using observations and both formal and informal interviews. Documentation review was done to supplement the above named methods. The documents analyzed include;

- i. Environmental action plans
- ii. Environmental management polices
- iii. The wetlands sector strategic plan 2001 – 2010
- iv. Journals and text books
- v. Conference reports.
- vi. Workshop presentations reports of regional and international for a.
- vii. Mbarara three year development plan

viii. News papers.

Research instruments

Three research instruments namely; interview schedules, interview guide and observation checklists were used in this study. Documentary information was used to supplement the three named research instruments.

Interview schedules

These were used for structured interviews. They were administered to 90 respondents living in the areas adjacent to wetland sites and whose activities have direct bearing on wetlands management. Interview schedule was used in order to obtain a detailed information on the selected wetlands which could not be obtained by the use of a closed ended questionnaire. Even some respondents could not manage to read and write which rendered the use of a questionnaire inappropriate for this particular study.

Interview guide

This was administered to the ten (10) key informants selected in Mbarara District and Mbarara Municipality. These were selected as people who have special information or specific information as far as environment management is concerned.

Observation checklist

This was to help the researcher to directly observe the present state of the wetlands in relation to urbanization and its associated processes and compare the information got with the ones collected using the other methods and instruments named above.

Documentary analysis

This was used in order to establish whether what is already known from the previous research works, news papers, text books, seminar reports and others tallies with the information collected in this particular research. This facilitate the theoretical and conceptual analysis that guided the study, provided baseline information for the study and indicated the gaps that existed between the established theoretical explanations and the status quo of the town in relation to wetland use and management which justified the need for this study.

Data analysis

Editing was done at the end of each working day after gathering data from the field. The interview guides were analyzed for accuracy, consistency and completeness of information. Because the study yielded both quantitative and qualitative data, both manual and computer aid methods of data analysis were used. Qualitative data was analyzed manually. Quantitative data was edited, coded, and analyzed using the SPSS (Statistical Package for Social scientists) soft ware. This package helped in the generation of the frequencies and enabled cross tabulation to map the relationships between variables on which interpretations and generalized conclusions were based.

Limitations of the study

The accomplishment of the objectives of this study was not an easy task and the following were the limitations encountered in the course of completing the research. Finances for completing the study were limited to fully facilitate research assistants, cover transport costs and others. A lot of time was spent on interviews mainly because people to be interviewed wanted the interviewers at their convenience. This at times involved making repeated visits for particular households notably during evenings and weekends.

Some key informants persistently refused to provide information expected of them. This was particularly so with those key informants who were involved in dealing with sensitive development projects within and around the wetlands sites. Time was not enough to exhaust research requirements as given months were few to complete the required research area.

V. RESEARCH FINDINGS

State of wetlands

To obtain information for this section direct observation technique and formal interview schedule were used as follows;

Direct observation

Using the direct observation technique, the following features were put on the checklist and their corresponding findings were as summarized on the table 6 below;

Table 5 showing features selected for direct observation and findings

No	The key features			
		Kakoba	Nyamitanga	Kamukuzi
1	Presence of slums around or within reach of the wetlands.	Observed	Observed	Observed
2	Permanent/modern residential house or housing estates within reach of the wetlands.	Observed	Observed	Observed

3	Presence of industries, institutions, other commercial establishments in and around the wetlands.	Observed	Observed	Observed
4	Brick making and sand extraction in and around the wetlands.	Observed	Observed	Observed
5	Evidence of recent floods.	Observed	Observed	Not observed
6	Evidence of agricultural practices	Observed	Observed	Not observed
7	Fishing, hunting and gathering.	Not observed	Not observed	Not observed
8	Wetland burning to clear way for other activities.	Not observed	Not observed	Observed
9	Implies intentions for the present land use practices.	Commercial oriented	Commercial oriented	Commercial oriented
10	Papyrus cutting	Not much	Not much	Very much

Source: Field data

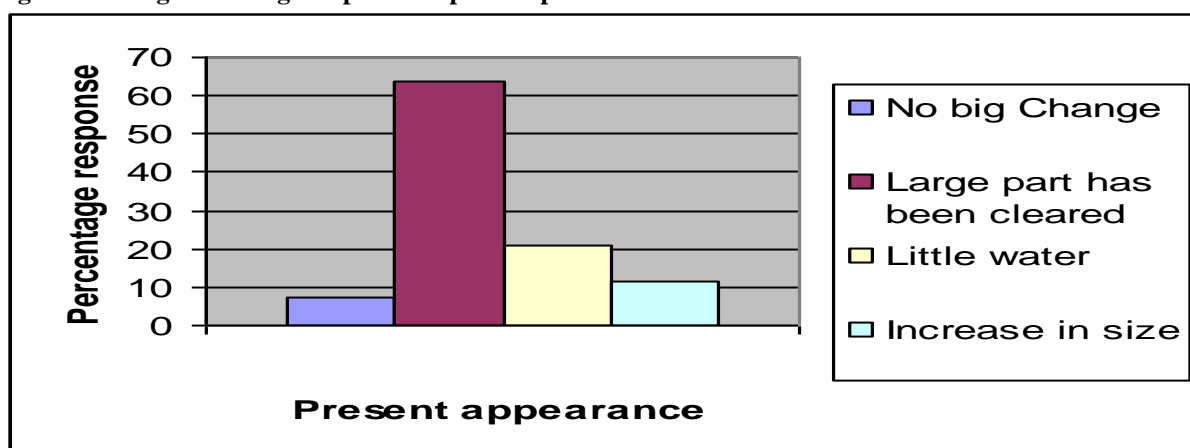
Table 6: Percentage response on the state of the wetland to first settlers in the area

State of the wetland	Freq	%
Swampy	18	18.8
Big area	19	19.8
Green and cold	12	12.5
Flooded with water	26	27.1
Thick area	28	29.2
Bushy	15	15.6
Full of papyrus	13	13.5
Being cleared for farm	2	2.1
Dry area	0	0.0
Emerging	2	2.1
Others	13	13.5

Compiled by the author

According to research findings, wetlands before the urbanization process were covering a big area, were thick and flooded with water. But with the interruption of land pattern by developments of commercial buildings, industries, schools, household construction and more others, wetlands started to be cleared and degraded.

Figure showing Percentage response on present patterns of wetlands



The researcher tried to compare the present and past patterns of the wetlands. From the graph above, 63.5% respondents say large part of the wetlands have been cleared for activities like crop growing, grazing, sand extraction, construction, brick making and alike.

Table 7: Major uses of wetlands in the past

Past major use of wetlands	Mentioned		Not mentioned	
	Freq	%	Freq	%
Provision of water for domestic use	54	56.8	41	43.2
Agriculture	40	41.7	55	57.3
Fishing	24	25.3	71	74.7
Provision of local medicine	8	8.4	87	91.6

Provision of materials	45	46.9	50	52.6
Modification of rain fall	4	4.2	91	95.8

Compiled by the author

There was need to bring out facts past major uses of wetlands. According to research findings, most respondents (56.8%) say they were basic source of water for domestic use. About forty six percent (46.9%) say wetlands were to provide materials for handcraft like papyrus, while least respondents (4.2%), reported that they were for climate modification and provision of local herbs (medicine) respectively.

Table 8: Current activities carried out in the wetlands

Activity carried out in the wetland	Freq	%
Crop growing	60	62.5
Grazing	46	47.9
Construction	18	18.8
Sand extraction	8	8.3
Fishing	9	9.4
Dumping	4	4.2
Brick making	19	19.8
None	10	10.4

Compiled by the author

From the table, crop growing is the major activity being currently carried out in the wetlands. This was reported by 62.5% of the respondents followed by 47.9% who say grazing is currently taking place in the wetlands. Dumping of waste, sand extraction and fishing are the least activities being carried in the wetlands today as according to 4.2%, 8.3%, and 9.4% of the respondents interviewed respectively.

Table 9: Dominant activities carried out in the wetland areas

Activity	Freq	%
Crop growing	36	37.5
Grazing	12	12.5
Brick making	11	11.5
Construction	5	5.2
Fishing	4	4.2
None	11	11.5
Others	17	17.7
Total	96	100

Compiled by the author

As clearly shown in the table, the common activity carried out in the wetland is crop growing where 37.5% of the respondents reported that they have garden in the wetlands. The least activities are grazing, brick making, construction, and fishing, with 12.5%, 11.5%, 5.2% and 4.2% respectively of the total respondents stating that they carry out these activities in the wetlands. However, 17.7% of the respondents say they carry out other activities in the wetland while 11.5% say they do not use wetlands for any activity. The results have further revealed that presently, the wetlands are being massively put to modern uses like industrial development and institutional establishments at the expense of the traditional values which used to be derived from them. The probable implication of these modern uses of the wetlands is that the wetlands which were said to be virgin in the past are now being badly depleted. Furthermore, the respondents popularly agreed that the flood patterns have drastically changed and that floods now occur more frequently than what used to be in the past.

What can be inferred from the above information is that the modern uses of wetlands have been so detrimental to them that they can be held responsible for their disappearance. Secondly, there appears to be a very strong link between wetlands depletion and flood pattern. The frequent floods which are now being experienced in the wetland areas can be linked to the destruction and disappearance of the wetlands.

In summary, wetlands have been providing ecological functions like maintenance of water table, prevention of erosion, reduction in extremes of flow, traps sediments and serves as wild life habitats and centers of biological diversity; and socio-economic functions such as supply of plant products like papyrus, fishing, cattle grazing, water supply, nutrient and toxin retention and tourism. The disappearance of these wetlands means water loss, reduce run off control, soil deterioration, traditional use, loss, restricted ownership of the resources, reduced economic flexibility, crop pest risk and health problems.

As presented in table 7, 8, 9 and graph 5, the popular view of the respondents on the past and present uses of the wetlands were majorly used in a sustainable manner by the local people. This included things like subsistence agricultural, swamp fishing, gathering of useful wetland materials for simple construction, food and medical purposes, hunting and other recreation activities such as swimming. Judged from the nature and scale of

these activities, it is certainly true that they were environmentally friendly and never threatened the existence of the wetlands and their associated resources. Thus, it can be said that the past uses of the wetlands intended to put the question of biological diversity at the forefront so that the needs of the future generation should not be jeopardized. This disappearance can probably be attributed to the rapid transformation.

From what was observed coupled with the popular view of the respondents on the present land use pattern. There is substantial evidence to say that there has been major shift in the present land use pattern. This shift has favoured commercial activities at the expense of traditional values. This potential conflict in economic uses and traditional uses was noted by crafter, Howard and Njuguna in the wetlands of Kenya. They said:

“The potential conflict for economic uses of large wetlands tend to mark off other traditional uses that residents and local people have for the same ecosystem. Such activities as honey gathering, collection of wetland plants for food shelter; plants for basketry and building, small scale swamp fishing, hunting and ceremonial activities all constitute uses of wetlands made by the local people of Kenya”. (Howard and Njuguna 1992:3). It is undoubtedly, true that these wetlands’ uses have been targeted. It was further found out that modern uses of the wetlands encourages drainage of the wetlands, clearing a way of the wetland vegetation, expulsion or destruction of animal species in the wetland areas, brick making and sand excavation which are not really desirable due to their multiplier effects on the surrounding population.

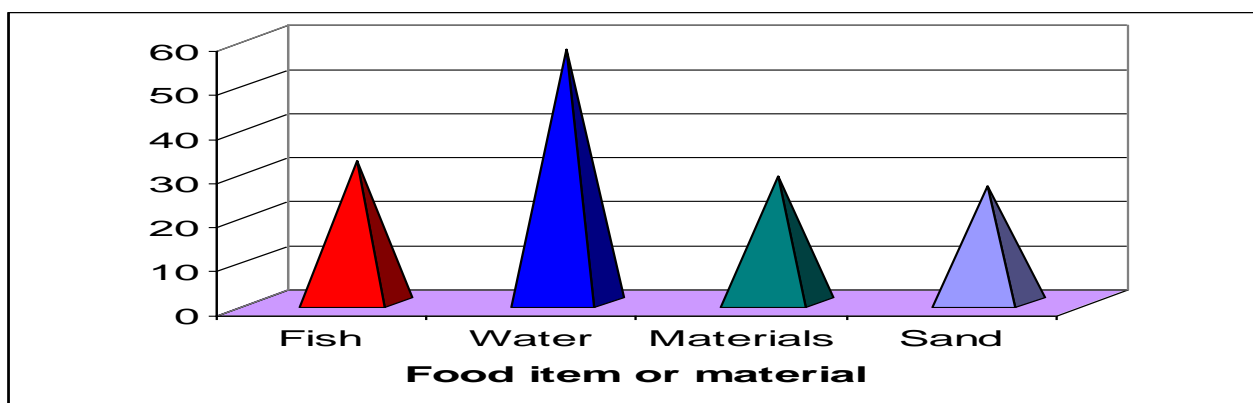
Table 10: Accessibility of wetlands by the respondents

Accessibility	Freq	%
Permitted by the land lord	15	15.6
We own wetlands	49	51.0
Wetlands are free land	14	14.6
Others	2	2.1
Not specified	16	16.7
Total	96	100

Compiled by the author

More than half on the respondents (51%) believe they own wetlands and therefore have the authority to use them the way they want. Fifteen percent (15.6%) respondents say they are permitted by the landlord to use wetlands while 14.6% believe wetlands are free areas and can be used by anybody without interference. However, 16.7% respondents did not specify on how they access wetlands.

Figure showing: Items got in the wetlands in the past



Most of the respondents that is (57.7%) say water is the major item they were fetching from the wetlands, followed by fish as stated by 32.2% respondents and the least collected items were materials for handcraft and construction then sand as according to 28.7% and 26.4% respectively.

Past flood pattern

Table 11: Current flood pattern in the wetland according to the respondents

Pattern	Past	Current
	%	%
A lot of flooding	74.4	6.7
Little water	20	75.3
Not sure	5.6	18.0

Compiled by the author

From the table, most respondents (74.4%) say there was a lot of flooding water in the wetland when they first settled followed by 20.0% who say there was little water. On the other hand, 5.6% respondents say they are not sure of the wetland flood pattern when they first settled.

Current pattern

Most respondents 75.3% say there is currently little water in the wetland compared to the past. This is followed by 18.0% who say they are not sure of the current wetland flood pattern while least respondents 6.7% say there is a lot of water flooding.

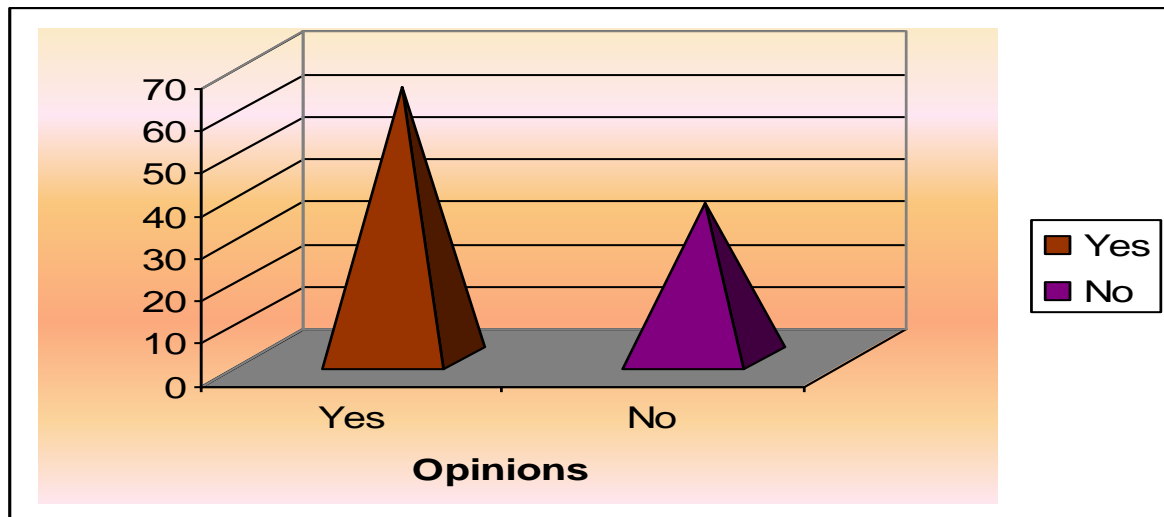
The future of wetlands

Ninety five percent (95%) of respondents indicated that there is no future of wetland unless government and municipal planners and other related bodies intervene to restore the degraded wetlands and preserve the existing ones. This was further confirmed by the three assistant town clerks who argued that wetlands are a nuisance in the field of health and drainage system. 5% of the respondents were also not decided on the future of wetlands. However, they argued that the existing ones need to be preserved. One respondent was quoted saying; "Wetlands have no future because competition for land is too much and therefore compromising environment and people's lives is not easy".

From the research findings many wetlands sites were found to have been cleared for farming, industrial development like the coca-coal plant in Mankenke, brick making like Ruti wetland site, sand extraction in Nsikye and others.

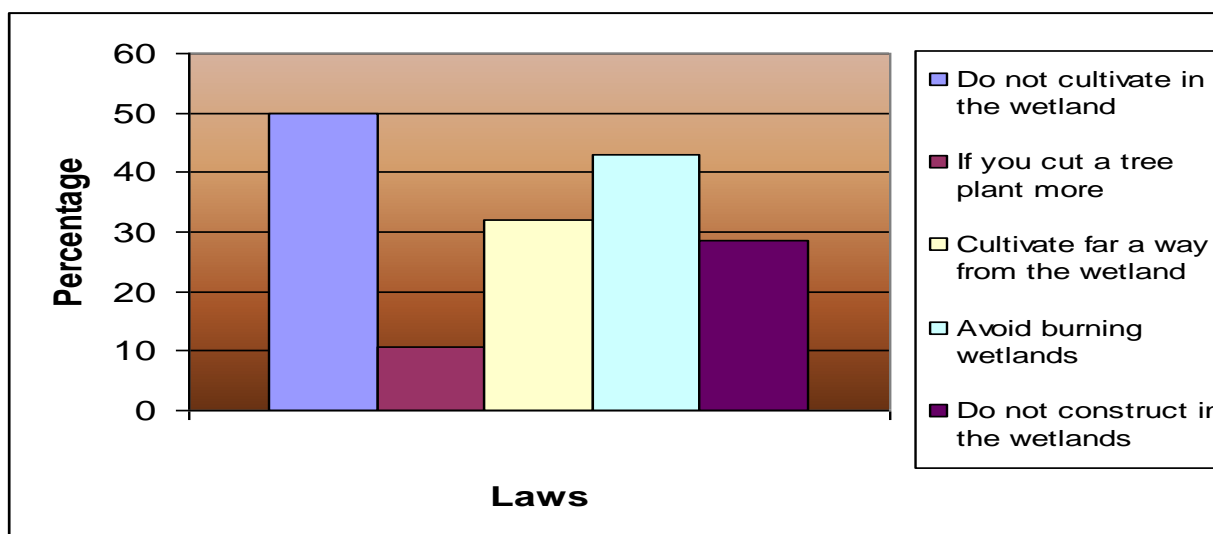
Information on environmental policies

Figure showing respondents awareness of wetlands conservation laws



It can be observed that more than half 63.7% of the respondents have heard about laws put in place to conserve wetlands. However 36.3% of the respondents say they have not heard them. From the data, one gets the impression that there are laws in place, which are supposed to guide the use of wetlands in a sustainable manner; but something appears to be wrong with the handling of them. Majority of the people are not knowledgeable about the laws and there seems to have been no serious attempts to educate people on those laws to protect environment in general and wetlands in particular. This has led to continuous destruction of wetlands.

Figure showing wetland conservation laws known to the respondents



As shown in the graph, 50% of the respondents have heard the law stating that do not cultivate in the wetland, also 42.9% have heard that wetlands should not be set on fire while 32.1% and 28.6% of the respondents heard that they should cultivate far away from the wetland and not to construct in the wetlands respectively. Least respondents 10.7% heard that if you cut a tree, plant more. From the above information it was established that some respondents had knowledge of the laws but argued that population pressure is too much and as a result wetlands remain a source of livelihood. Other respondents argued that law enforcers are not there or where there available they are inefficient in monitoring wetland usage. Even it was established that wetlands are not clearly demarcated for people to know.

Table 12: Setbacks to environmental policy implementation

Reason	Freq	%
Government is careless	22	36.7
Political interference	13	21.7
Law enforcers use wetlands	6	10.0
Embezzlement	15	25.0
Don't know	4	6.6
Total	60	100

Compiled by the author

Those who say environmental policies are not well enforced, majority 36.7% think the reason is that the government is careless about enforcing the policies followed by 25.0% who say there is much embezzlement in enforcing the policies. 21.7%, 10.0% of the respondents who say environmental policies are not well enforced believe the setbacks are that there is much political interference and the law enforcers use the wetlands themselves respectively. 6.6% of these respondents did not know why the policies are not well enforced.

Table 13: The weakness of environmental policies

Law weakness	Freq	%
Language problem	4	7.6
Corruption	7	13.2
Lack of follow up	28	52.8
Not people centered	14	26.4

Compiled by the author

The most reported weakness of environmental policy is that there is lack of follow up on these laws. This was reported by 52.8% of the respondents who responded to the question. 26.4% say these policies are not people centered that is people are not consulted in making laws about wetland protection. 13.2% believe there is corruption (those enforcing the laws are the most defaulters).

Table 14: Solutions to ineffective environmental policy enforcement

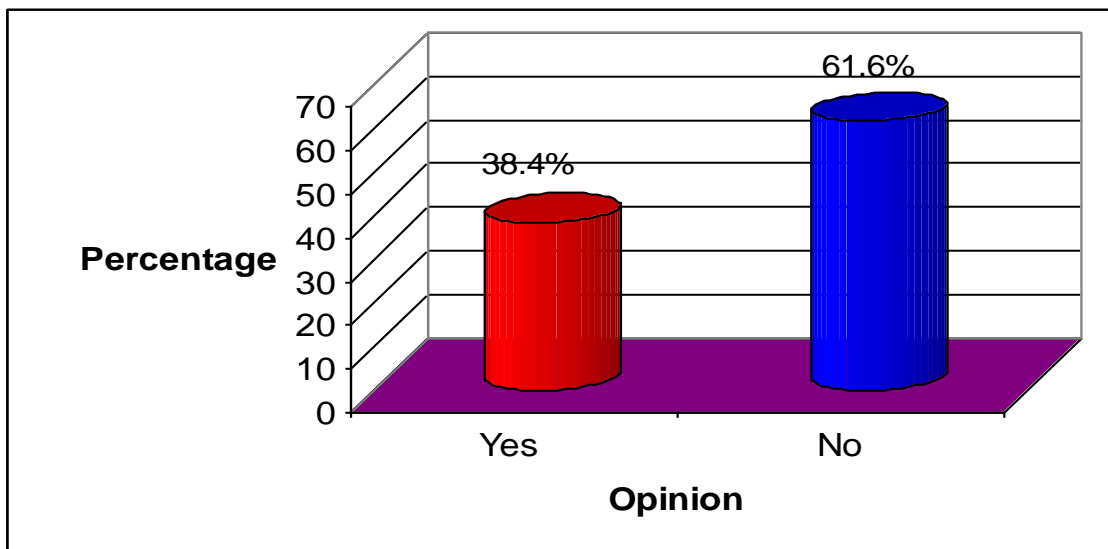
Solution	Freq	%
Provide massive education	31	46.3
Translation of laws to local languages	5	7.5
Punish defaulters	10	14.9
Facilitate law enforcers	7	10.5

Avoid political interference	14	20.9
Total	67	100

Compiled by the author

Data was captured on respondents' opinions on how to make effective environmental policy enforcement. A large percentage (46.3%) suggest that massive education through radios, Newspapers, workshops and others be provided. 20.9% suggest that political interference be avoided to allow policy enforcers do their work effectively while 14.9%, 10.5% and 7.5% suggest that defaulters be punished, law enforcers be facilitated to do their work and translate the policies to the local language respectively.

Figure showing respondents who have received environmental awareness education



It is apparent that at least more than half 61.6% of the respondents have not received environmental awareness education much as 38.4% have.

Table 15: Source of environmental awareness education received by the respondents

Source	Freq	%
Radios	21	46.7
Televisions	3	6.7
NEMA officials	7	15.6
School	8	17.8
News papers	6	13.2
Total	45	100

Compiled by the author

Of those who received environmental awareness campaign, majority 46.7% learn to radios followed by 17.8% who got the information from school. The least source of information as according the respondents is television as only 6.7% watch televisions.

From the above presentation, the researcher found out that despite educating the masses through media, seminars, workshops and conferences, they have not changed their attitude towards wetland degradation yet it was assumed that these channels or avenues would transmit knowledge not only to policy makers, and bureaucrats in office but to every one concerned with the use of wetlands in particular and the environment in general at grassroots levels. To overcome such a situation, the role of the youth in conserving the generation must particularly be emphasized since are the next generation who would have repay the cost. This view is completely in agreement with what Micheal Keating explained in the Earth's summit's Agenda for change.

He said:-

“The youth makes up one third of the world's population in determining their own future....development plans should ensure young people of a secure future including a healthy environment, improved living standards, education and jobs”, Micheal, K. 1993:44).

This suggests it would be important to inculcate environmental issues in the minds of every body at all levels, at all circles and at all changes so as to achieve the goals of sustainable development. Also on environmental laws awareness, environmentally concerned bodies are to blame because experiences in the field has shown that they focus their attention on to a wrong target population. They largely take environmental issues as highly academic giving the impression that the ordinary man who has no public office knows nothing about the environment. In

the research findings it was established that people don't have proper understanding of environmental laws, laws are not people centered, there is language problem and laws lack follow-up.

These findings appears to contradict the Freiran version of activist particularly research which emphasizes dialogue and participation in order to enhance people's awareness, confidence and empowerment of their action; hence stressing the philosophy of the life that the poor and the exploited should be enabled to conduct their own analysis of their own reality. The researcher strongly believes that if the bureaucrats concerned with environmental conservation were not only taking participatory appraisal methodologies lightly, but actually practicing it at grassroots levels, the goals of environmental conservation and protection in form of rules would be achieved. On the role of NEMA, most people are aware of its activities, however, most of the respondents were of the view that its monitoring capacity is very limited. From the research findings the whole of Mbarara Municipality has only one environment officer monitoring all the three divisions. Yet every division should be having an environment committee. This shows that disseminating environmental education or awareness and enforcement of laws is still a myth rather than a reality.

Government initiative in wetlands conservation

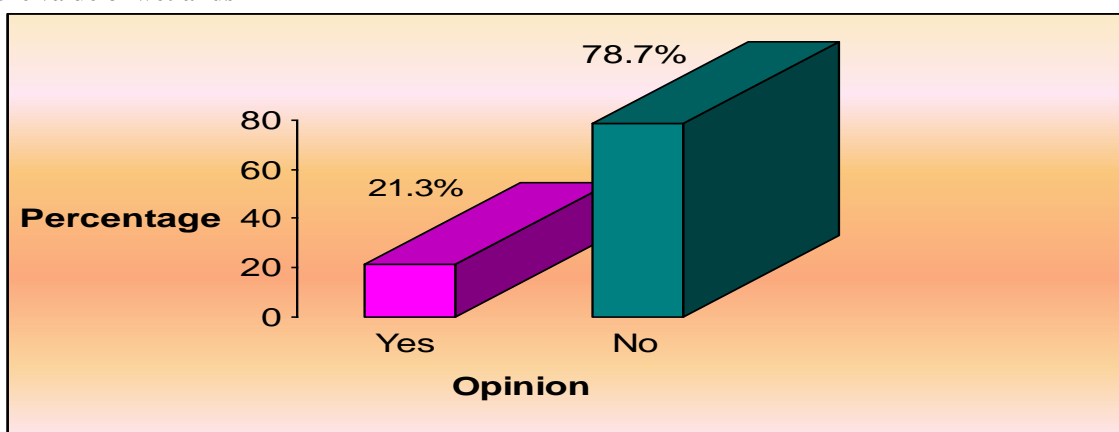
The research obtained information basically from key informants and was reinforced by documentary analysis technique and observation. Key issues covered included government policies on environment in general and wetlands in particular and their enforcement, coordination of environmental management issues among the relevant bodies, urban settlement policies, industrial location policies, environmental impact assessment and involvement of all parties in land use planning through participatory approach.

Through the interview guide, direct observation and documentary analysis technique, the study revealed the following: firstly, there is apparently no proper urban settlement policy and as a result people acquire plots anywhere for settlement without due regard for the implications on the environment. Secondly, there is unfair tendency by the government to allocate swamps for industrial establishments. Thirdly, there is no restriction on migration from one part of the country to another and this encourages rural-urban migration with no appropriate mechanism to take care of its socio-economic and environmental multiplier effects.

The country's environmental laws have remained on paper and their subsequent enforcement has hit a snag since different priorities and interests, hence a choice between development and environmental conservation has become a problem. Top-bottom approach has majority been employed in the land use planning process with the result that the use are taken by the concerned authorities.

However, the major goal of this particular research question was to seek the views of the 10 key informants purposively selected from the various environmentally related bodies on the issues of whether there is coordination among the major institutions concerned with the management of environmentally related issues in the municipality. The study revealed that there is no coordination of the relevant organs on environmental policies and conservation.

Figure showing the level of explanation extended to the citizens by the government officials and LC's on the value of wetlands



From the figure 11, it can be concluded that the Government Officials and Local Governments have not done enough to sensitize the citizens on the value of wetlands. This was reported by a big percentage of respondents 78.7. However, 21.3% of the respondents say they have been sensitized of these 61.1%, 52.6%, 27.8% say they were told not to burn the wetlands, not to cut them down and that wetlands are good for rainfall modification respectively.

Bivariate analysis

In the background of the study, a number of research questions were stated. The field operation highlighted many variables. However, not all the highlighted variables examined in the field were included. Variables such

as activities carried out in the wetlands, environmental policies, level of education and others have been tested whether they influence wetland use.

Table 16: Activities carried out in wetlands by respondent location

Activity	Location of respondents	
	% living in town	% not in town
Crop growing	28.6	20.0
Grazing	17.6	0.0
Construction	12.1	20.0
Sand extraction	7.7	0.0
Fishing	9.9	0.0
Dumping	5.5	0.0
Brick making	12.1	20.0
None	6.6	40.0
Total	100.0	100.0

Compiled by the author

From table, a large number (28.6%) of those who live in town, use wetlands for crop growing followed by 17.6% who use them for grazing. Equal percentage of respondents 12.1% use wetlands for construction and brick making while least percentage (5.5%) use them for dumping wastes. However 6.6% of the respondents living in town do not use wetlands for any activity. On the other hand majority 40.0% respondents who do not live in towns do not use wetlands for any activity much as equal percentage (20.0%) use them for brick making, crop growing and construction of house for settlement.

Table 17: Weaknesses in the law of environmental awareness education received

Weakness of the law	Percentage response on adequacy of environmental awareness education received.	
	Adequate	Not adequate
Language problem	0.0	5.9
Law enforcers use wetlands themselves	50	11.8
Lack of follow up	50	52.9
Not people centred	0.0	29.4
Total	100	100.0

Compiled by the author

Equal respondents 50% who have received adequate environmental laws are that laws are law enforcers are the most defaulters and that these laws lack follow up by the respective bodies concerned. None of the respondent says the laws are not people centered or has a language problem. On the other hand, 52.9% and 29.4% respondents who have not received adequate environmental awareness education say the weakness of the laws are that they lack follow ups and they are not people centered (local people are not consulted in making laws governing wetland use) respectively. While 11.8% and 5.9 say law enforcers use the wetlands themselves and also face language problems respectively.

Table 18: Respondents suggestions to effective environmental policy enforcement by knowledge of laws to conserve the wetlands

Respondents suggestions to effective environmental policy enforcement	Knowledge of laws put in place to conserve wetlands	
	Yes	No
Massive education	44.4	52.4
Translation to local languages	11.1	0.0
Punish defaulters	8.9	23.8
Facilitate law enforcers	15.6	0.0
Avoid interference	20.0	23.8
Total	100.0	100.0

Compiled by the author

As clearly displayed from the above table, most respondents (52.4%), who have no knowledge of laws put in place to conserve wetlands suggest that massive education through radios, news papers, workshops and others be provided, followed by equal percentages 23.8% who suggest that defaulters be punished and also political interference be avoided. None (0.0%) suggests that laws be translated to local languages and law enforces be facilitated. On the other hand, 44.45, 20.0% respondents who have knowledge of the laws suggest that massive education be provided and political interference avoided respectively. Least respondents, (11.1%, 8,9%) suggest that laws be translated to local languages and law enforcers be given more facilitation to do their work.

Table 19: Respondents knowledge on the activities of NEMA

Role of NEMA	Knowledge of NEMA	
	Yes	No
Protecting environment	59.4	0.0
Monitor environment	21.9	0.0
Enforce environmental policies	12.5	0.0
Don't know	4.7	100.0
Educate about environment	1.6	0.0
Total	100.0	100.0

Compiled by the author

According to the table, most respondents (59.4%) who have heard about NEMA say they know its role is to protect environment, followed by 21.9% who say it monitors environment. While least respondents 12.5%, 4.7% and 1.6% say NEMA enforces environmental policies, have no idea of what it does and educate about environment respectively. All those (100.0%) who have never heard about NEMA say they have no know idea about its role.

VI. DISCUSSION OF THE FINDINGS

Introduction

This study aimed at investigating the effects of urbanization on the management of wetlands in Uganda with specific reference to Mbarara Municipality, south western Uganda. According to National Wetlands and Conservation Management Programme (NWCMP, 1991), Wetlands cover about 30105km² representing 13% the total area of Uganda's. the area under permanent wetlands is currently estimated at 7296km² and seasonal wetlands comprises impeded drainage while swamps constitute 30 percent and swamp forests 10%. However, all these are threatened to extinction or depletion if no proper management policies are instituted and implemented.

According to Burkhart, (1994), wetlands must remain healthy because some birds, animals and plants live only in wetlands and if they are lost they will never return. He further stresses that, wetlands clean the water we drink. They purify what is carried into the swamp from sewers. Wetlands also provide a living for people who make craft items from papyrus and other materials or who do other kinds of work, near the wetlands. However, by burning or by harvesting papyrus more than once a year may loose this blessing. This is why the research topic was chosen considering the importance of wetlands and the way there are degraded.

According to Muhanguzi (1991), wetlands had historical functions like provision of fisheries especially along River Rwizi banks and lake Kiyanja, served as hunting ground, helped in brick making harvesting raw materials for building purposes and even people collected water from swamp wells. These wetlands were also important for socio-cultural ceremonies and rituals and recreational activities. Thus people preserved them because of their socio-economic and cultural importance. However, of recent, indiscriminate exploitation of wetland resources has been reported due to increasing levels of poverty, population increase leading people to construction houses in flood plains directly affecting wetlands yet these wetlands are acting as receptacle for town wastes especially to areas of Kijungu and Nyamityobora in Kakoba division.

The study assessed four aspects namely;

- i. The rate and trends of urbanization in Mbarara Municipality.
- ii. The present land use pattern and their likely impact on the present and future conditions of wetlands.
- iii. The implementation of NEMA policies as well as the institutional structure for coordination of environment conservation activities in the Municipality.
- iv. The gaps in policies related to urbanization and protection of wetlands.

In 1994, the Government of Uganda adopted the National wetlands policy. This policy describes in broad terms how the government intends to deal with Uganda's wetlands. A series of laws ranging from National Environment Statute (NES. 1995), giving detailed rules and procedures of what can and cannot be done in wetlands, the National Environment (wetlands, River Banks and lake shores management) Regulations 2000, the local government Act and the Land Act (1995), Local Government Act (1995), have been put in place to deal with wetland management. Also the constitution of Uganda (1995), talks about wetland ownership, protection and management. Therefore, we have a clear set of laws and regulations that govern the use of wetland resources. These laws and regulations are intended to ensure that wetlands in the country are managed and used more wisely. It is hoped that wise use will allow wetlands to provide sustainable benefits to the population of Uganda as a whole, mankind in general and the environment in long term (wetland sectors strategic plan 2001 – 2010). In other words wetlands and regulations are to ensure that the benefits of wetlands are optimized and fairly distributed to the people of Uganda and beyond today and in the future.

Nevertheless, for the case of Mbarara Municipality, the researcher established that, it is one thing to enact laws but another to ensure that these laws are being adhered to. The research revealed that the officials (law

enforcers) who should be protecting wetlands are the ones abusing wetlands themselves and the laws have not been put in practice as required by National Environment Statute (1995). It was also revealed that some people are not aware of specific laws yet for laws to be understood the reasons behind the law and are aware that some body who breaks the law should be punished.

Law enforcement officers themselves were not sensitized and yet this is a group of officials who should sensitize and educate others (citizens) about the existence and meaning of laws and regulations. It was quite surprising for one divisional town clerk to mention that, "wetlands are nuisance to the public in terms of health because they hide mosquitoes and block the drainage system". To such official wetland clearance would be the option yet wetlands should be used wisely and in a sustainable manner.

It was further established that laws lack follow up by respective bodies concerned (50%). This can be explained by the fact that for the whole municipality with three divisions, only one environmental officer sitting at the Municipal council was tasked to handle environmental wetland issues in the Municipality, it was further revealed that the Local Environment Committee (LECs) at local council 2 and 3 level are missing yet these are committees according to the law who are responsible for planning and executing sound environment management in their area of jurisdiction. They are the "local eyes on the ground". LECs have the mandate to prevent, stop or discontinue any act or mission deleterious to the environment. Their duty is to promote legal wetland use through information provision and regulatory actions like the enactment of by laws. This was found not existing in Mbarara Municipality and therefore strong committees need to be put in place to handle the situation. It is further advised that in case of conflict of interest, where the LC1/LCIII, leaders are involved in the illegal activity then the report should be made to the subcounty chiefs which in this case is the division town clerk/district environment officer/NEMA/wetland inspection division. The study established that the present land use pattern is geared towards meeting the needs of highly commercial activities like construction of residential houses, brick making and sand extraction. It was further observed that activities such as papyrus, fishing, hunting and gathering of useful materials have more or less been neglected.

On the question relating to the past uses of the wetlands, present uses of the wetland, whether there has been a shift in the land use pattern or not, the popular view was that in the past the wetlands were mostly used in a sustainable manner by the local people but there has been a major shift in the present land use. The shift has favoured commercial activities at the expense of traditional values. It was found out that the modern uses of the wetlands encourages draining of the wetlands, clearing away of the wetland vegetation, expulsion or destruction of animal species in the wetland areas, brick making and sand extraction.

On the question of population increase and wet land degradation, it was established that there is gradual influx of the population since independence either for trade or employment. This has made the town more and more metropolitan, witnessing a fast growing population with increased levels of tribal and ethnic mix. Documentary analysis revealed several reasons for this population change. During the period 1900-1948, the population of Mbarara town grew to a staggering total of 2956 inhabitants, depicting a growth rate of 2.6% per year (reconstruction and development corporation 1985) and it continued growing at the same rate in the inter census period of 1949-59. For whatever other reasons, some of the elders interviewed attributed the poor population growth rate to the high rate of emigration of especially men to Buganda for employment. Because the men were mostly away, their wives who remained alone at home spent long time without having children.

The period 1960-69 saw the population of Mbarara town growing to 16,078 inhabitants showing a growth rate of 3.4% per year. This was due to construction of schools, like Ntare School, hospitals like Mbarara hospital. In the period 1970 – 1976, the population of Mbarara town grew from 16,078 to approximately 24,016 inhabitants. This was attributed to the expulsion of Asians in 1972 and local residents took over their properties, jobs and businesses and this further accelerated rural urban migration. On the close analysis following documentary analysis, the researcher established that wetland destruction has been due to poor structure plan laid by town planner who have allocated wetland sites to industrial developers like Coca-cola plant occupying Mankenke valley swamp, institutional developers like modern school occupying Kyamugorani valley swamp and others. Town authorities have not put any means to protect wetlands. Thus the desire for increased commercial activities and industrialization can best explain the wasteful and poor utilization of wetland resources plus non sustainable means of land resource utilization, all of which have led to destruction of wetlands.

The research found out that planners and administrators of the district were interested in commercial ventures like industrial, development, commercial buildings set up, residential houses construction, schools construction than management of wetlands. Thus one can ably argue urbanization in Mbarara town basically has been motivated by commercialization rather than wetland conservation and management. The structure plan since the town was established does not at all cater for wetland sites hence justifying the words of one town clerk who commented that "wetlands are a public nuisance which should be cleared for the health development of town dwellers".

Urban planning has been institutionalized and controlled since 1918. (RDC 1985), key information especially the divisional town clerks provided useful information on town planning and on wetland management. The three

divisional town clerks provided that the 1985 structure plan has positively led to the growth and development of the town by acting as a guideline to different users. However, the findings disclosed that in some divisions the municipal council has failed to guide developers leading to destruction of wetlands, for instance those constructing schools, industries like the coca cola plant and so on.

The layout plan of 1951 resulted into the gazettement of the whole of the old town which was fairly planned and its development controlled. However, the town changed boundaries when it elevated to the level of a municipality to cover a bigger area almost three times the size of the original town (see map 6) the new areas of the town did not have any land use proposals until the 1985 when the reconstruction and development corporation (RDC) was initiated by the Act of parliament to guide developers after the 1979 war. This called for proper town planning which was concerned with providing the right site, at the right time, right place and for the right individual activity. The structure plan was prepared by the RDC and two plans were made for the town. The first one was the on line structure plan that showed different land uses within the town, such uses were administration residential, industries, recreational and special purpose areas for infrastructure and services (see map 8). The second was the detailed development plan based on the outline structure planned showing specific plot demarcations and road layout. This was to cover all suburbs.

However, it is important to note that the structure plan of 1985 aimed at locating land uses minus preservation and management wetlands for instance Central Business District (CBD) was located covering the Makhansigh street to the west, Mbaguta street to the east, Bus station, central market, Taxi park and warehousing area east of Mbaguta street as well as a commercial places along Bulemba road. Also land was allocated to for institutional development like police and prison barracks, the police stations, bank of Uganda offices ministry or works compound and hospital complex, municipal primary school, churches and Independence Park.

VII CONCLUSIONS AND RECOMMENDATIONS

The study that sought to understand the effect of urbanization on wetlands management in Mbarara municipality has come out with the following conclusions;

Urbanization has resulted into massive exploitation and destruction of the wetlands and there is no hope for wetlands of Mbarara Municipality in the years to come if no appropriate measures are instituted to arrest the situation. Wetlands have no future because they are considered as a nuisance by Municipal authorities. They argue that they should be drained to allow free movement of water to avoid harbouring mosquitoes and other related diseases. The present land use pattern is detrimental to the wetlands that it has failed to maintain their ecological character and biological diversity.

The present environment management policies have not only been complicated for the ordinary Uganda to comprehend, but their enforcement have been so relaxed that those who go abusing the environment are allowed to go apprehended. There are apparently a lot of institutional weaknesses among the various agencies created by the government to take charge of environmental matters which has caused lack of coordination of environmentally related issues and poor management of wetlands in the Municipality. There appears to be no feasible strategy to harmoniously address the question of rural urban migration who impact on the urban environment has been grossly negative. Regarding wetland knowledge, the people are knowledgeable about the direct wetland benefit and less knowledgeable about the indirect values and functions of wetlands. However, the majority of the participants are aware of wetland degradation. Threats to wetlands mentioned included brick making, construction of houses for settlement, sand excavation, set up of industries and institutions. Although wetland reclamation was observed in the study area, most of the participants interviewed did not perceive it as a threat.

Despite the high awareness of the value of wetland and government policy exhibited by the people, politicians should be held responsible for keeping wetlands degraded by spreading parallel arguments to gain rich people sympathy for votes centrally to the policy in place. Their views tend to have more effect on the people since they are the people trustees for immediate source of ideas and information hence held in high esteem. The policy needs the good will and blessing of the politicians to be embraced especially local councilors. It is commercialism in form of desire for industrialization, institution development in form of schools and recreational activities that is affecting wetlands more rather than increasing population, attitude, awareness, land tenure system and inappropriate policy. The government has no strategy of compensating those who encroached wetlands before the law to avoid more reclamation.

The study came out with the following recommendations that the researcher hopes would enhance the policy effectiveness. It will also help policy makers review the policy in place now by giving the policy on integrated approach. The remedial approaches to wetlands degradation will not be taken in isolation but, rather as a part of a global environment whose rescue can be achieved by both strategies directed at the wetlands themselves and outside the wetlands. That is on sport strategies and off sport strategies. In this way it is hoped, that wetlands will be sustainably well managed.

Immediate plans should be made to ensure that urban development in Uganda should take place on an environmentally sustainable manner and in full recognition of the local urban ecosystems. Emphasis should be put on using and consolidating the existing cities and urban centres with their associated infrastructure rather than their uncontrollably further dispersment. Land use planning supported by appropriate specific urban design strategies as well as enabling policies and programmes which address urbanization on multi-sectoral basis should be embarked on. All efforts should be directed towards wise use of wetlands and take into consideration the views of all parties or sectors whose activities are related to the utilization of wetlands. Environmental related sciences should be quickly integrated in the schools educational curriculum this will help enhance fast awareness of the dangers of wetland destruction since at least every family today has a school going person courtesy of UPE. This will definitely address shortcomings like the costs of newspapers and dry cells for radios. Even the parents who are not able to read and write will readily access the information from the school children. These may be their children, grandchildren or other people's children. The politicians of all categories should get open forum where a strong stand on vital issues must solidly be expressed. This will clear the air for all of them and avoid instances where they are individually held captive by the rich people and threaten them with loosing votes. That in spite of the fact that these politicians know about the policy in place they usually shy away from explaining to the people. They fear that this hurts the interests of the rich people who own big chunks of land in the wetlands and they can easily maneuver votes for or against politicians. Intensified education and sensitization programmes should be carried out and specifically targeted to explain to the people about the balance of nature and to increase wetland knowledge. The programs should specifically emphasize the indirect benefits from wetlands since the study revealed that the majority of the participants were not knowledgeable about the indirect wetland benefits. Thus the behaviour of the people living adjacent to wetlands would be changed. This would lead to sustainable use of wetlands thus conservation of wetlands. These educational programmes should build on what people already know. Indigenous knowledge. This could be achieved by a bottom up approach in the making of the wetland conservation initiatives that involve consulting the local people – wetland users. The inclusion of the local communities knowledge and ideas will lead to a more successful and sustainable use of wetlands

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