AN ASSESSMENT OF WETLAND ECOSYSTEM DEGRADATION IN BUSSI ISLAND WAKISO DISTRICT

BY

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;

DEDICATION

To my parents and relatives

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LIST OF ACRONYMS

BOD	Biological Oxygen Demand
DRC	Democratic Republic Of Congo
GIS	Geographical Information System
NEA	National Environment Act
NEAP	National Environment Action Plan
NEMA	National Environment Authority
NEPAD	National Environment Programme against Deforestation
NGO	Non-Governmental Organization
RAMSAR	Regional Agricultural Members African Region
USEPA	United States Of Environment Protection Authority
UWA	Uganda Wildlife Authority
WPL	Wetland Protection Legislation

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ABSTRACT

The study assessed wetland ecosystem degradation in Bussi Island Wakiso district. Specifically the study assessed people's knowledge of wetland ecosystem conservation in Bussi islands and investigated people's beliefs related to wetland ecosystem degradation in Bussi islands. Data was collected using questionnaire and interview guides**.** The study used a sample size of 72 respondents. At the end of the study, it was confirmed that people's knowledge and beliefs were the underlying cause of wetland ecosystem degradation in Bussi Islands. Therefore, it was reached that wetland ecosystem degradation in Bussi Island is highly dependent on people's knowledge and beliefs that are too diverse and destroying. The study thus, recommended that there is a need to challenge people's beliefs and knowledge through sensitization, workshops, poverty alleviation and education so as they can change their beliefs towards wetland ecosystem.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This study was done as an assessment of wetland ecosystem degradation in Bussi Island in Wakiso district. The chapter presents the background to the study, statement of the problem, research objectives, research questions, conceptual framework, and significance of the study as well as the scope of the study, definition of key terms and justification.

1.1 Background to the study

Wetland ecosystems are critical natural resources that serve various purposes including environmental, hydrological and socioeconomic functions. However, this important resource is so fragile and has suffered deterioration due to human activities such as cultivation, grazing, water abstraction among others. Several current studies have studied wetland ecosystem changes using GIS and remote sensing and other scientific methods. These studies lack information on people's perceptions. Ecosystems are important resources which play many functional purposes (Mutyavaviri, 2006). They vary in size and type and are thus differently defined. The most commonly adopted definition for ecosystems is that of the RAMSAR Convention (1971) which defines ecosystems as, areas of marsh, fern, peat land 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 (Mutyavaviri, 2006; Msipa, 2009).

Ecosystems can extensively be looked at as a community of living organisms (plants, animals and microbes) in conjunction with the nonliving components of their environment (things like

air, water and mineral soil), interacting as a system (Cherry, 2012). These biotic and abiotic components are regarded as linked together through nutrient cycles and energy flows (Tsujii and Sasagawa, 2012). As ecosystems are defined by the network of interactions among organisms, and between organisms and their environment, they can be of any size but usually encompass specific, limited spaces (although some scientists say that the entire planet is an ecosystem). In this study thus, ecosystems will mainly be limited to living organizations within the island and that is Bussi Island in Wakiso district in Uganda.

In Africa, most of the ecosystems are limited flood plains, islands, artificial impoundments and pans (Mutyavaviri, 2006). They are estimated to cover an area of about 1.28 million hectares of the continent, with 20% of them in the communal areas (Mharapara et al, 1997). In this case, wetlands share a common feature of retaining excess water, long enough to influence land uses, soil characterization and life forms that flourish them. They support many water bird species, hippopotamus, buffalos and waterbuck. They also provide spawning ground for riverine and anadromous fishes and critical dry season grazing lands for domesticated livestock and wildlife (Beilfuss and Davies, 1999).

Wetlands play critical functions ranging from environmental, hydrological and socio-economic benefits to the local communities (Dixon and Wood, 2003). They recharge rivers and serve as reservoirs for dry water supply (du Toit, 1994). In addition, they serve to purify and improve river water quality (Bowden, 1987; Breen et al., 1997; Smith, 2013). They also provide important habitats for many bird and animal species (Bowden, 1987, Smith, 2013). They are home to large numbers of both terrestrial and amphibious organisms. Wetlands serve as a mini-

ecosystem and without such areas; populations of countless species would be threatened. The loss of wetlands poses dangers to wildlife as well as human populations both in terms of protection of terrain and in a broader economic sense (Smith, 2013).

Despite the importance of wetlands to humanity, they have been largely degraded and rather treated as wastelands. Excessive pressure on wetlands results in degradation and eventual loss (Mharapara et al, 1997; Bedford, 1999). Degradation has been largely a result of human activities that include overgrazing, housing development, cultivation, groundwater extraction and artificial drainage among others. As a result of population growth, many thousands of swampland have been logged and drained for residential and agricultural purposes.

Much of the once mucky land has been filled in and developed for growing crops, grazing livestock, building homes or citrus orchards (http://www.attrakt.com, 2013). Land development leads to land clearance or erosion (Mclnnes, 2009). This cause chemical changes in the chemical makeup of wetlands which results in the whole ecosystem being thrown off track (Mclnnes, 2009). Waste dumping pollutes wetlands, thereby disturbing the life forms that depend on them. Macrophyte exploitation, brick making, medicinal plant harvesting, crop production and fishing are some of the human activities behind wetland degradation (Cherry, 2012). Farming is undertaken without due consideration to sustainable land use practices, with large tracts of land being cleared for farming and infrastructural development at the expense of valuable wildlife habitat. The important roles of wildlife in the ecosystem food web as pollinators, predators, seed dispersers or prey species of other animals did not seem to have been appreciated by a majority of land users (Wuver, 2006). However, very little has been done in as much as policy making

and protection of wetlands is concerned, probably because they are wrongly regarded as wastelands that can be sacrificed for the sake of social welfare (Seyam et al., 2001; Mutyavaviri, 2006; Wuver, 2006) or as natural resources with no need for management (Mharapara et al, 1997; Mutyavaviri, 2006). The environmental importance of the resource has been eclipsed by uses of the wetlands outlined above. Government policies on the use of wetlands are not sound that this important resource continues to be degraded at alarming levels. Some of the policies were designed not based on the perceptions of the people residing around the wetlands. Thus, they tend to contradict what people ought to know and this result in poor implementation of policy recommendations. The lack of attention is predominant in communal areas where either very little research has been done or researches have been too unrealistic by ignoring local peoples' perceptions. It is in view of this gap that a qualitative assessment of impacts of human activities on wetland ecosystems merits attention. Thus this research will focus on the impacts of anthropogenic activities on wetlands based on local people's perceptions.

1.2 Problem Statement

Ecosystem conservation in Uganda is among the things that have been given priority by the government and this is exemplified in National Environment Act 1995, the Wetland Protection Legislation 1994, The Forest Statute Act, CAP 246, The Water Statute 1995, The World Life Statute 1996, National Environment Action Plan (NEAP) Of 1994, Anti-Poor Fishing Policies And Environmental Conservation Act 2006. All these are done in an effort to minimise environmental degradation in Uganda. However, despite all effort done, it is seems that the rate at which wetlands are encroached and destroyed is beyond expectation. For instance, according to NEMA report (2009), 46% of Uganda's wetlands have been degraded for settlement and other economic activities in urban and peri-urban areas. In Bussi Island particularly, the report

indicated that the island is upon extinction because farmers are increasingly encroaching on it for agriculture. They use poor fishing methods and there is high deforestation done in the island. If nothing is done thus, it means that this island would soon be degraded and the end result is likely to affect the people in the area and Uganda at large, hence leading to water pollution, drought, famine and other environmental related problems. Therefore, this study was conducted to investigate the underlying cause of ecosystem degradation in Bussi Island.

1.3 General objective

The study aimed at assessing causes of wetland ecosystem degradation in Bussi Island in Wakiso District.

1.4 Specific Objectives

i) To assess the people's knowledge of wetland ecosystem conservation in Bussi islands.

ii) To investigate people's beliefs related to wetland ecosystem degradation in Bussi islands.

1.5 Research questions

i) What is people's knowledge leading to wetland ecosystem degradation in Bussi islands at household level?

ii) What are people's beliefs leading to wetland ecosystem degradation in Bussi islands at household level?

1.6 Research hypothesis

Ho= People's understanding of wetland ecosystem conservation and degradation is not the cause of poor wetland ecosystem management.

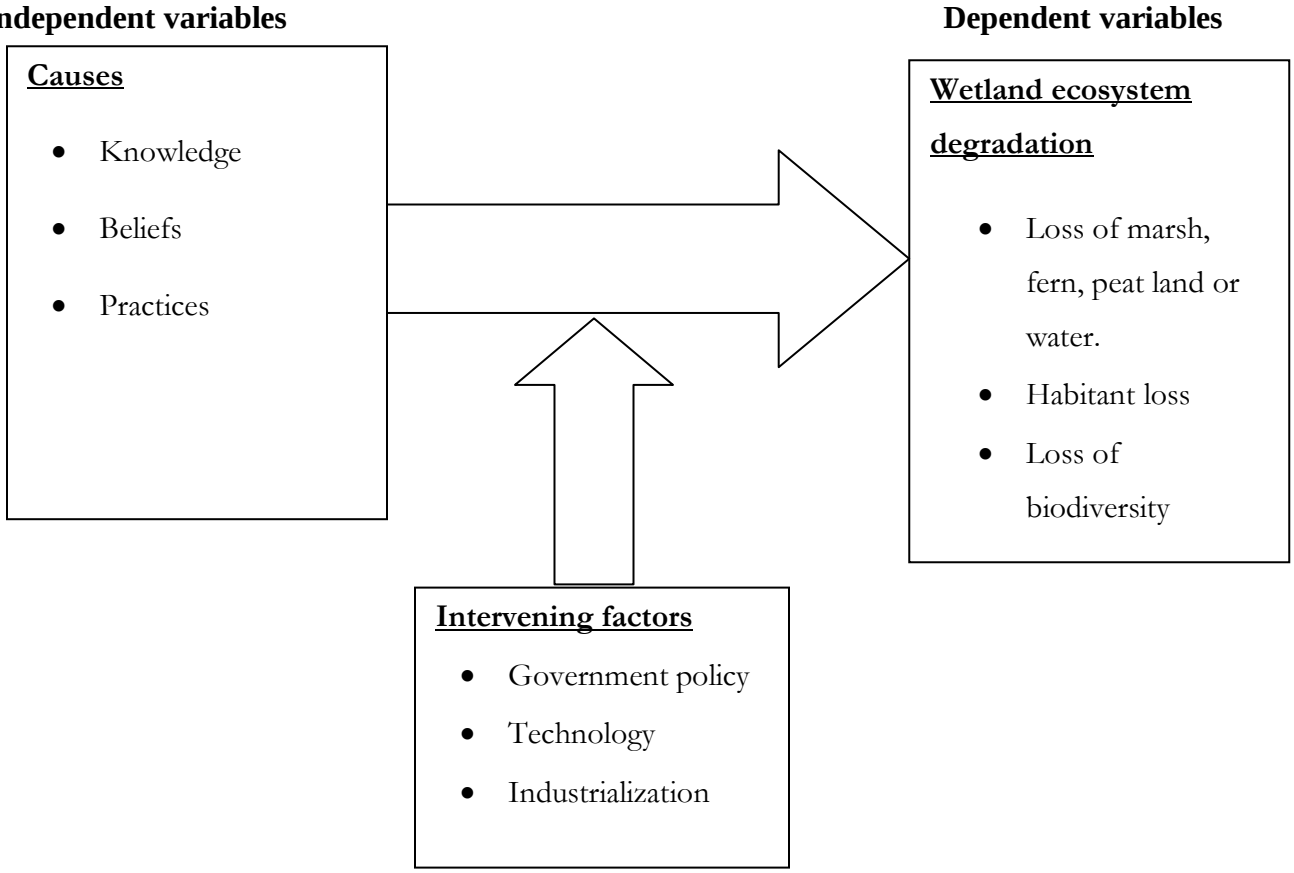
1.7 Significance of the study

The study may be of much importance to agro-ecologists as it will act as a guide in pointing at household based factors act as a central pillar in degrading wetland ecosystems. The study will also serve as a tool in discovering the reasons behind ecosystem degradation from household point of view. The study will establish constraints that seem to stand in the way of ecosystem conservation in Uganda and particularly in Bussi Island. The study will guide policy makers in designing and implementing appropriate strategies required to protect wetland ecosystem degradation for improved wellbeing.

1.8 Justification of the study

According to millennium development goals of 2015, ecosystem conservation was among the goals that had been set to achieve by 2015. Currently, we are in 2014 and, it seems that we are remaining with only one year. A lot of studies have been conducted to find out the factors at household level leading to wetland ecosystem degradation in Uganda and the world but no study has been done in Bussi Island in Wakiso district. Thus, the rationale for this study is to try to investigate the factors at household level leading wetland ecosystem degradation using Bussi Island. If this study is not done thus, it may be a cornerstone to increasing level of wetland ecosystem degradation Uganda. This study is therefore unique and will prove a lot of importance for the government, policy makers and the people that will come across it.

1.9 Conceptual Framework



Source: Crecious and Chapungu, 2013

In the conceptual framework above, it can be realized that the people's knowledge, beliefs and practices have a direct causation to wetland degradation in form of loss of marsh, fern, peat land or habitant and water as well as loss of biodiversity. Therefore, knowledge, beliefs and practices will be the independent variable and wetland ecosystem degradation will be the dependent variable.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter, the researcher critically analyzes works of other people related to variables under study. A review of the people's knowledge, practices and beliefs leading to ecosystem degradation is presented.

2.1 People's knowledge and wetland ecosystem degradation

Kat (2003) ascertain that people's knowledge can either degrade or conserve wetland ecosystems. Specifically, knowledge especially indigenous knowledge is a very broad term that comprises all aspects of life - food, farming, and hunting, medicine preparation and treatment, arts, crafts and technologies used by indigenous cultures around the world. What distinguishes this knowledge from western knowledge systems is its integration in the culture and cosmology as a whole. Each aspect of indigenous knowledge is but one strand of knowledge, intricately interwoven and inextricably linked to the whole web of existence. Indigenous knowledge on the other hand seeks to comprehend the interwoven aspects of its ecosystem by means of identification rather than by abstraction (Kat, 2003).

According to the Uganda Wildlife Authority Management (2010), the study found out that, the indigenous knowledge practices that have led to the degradation of wetlands and which are restricted included; poaching, witchcraft, bush burning, mining, fishing, farming/ cultivation, grazing, tree cutting for timber, fire wood, charcoal burning, and building materials. However, the contribution of indigenous practices by local communities to the conservation and sustainable use of biological diversity goes far beyond their role as natural resource degraders. Their skills

and techniques have provided valuable information to the global community and a useful model for biodiversity policies.

Furthermore, as on-site communities with extensive knowledge of local environments, indigenous knowledge by local communities are most directly involved with conservation and sustainable use. The study also assessed and found out that the local communities negative attitudes were due to restricted access to wildlife resources within the Protected Areas, harsh evictions and often inhuman treatment of offenders, unclear boundaries of Protected Areas, unresolved effects of problem animals and vermin and institutional rivalries.

Mung'ong'o et al (2004) also found out that most local people are very poor that they cannot afford the fee levied on tracking or viewing the wild plants and animals. This has created a situation that people believe these natural heritages are only a pleasure for whites and people with white collar jobs. At the end of the day the local people feel oppressed as they are not allowed to use the resources as they used to do thus creating a conflict between the Protected Area management Authority and the local people.

Resource access conflicts between the Protected Areas authorities and the local people has increased the tendency for people to have negative attitude as they have viewed the wildlife as a waste of valuable resources which they needed and from which they had been wrongly excluded yet they consider the resources to be theirs traditionally for example the Basongora poisoning the cat family. The changes in indigenous knowledge practices have led to exploitation of these ecosystems for immediate monetary profit rather than managing them for sustainable biotic yield

(Wuver And Attuquayefio, 2006) instead this has resulted into excessive exploitation of natural resources resulting into unnecessary degradation and alteration of habitats of wild plants and animals because there is a strong interdependent link between degraded habitats and loss of wild flora and fauna.

People's practices have also been linked to wetland ecosystem degradation (NEPAD, 2003). The interaction between human beings and the environment is the driving force behind ecosystem changes over time. Thus, an increase in an area's population would mean an increase in the interactions and therefore ecosystem changes (Roberts, 1988; Mutyavaviri, 2006). In Zimbabwe's Magwenzi wetland, according to Mutyavaviri (2006), the population had increased significantly over the years. The growth in population led to increased pressure on limited environmental resources as households continuously exploit the environment to meet the demands of the growing household size. Thus, population growth can be used as a proxy indicator for increased human impact on wetland ecosystem (Roberts, 1988). His study (Mutyavaviri, 2006) established that, based on views of the people in Magwenzi area, human activities had a significant impact on wetland ecosystems. Ecosystem aspects mainly affected include land cover which consequently affects vegetation species richness and evenness. Cultivation of land was identified as the key activity that influenced land cover changes. It was reported that woodlands have been converted into settlement and cultivated areas. This is also confirmed by what Robberts (1988) argues that human activities such as wetland cultivation significantly influences changes in land cover type. He propounded that these changes in land cover type also affect existing ecosystem interactions within the wetland. This affects the number and type of species in the wetland.

Mutyavaviri (2006) also confirms that practices of cultivation on wetlands have far reaching impacts on wetland ecosystems including interactions at microbial level to large ecosystem components. She says cultivation improves aeration of soils, mixes organic material with inorganic materials and this consequently changes the existing microbial interactions within the soils.

The growth in average herd size of cattle means an increase in the impacts on land cover as the grazing intensity increases. Middleton (2003), Hugget (2004) and Champion et al. (2001) concur with the respondents' view that land grazing significantly alters ecosystem functions and interactions. Excessive grazing has resulted in erosion of soils on the wetland. Treading by animals also adds to the compaction of soils. The hydrology of Magwenzi wetland in Zimbabwe was significantly affected and this affected animal species diversity, especially those whose ecological niche is water based. Some animal and plant species survive optimally under wet conditions. The drying up of wetland due to excessive water abstraction and climatic changes significantly affects the existence of these species. This affects ecosystem interactions that previously existed in the wetland. Hugget et al (2004) and kling et al (2003) also contend with the view that water abstraction in a wetland causes significant ecosystem changes.

Roads and bridges are frequently constructed across wetlands since wetlands have low land value. It is often considered to be more cost effective to build roads or bridges across wetlands than around them (Winter 1988). Roads can impound a wetland, eve n if culverts are used. Such inadvertent impoundment and hydrologic alteration can change the functions of the wetland (Winter 1988). Road and bridge construction activities can increase sediment loading to wetlands (Mitsch and Gosselink 1993). Roads c an also disrupt habitat continuity, driving out more

sensitive, interior species, and providing habitat for hardier opportunistic edge and non-native species. Roads can impede movement of certain species or result in increased mortality for animals crossing them. Borrow pits (used to provide fill for road construction) that are adjacent to wetlands can degrade water quality through sedimentation and increase turbidity in the wetland (Irwin 1994).

The maintenance and use of roads contribute many chemicals into the surrounding wetlands. Rock salt used for deicing roads can damage or kill vegetation and aquatic life (Zentner 1994). Herbicides, soil stabilizers, and dust palliatives used along roadways can damage wetland plants and the chemicals may concentrate in aquatic life or cause mortality (USEPA 1993a). Runoff from bridges can increase loadings of hydrocarbons, heavy metals, toxic substances, and deicing chemicals directly into wetlands (USEPA 1993a). Bridge maintenance may contribute lead, rust (iron), and the chemicals from paint, solvents, abrasives, and cleaners directly into wetlands below.

Innovative methods of constructing roads and bridges, and end-state (master) planning that reduces the need for new roads, can reduce the impacts of urbanization on wetlands.

Landfills can pose an ecological risk to wetlands. Landfill construction may alter the hydrology of nearby wetlands. Leachate from solid waste landfills often has high biological oxygen demand (BOD), and ammonium, iron, and manganese in concentrations t hat are toxic to plant and animal life (Lambou et al. 1988). Sanitary landfills may receive household hazardous waste and some hazardous waste from small quantity operators, as well as sewage sludge and industrial waste. Although regulated (under RCRA Subtitle D), these facilities may not always be properly located, designed, or managed, in which case some surface water contamination may occur.

Researchers who conducted a study of the proximity of 1,153 sanitary landfills to wetlands in 11 states, found that 98 percent of the sanitary landfills were 1 mile or less from a wetland, and 72 percent were 1/4 mile or less from a wetland (Lambou et al. 1988).

As a result of disturbance and habitat degradation, wetlands can be invaded by aggressive, highly-tolerant, non-native vegetation, such as purple loosestrife *(Lythrum salicaria)*, water hyacinth *(Eichornia crassipes)*, and salvinia *(Salvin ia molesta*), or can be dominated by a monoculture of cattails *(Typha spp.)* or common reed *(Phragmites spp.)* (McColligan and Kraus 1988; Weller 1981; Mitsch and Gosselink 1993). Particularly in constructed wetlands, including restored wetlands, non-native and tolerant native species may outcompete other species leading to a reduction in species diversity (Ministry of Water and Environment, 2010).

Non-native species may be introduced on purpose. For example, water hyacinth has been noted for its ability to sequester nutrients and is used for wastewater purification (Mitsch and Gosselink 1993). Water hyacinth and similar species can rapidly fill a wetland and are a threat to water quality in some areas.

Historically, agriculture has been the major factor in freshwater and estuarine wetland loss and degradation. Although the passage of the Food Security Act of 1985 "Swampbuster" provision prevented the conversion of wetlands to agricultural production, certain exempted activities performed in wetlands can degrade wetlands: harvesting food, fiber, or forest products; minor drainage; maintenance of drainage ditches; construction and maintenance of irrigation ditches; construction and maintenance of farm or forest roads; maintenance of dams, dikes, and levees; direct and aerial application of damaging pesticides (herbicides, fungicides, insecticides, fumigants); and ground water withdrawals.

These activities can alter wetlands hydrology, water quality, and species composition. Excessive amounts of fertilizers and animal waste reaching wetlands in runoff from agricultural operations, including confined animal facilities, can cause eutrophication.

Practices of Grazing livestock can degrade wetlands that they use as a food and water source. Urea and manure can result in high nutrient inputs. Cattle traffic may cause dens and tunnels to collapse. Overgrazing of riparian areas by livestock reduces streamside vegetation, preventing runoff filtration, increasing stream temperatures, and eliminating food and cover for fish and wildlife (GOU, 2010). As vegetation is reduced, stream banks can be destroyed by sloughing and erosion. Stream bank destabilization and erosion then cause downstream sedimentation (Kent 1994b). Sedimentation reduces stream and lake capacity, resulting in decreased water supply, irrigation water, flood control, hydropower production, water quality, and impairment of aquatic life and wetland habitat (USEPA 1993b).

The economic losses attributed to the reduced quality and quantity of water and habitat from overgrazing of riparian wetland vegetation is more than $200 million (USEPA 1993b). The depletion of vegetation from riparian areas causes increased water temperatures and erosion and gully formation, prevents runoff filtration, and eliminates food and cover for fish and wildlife (USEPA 1993b). If stocking of livestock is well managed, grazing can coexist with wetlands, benefiting farmers and increasing habitat diversity.

If best management practices are used and careful monitoring occurs, silviculture and timber removal may only minimally affect some wetland functions. Habitat and community structure, however, still may be seriously degraded.

Drainage, clearing, haul road construction, rutting, and ditching of forested wetlands, all may affect wetlands in some way, although the impact may only be temporary. Since timber removal generally occurs in 20-50 year rotations, careful harvest may no t be a permanent threat to wetlands. Adverse effects of timber harvest can include a rise in water table due to a decrease in transpiration, soil disturbance and compaction by heavy equipment, sedimentation and erosion from logging decks, skid trails, roads, and ditches, and drainage and altered hydrology from ditching, draining, and road construction (Shepard, 1994). By utilizing best management practices, hydrology and biogeochemical processes of wetlands may be altered for only one to three years following timber harvest (Shepard, 1994).

Pesticides and fertilizers used during silvi-cultural operations can enter wetlands through runoff as well as through deposition from aerial application. Fertilizers may contribute to eutrophication of wetlands.

Peat is mined for agricultural and horticultural uses on a relatively small scale in the United States (Mitsch and Gosselink 1993). Wetlands that are mined for peat are significantly modified, often being transformed into open water habitat (Camp Dresser and McKee, 1981). Peat mining not only removes peat but requires clearing of vegetation, drainage of the wetland, and creation of roads for equipment access to harvest the peat. These activities destroy the portion of the wetland selected for harvest an d degrade adjacent areas.

An alternative to mining peat in pristine wetlands is to mine in former wetlands or wetlands that have been severely degraded through conversion to other uses. Phosphate mining has resulted in the loss of thousands of acres of wetlands in central Florida (Mitsch and Gosselink, 1993). Other

types of mining operations can also degrade wetlands through hydrologic alterations, high metal concentrations, and/or decreased PH.

Acid drainage from active and abandoned mines causes extensive ecological damage. Acid mine drainage introduces high levels of acidity and heavy metals into the wetland environment through runoff and through direct drainage from mines into wetlands. The acidity and the high metal concentrations alter the biotic community composition and can result in mortality (Lacki et al. 1992, Mitsch and Gosselink, 1993). Although natural wetlands may have the capacity to buffer some of the acidity and absorb a certain amount of the pollutants, over time, the assimilative capacity will be saturated (Kent 1994; Weider 1993).

Although the European Union has developed a wide range of environmental directives that deal with wetland conservation as a major issue, there are still too many cases when this legislation is not strictly implemented and not enough effective measures are taken to protect these ecosystems. Some of the usual reasons for this include the shortage of funding to tackle every problem or threat, and the difficulty to properly identify non-point pollution sources and other causes of wetland degradation and their interrelationships, for which further research is often needed.

Another key issue that impairs wetland conservation and restoration projects is the lack of concern and involvement from local communities and stakeholders. Without the support and participation of people, organizations and institutions affected by or involved in wetland management, project are prone to fail. The existing conflicting interests that are at stake in some cases make this cooperation even more difficult to achieve.

The multiple causes of wetland degradation do not act separately. On the contrary, they usually have many different origins and there are complex relationships between them, so that ameliorating one aspect may be useless if others are not handled and, the other way around, different aspects may improve by acting on a single key issue. Therefore it is essential to identify these causes and their interrelationships before taking any restoration actions. Problems must be understood in order to find solutions to them.

Human activities such as fishing, aquaculture, tourism, etc., changes in climatic regimes, and the natural movement of different materials from the watershed are some of the causes of the appearance of invasive species in wetlands. These are species that rapidly increase their spatial distribution by expanding into native communities (Richardson, 2001). Wetlands seem to be especially affected compared to other types of habitat, both in terms of the number of invasive species that affect wetlands as a proportion of the total and the fact that invasive wetland species tend to be among the most aggressive and damaging (www.wwt.org.uk, 2012). Even though less than 6% of the earth's land mass is wetland, 24% (8 of 33) of the world's most invasive plants are wetland species (Zedler and Kercher, 2004).

Although not all the effects they produce are necessarily negative, the general outcome is in most cases certainly harmful. Some of the most significant effects are (Zedler and Kercher, 2004): Alteration of habitat structure by invasive plants, by lowering the water table, shifting from herbaceous to woody plants or vice versa, stabilizing river banks, or reducing topographic heterogeneity, reduction of plant and animal diversity and richness, Alteration of nutrient regimes and of food webs, changing water food quantity, quality, accessibility, etc.

The development of tourism in and around lake and wetland areas in the last decades has a strong influence in the degradation and loss of these ecosystems. Tourism-related activities involve the creation of infrastructure, direct disturbances to flora and fauna (by people, water sports, traffic, etc.), and in general an increase in all kinds of impacts related to urbanization, such as water extraction, dumping, sewage, introduction of alien species, etc. (Montes et al., 2007). These impacts should be considered by tourism management institutions and every actor involved, so that a sustainable tourism compatible with wetland conservation is developed.

The natural resources present in wetlands, such as fish and seafood, pasture, timber, etc. have always constituted an important source of income for local economies. However, if the exploitation of these resources is not sustainably managed it can become a serious threat to the ecosystem. Overgrazing of livestock, for instance, can result in high nutrient inputs from urea and manure, soil compacting, reduction of vegetation in stream banks and therefore increased erosion and reduced food availability for wildlife. As for fishing, if it is excessive it can cause local extinctions and highly modify ecosystem structure and the composition of plant, animal and plankton communities. In many occasions the intentional introduction of foreign invasive fish species for fishery purposes has also occurred. Aquaculture, on the other hand, can affect water quality through the input of feeds, drugs, pesticides and fecal wastes, and biodiversity through the introduction of exotic animals, parasites, and diseases. Hunting does not impair wetlands directly, but the intensive practice of this activity in wetland areas can contribute to their degradation through disturbances to wildlife, pollution from lead ammunition (nowadays forbidden in many countries), and the direct alteration of waterfowl communities.

2.2 People's Beliefs and wetland ecosystem degradation

According to Kyasimire (2010), people use beliefs/ taboos as a way of conserving wildlife. In relation to wildlife management, many natural/ cultural laws concerning conservation are practiced. Whoever is found guilty of committing "a taboo" is required to undergo a ritual cleansing. These taboos include: • Killing a pregnant animal; killing big animals like elephants, buffaloes, hippopotamus, gorillas, and chimpanzee; in the case of the last two, because they resemble humans. Killing a chimpanzee is permissible if the chimpanzee has raped a woman. It is also believed that cat family (lions, leopard, cheetah, serval, caracal and golden cats) "have bad spirit," and that if a man kills one, all the children born in his family will die. It is an offence to cut a big tree species for the sake of honey, rather one has to climb or use a ladder. Urinating or defecating in water bodies like rivers and lakes are also a taboo. She also noted that the Basongora tribe has a very strong taboo on wild meat; they still believe that if they eat bush meat, it brings bad omen to the cows. Taboos/laws such as these act as conservation management tools that control and check people's behavior/ characters, and attitudes towards wildlife. They also instill in them the respect and love for wildlife and make them aware that their survival and continuity are intertwined with wildlife conservation. These traditional by-laws help to protect the wildlife resources that are seen today in these Protected Areas.

The study found that the natural laws and regulations were always passed on from one generation to another through storytelling, a form of informal education, and would be recited around the fireplace soon after meals or during food preparation. These stories were normally told by the old people. Traditionally, parents, elders, guardians and older children were charged with the responsibility of ensuring that children are equipped with the basic cultural informal education. Topics like totems and their values; marriage initiation; respect for elders; protecting

the environment; hunting; social life; hygiene; water and gardens were taught and these stories encompassed issues like animals; birds; people; plants; trees; and aimed at equipping children with adequate knowledge that would make them a whole person as well as building up the memory capacity. Conservation ethics are mainly embodied within their daily cultural practices and customs. For example, according to Suzan (2009), all communities at clan level, people have totems in form of an animal. Each clan has a different animal and these totems include: elephants, red tailed monkeys, lions, bushbucks, duikers, Uganda Kob, leopard, crested crane. These totems are regarded as a member of kin, such as a sister or a brother, that one is prohibited from mistreating, killing or even eating. The logic behind these totems ensures that animal species of one's totem, which live near him/her, will not be killed. The more clans exist, the more animal/bird totems are protected and thus conserved.

The indigenous people used to live essentially in symbiosis with the forests or environments they lived in; activities included hunting; food gathering; honey gathering; clothing materials; collection of medicinal herbs which were conservation friendly to their environments on which they depended as these activities did not destroy the basic resources. Tradition, cultural events and worship of the ancestors have led to the conservation of the environment as people cannot destroy such areas instead preserve them the more.

There was sustainable use of biological resources as some communities had rules and rights they followed like controlled hunting where the animals killed were determined by the chief, the hunt was rudimentary and primitive with use of arrows and spears compared to current fire arms which have large scale extermination. (The Bambuti, Batwa in Kahuzi-Beiga National Park in

DRC). Wildlife was the source of man's livelihood in the following ways: As a source of food; wealth, prestige and fame; medicine/magic and witchcraft; clothing/bedding. These uses/ values, and perceptions towards wildlife, helped the people and contributed greatly to sustainable use of these resources. Human benefits are a multitude of direct anthropocentric benefits of wildlife in the areas of agriculture, science and medicine, industrial materials, ecological services, in leisure and in culture, aesthetic and intellectual value (Nabalegwa Personal communication, 2001).

Some of man beliefs and practices once not controlled lead to poor management of wetlands. These beliefs and practices lead to soil erosion, bush encroachment, deforestation and pollution. These effects generally sum up to environmental degradation. Environmental degradation is a result of multilateral processes that encroach on the environment. These include socio-economic, institutional and technological activities on the environment. High agitation for economic growth, intensification of agriculture, rising energy and transportation, and urbanization results into mismanagement of natural resources thus dynamic environment changes. This is in agreement with NEMA report (2004) which shows that poverty has been and is the major cause of environmental degradation and resource depletion. Poverty in the environment fragile areas triggers cause and effect of environmental degradation. Undesirable land use patterns such as poor farming systems lead to land degradation. These poor farming practices include monocropping, clearing and burning the vegetation and use of rudimentally techniques for production. Kimaru (2003) points out places that are densily populated such as Kigezi Highlands, vegetative fallowing has been largely abandoned which has resulted into loss of organic matter and soil biodiversity. Soil physical properties and soil nutrients will be affected. Social, economic and technological factors have a big bearing on the farming practices. The cutting of the trees leaves the land bear subjecting it to soil erosion. This leaves the soil layers to

be washed to the lowlands. The low lands are subjected to floods that causes loss of lives and property. Common areas which are victims of this include Bududa in Western Uganda.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter will indicate how data for the study will be collected, analyzed and interpreted in order to answer research questions or test the research hypothesis, thereby meeting the purpose of this study. This chapter will therefore comprise research design, study population, determination of sample size, sampling techniques, data collection methods, data collection instruments, quality control, and data analysis.

3.2 Research Design

This study will use a cross sectional research design. This research design means a process of conducting research on study variables in a relatively short or specified period of time (Sekaran, 2003). This type of research design was selected as ideal for this research because the study intended to study the causes and effects of ecosystem degradation within a specific period of time. In this study, numerical figures and descriptive information will be obtained, giving it both a quantitative and qualitative research dimension. The study will thence use both qualitative and quantitative approaches during sampling, data collection, quality control, and analysis. At data collection stage, qualitative design will involve administering open ended interview to the respondents, whilst the quantitative design will involve administering closed ended interview and questionnaires to household/ community members in Bussi Island. In sampling, both purposive and simple random sampling techniques will be used to select local leaders/NEMA officials and local community members respectively

3.3 Study Area and Population

The study was done in Bussi Island in Bussi Sub-county in Wakiso district in central Uganda. This island covered over 1000 households. This area was found to be a best place for operationalisation of the study variables for the study. The study focused on causes i.e. knowledge, practices, and beliefs leading to wetland ecosystem degradation. The knowledge, practices and beliefs formed the independent variable of the study whilst wetland ecosystem degradation formed the dependent variable of the study. Wetland Ecosystem degradation was measured using human activities like grazing, housing development, cultivation, groundwater extraction and artificial drainage, population growth (size of the population), brick molding and many others. The study was limited to the period between 2009 and 2013. This period was chosen because this is when a lot of encroachments have been done on the island (NEMA, 2009)

The study population consisted of 98 constituting 80 households in Bussi Island (UBOS household survey, 2011). These consisted of 80 local community members and 11 local leaders and 7 NEMA officials in the district. The local community members were chosen because they form a big part of people encroaching wetlands in the area. The local leaders were chosen because they are aware of long preserved perceptions and measures towards ecosystem conservation. NEMA officials were also chosen because they are aware of the policies in place and the challenges faced in conserving wetland ecosystems.

3.4 Determination of the Sample Size

The sample size was determined using the table in Appendix C from a study by Morgan and Krejcie (1970, as cited in Amin, 2005). This therefore meant that the sample included 66 local community members. The sample sizes are depicted in Table 3.1.

Table 3. 1: Sample Size of Respondents and Sampling Technique

Category of Population	Population Size	Sample Size	Sampling Technique
Local community members	80	66	Simple Random sampling
Local leaders	11	5	Purposive sampling
Wakiso NEMA officials	7	3	Purposive sampling
Total	**98**	**72**	

Source: UBOS (2011)

3.5 Sampling Techniques

The study used both probabilistic and non-probabilistic sampling techniques.

3.5.1 Probabilistic Sampling Techniques

From the existing probability sampling techniques, the study used simple random sampling technique. Simple random sampling was used to select local community members in Bussi Island. This technique was chosen because the category of local community members has a large population size and as such warranted simple random sampling to minimize sampling bias (Mugenda & Mugenda, 2003).

3.5.2 Non-probabilistic Sampling Techniques

From the existing non-probabilistic sampling techniques, purposive sampling was employed to select local leaders and NEMA officials who were targeted due to their perceived knowledge arising out of known experience that they have. This technique was employed following the postulate that if sampling has to be done from smaller groups of key informants, there is need to

collect very informative data, and thus the researcher needs to select the sample purposively at one's own discretion (Sekaran, 2003).

3.6 Data Collection Methods and instruments

3.6.1 Survey

This was used to collect primary data from local community members, and, it involved use a semi-structured questionnaire depicted in Appendix A. The method of survey using a semi-structured questionnaire was deemed appropriate since part of the questionnaire offers the local community members a choice of picking their answers from a given set of alternatives while the other part of the questionnaire allows them to qualify their responses (Amin, 2005). The Questionnaires were used to collect data from the local community members in Bussi Island. The questionnaire (Appendix I) was used in this case because it has proved to be an invaluable method of collecting a wide range of information from a large number of individuals especially when it comes to people like the local community members (Sekaran, 2003). The questionnaires are popular because the respondents filled them in at their own convenience and are appropriate for large samples. The questionnaire was designed with both open and closed ended questions (Amin, 2005).

3.6.2 Interview

This was used to collect primary data from Local leaders and NEMA officials. It involved use of a semi-structured interview guide depicted in Appendix B. The method of interview using a semi-structured interview guide was deemed appropriate since the aforementioned categories of staff had vital information yet no time to fill in questionnaires (Sekaran, 2003). The researcher prepared and used a semi-structured interview guide to conduct interviews with local leaders and

NEMA officials in Wakiso district. Interviews were chosen because they were thought to provide in-depth information about a particular research issue or question. Still, interviews were chosen because they made it is easy to fully understand someone's impressions or experiences, or learn more about their answers as compared to questionnaires. According to Mugenda and Mugenda (2003), interviews are advantageous in that they provide in-depth data which is not possible to get using questionnaires.

3.7 Data Quality Control of the Instrument

3.7.1 Validity

The validity of the questionnaires was established using the content validity test. Using the ratings the content validity indices were computed. The Cronbach Alpha method of internal consistency was used to compute the reliability of the measures of the variables of the study using various questionnaire items administered to respondents (Kothari, 1990).

Table 1.2: Content Validity Indices for the Questionnaire

Variable	Description	No. of Items	Content validity index
Independent	People's knowledge	11	.788
	People's beliefs	14	.761
Dependent	Wetland degradation	3	.0743

Source: *Primary data*

According to Content validity Index, the questionnaire was considered valid since all the coefficients in Table 2 were above 0.7 which is the least recommended CVI in survey studies (Amin, 2004; Gay, 1996).

3.7.2 Reliability

Gay (1996) defined reliability as the degree of consistency that the instrument demonstrates. After pilot testing in the field, reliability of the instrument, on multi-item variables (i.e. people's perception on the causes of wetland degradation) was tested via the Cronbach Alpha Method provided by Statistical Package for the Social Scientists (Foster, 1998). The researcher used this method because it was expected that some items or questions would have several possible answers. The researcher established reliability of the questionnaires by computing the alpha coefficient of the items (questions) that constituted the dependent variable and that of the items that constituted the independent variable. The results are as on Table 3.3:

Table 3.3: Reliability indices for the respective sections of the questionnaire

Variable	Description	No. of Items	Cronbach alpha
Independent	People's knowledge	11	.831
	People's beliefs	14	.767
Dependent	Wetland degradation	3	.767

According to Cronbach Alpha Coefficient Test (Cronbach, 1971), the questionnaire was considered reliable since all the coefficients in Table 4 were above 0.7 which is the least recommended CVI in survey studies (Amin, 2004; Gay, 1996).

After the approval of the proposal, the researcher designed the questionnaire, validated it then tested its reliability using the Cronbach Alpha method. After modifying the instrument, the researcher secured a letter of introduction to assist the researcher proceed with the study. Two

research assistants were selected from the undergraduate classes to help in distribution and collection of questionnaires to and from respondents.

3.8 Data Analysis

The process of data analysis involved editing in order to check for errors and omissions, coding were employed to reduce the data to a meaningful pattern of responses and tabulation of the findings was done in order to prepare data, analyze and compile the research report. The quantitative data was then be presented in tables, pictograms and histograms where as the qualitative data was presented in form of literature presentation

Multiple regressions were used to determine the degree of relationships between more than two variables. Correlation coefficients were computed to establish the degree of the relationships between the independent variables and the dependent variable and to determine the strength and direction of their relationship. Here, multiple regressions were used to determine the degree of relationships between more than two variables. Correlation coefficients were computed to establish the degree of the relationships between the independent variables and the dependent variable and to determine the strength and direction of their relationship. The correlation coefficients results were obtained at 0.01 level (2-tailed) significance and at 0.05 level (2-tailed) significance.

3.11 Ethical considerations

The major ethical problem in this study was the privacy of the subjects and confidentiality of their information. To ensure privacy, the subjects were informed upfront that indeed their names were not be required, that they have the right to leave questions unanswered for which they do

not wish to offer the requisite information, and that the researcher did not put the respondent under pressure and if this happened (Mugenda & Mugenda, 2003). To ensure confidentiality, the subjects were informed upfront that the information they give was solely used for academic purposes and data obtained on private matters were treated in confidence (Amin, 2005).

CHAPTER FOUR

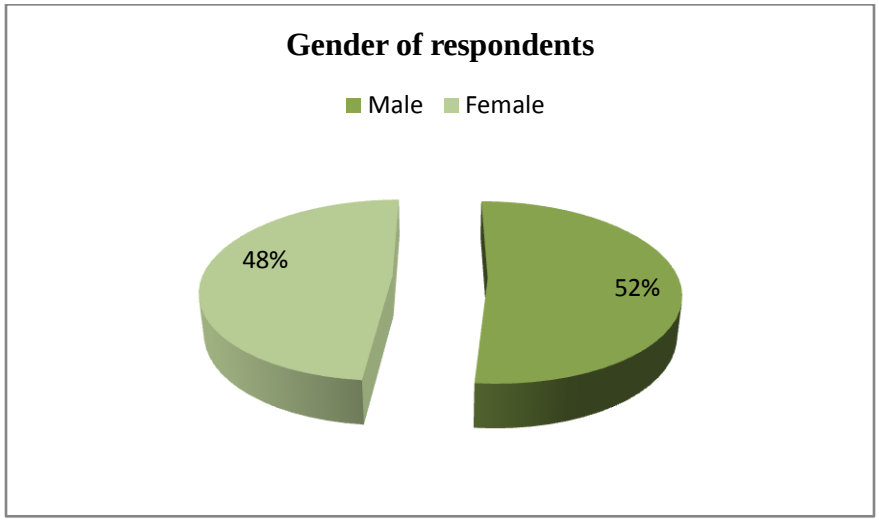
PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter presents findings of the study which was conducted about the assessment of wetland ecosystem degradation in Bussi Island Wakiso district. The findings are presented according to the objectives of the study as presented in chapter 1 that is: to assess the people's knowledge of wetland ecosystem conservation in Bussi islands and to investigate people's beliefs related to wetland ecosystem degradation in Bussi islands. In the first section, the social background of the respondents is given. In the second section, the empirical analysis of study findings are analyzed (that is findings on people's knowledge of wetland ecosystem conservation in Bussi islands and people's beliefs related to wetland ecosystem degradation in Bussi islands) and the last section handles the testing of hypothesis.

4.1 Background of the Respondents

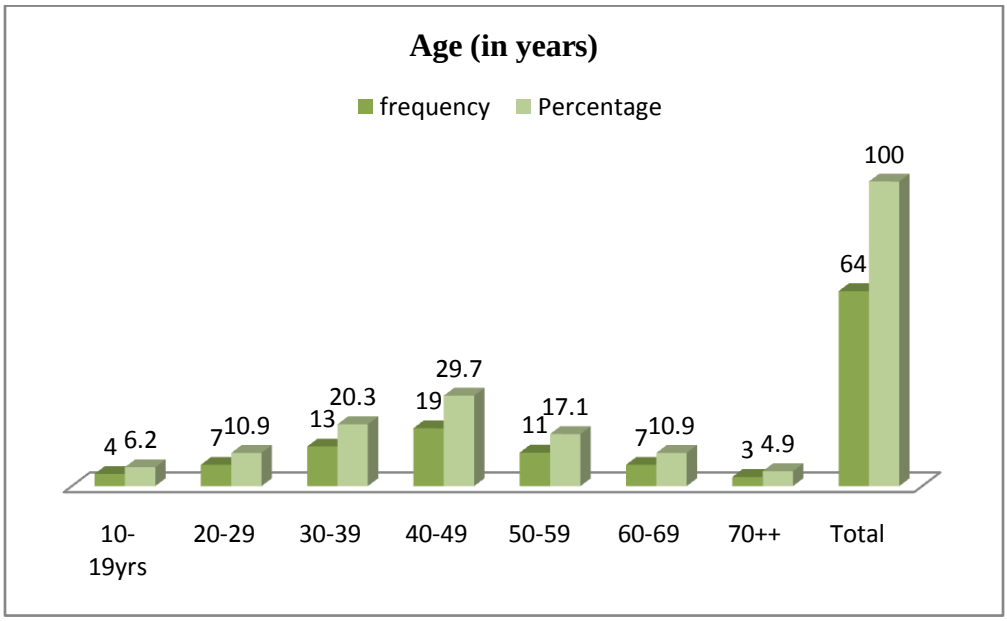
Figure 4.1: Gender of respondents



Source: primary data

The study was conducted mainly from the male respondents who constituted 51.5%. Females on the other hand, were represented by 48.4% of the respondents. This directly tells us that no matter the percentage of males and females who attended the study, all sexes were represented which means a lot since all sexes are depicted to participate heavily in wetland degradation.

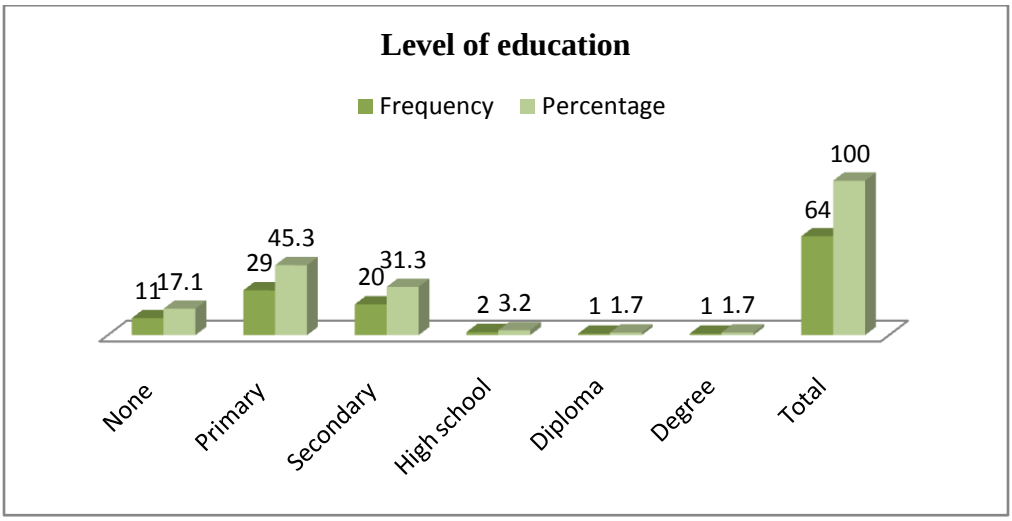
Figure 4.2: age of respondents



Source: primary data

Most of the respondents had 40-49years and these took the highest toll of 29.7%. Those who were in the category of 30-39 constituted 20.3%, 50-59years were represented by 17.1%. Cumulatively, since the biggest portion of the respondents was above 30years with a percentage of almost 85%, it directly means that the study was attended too and informed by people who had spent enough years observing what is going on in the area and elsewhere. Thus, their responses are worthy to be believed. This implies that wetland ecosystems degradation varies according to different age group. The higher the age group, the less possibility of encroaching wetlands and the lower the age, the higher the possibility of encroaching on wetland ecosystems.

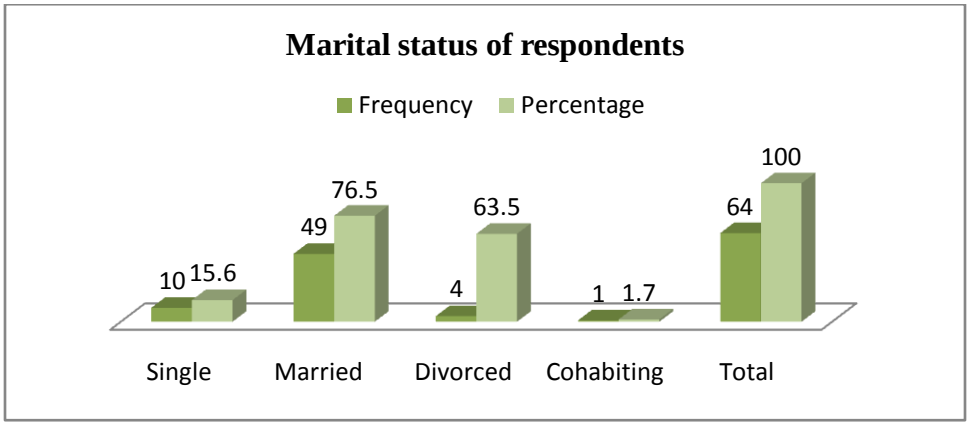
Figure 4.3: Level of education of respondents



Source: primary data

Additionally, most of the respondents had studied up to primary level and these took 45.3%. Those who had studied up to secondary level constituted 31.3%. 17.1% had not gone to school or had no education at all. Basing on the type of study, the study was informed by the very local people who reported information to the study as they unveiled. This implies that wetland ecosystems degradation varies according to different education level. Since the study was attended too by more less educated people, it means that wetland degradation is much likely to happen the lower the level of education becomes and vice versa.

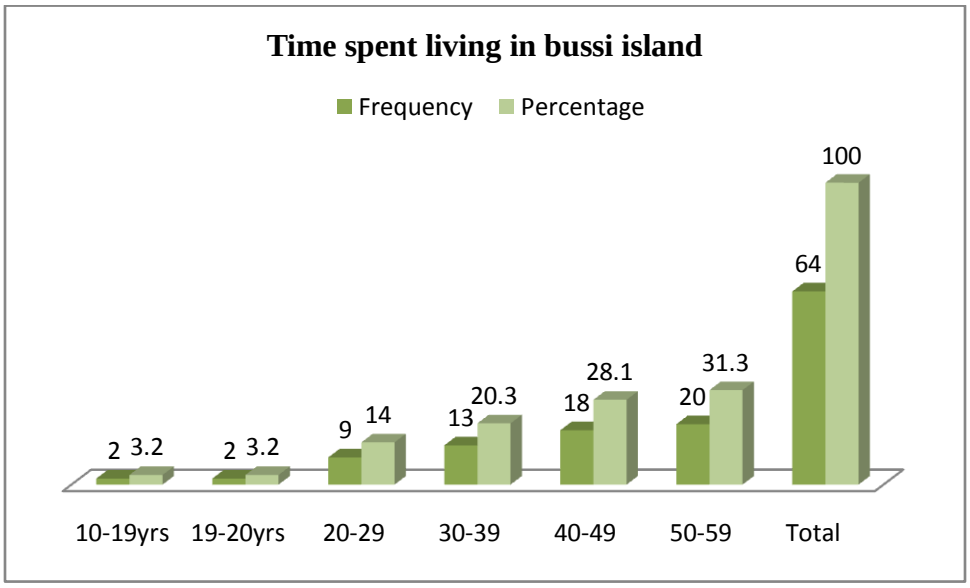
Figure 4.4: Marital status of respondents



Source: primary data

The study still found out that most of the respondents were married and these were 76.5%. As far as this study is concerned, it purely means that the study was informed by people who had their households in the area looking after their families using the resources from wetlands. These thus are thought to provide the required information as regards wetland degradation in Bussi islands.

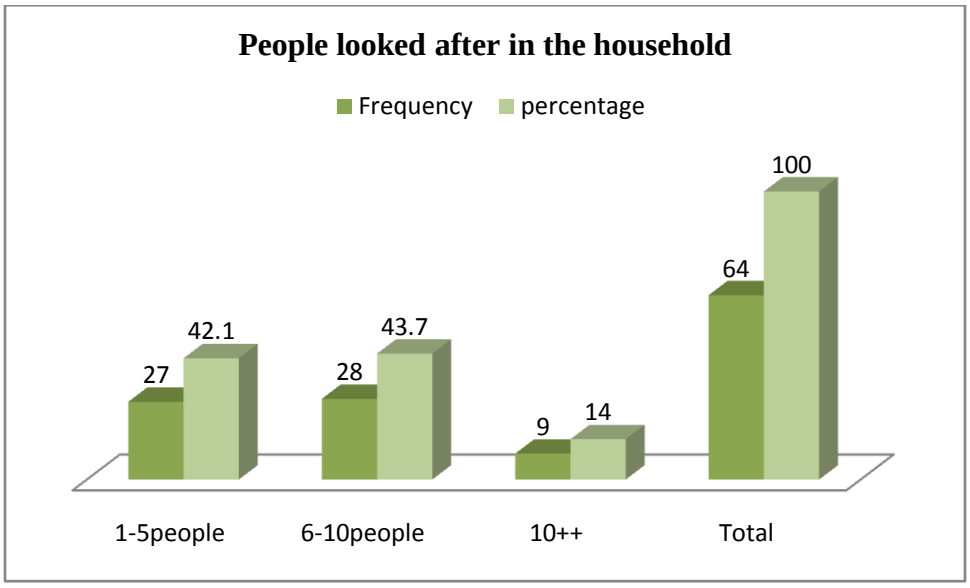
Figure 4.5 Time spent living in Bussi islands (in years)



Source: primary data

On the other hand, most of the respondents had lived in Bussi islands for the last 50-59years and these took 31.3% of the respondents. Those who had lived for 40-49years took 28.1%. Therefore, it can cumulatively be reached that over 80% of the respondents had spent over 30years on the island. This thus means that the study was informed by people who had lived in the area for a long period of time and they completely reported out of experience.

Figure 4.6: People looked after in Household



Source: primary data

Lastly, most of the respondents were looking after people between 6-10 and these were 43.7% .Those who had 1-5people were represented by 42.1%. This means that about 85% of the respondents were looking after 1-10people. This number is too big and reflects the big population of people in the area. This already means that wetlands were susceptible to be degraded.

4.2. Empirical Findings

4.2.1 People's knowledge on wetland ecosystem conservation in Bussi islands.

Table 4.1: Factors influencing People's knowledge of wetland ecosystem conservation in Bussi islands

	Mean	SD
wetland degradation reduces water levels	1.16	1.023
Hunting wetland animals poses a big threat to wetland degradation	1.49	1.183
Wetland enrichment leads to change of seasons	1.50	.701
There are some trees that cannot be cut down because of their cultural	2.21	.686

importance and attachment		
Wetland degradation leads to loss of fish	2.37	.509
Wetland degradation leads to salty water	2.42	.493
Wetland degradation leads to water scarcity	2.52	.579
Wetland degradation leads to desertification	2.60	.498
Throwing excretes in wetlands degrades environment	3.18	.790
wetland degradation leads to habitant loss	3.22	.676
Wetland degradation leads to drought	3.47	.570
deforestation leads to low rainfall	4.55	.555
Wetland degradation leads to soil erosion	4.55	.567
Some wetlands ecosystems serve as medicine or herb	4.60	.498

The results from the study showed that, overall; Deforestation around wetlands leads to its degradation. This was strong agreed by 33% of respondents (22.5% agreed) and it was indicated with a relatively higher mean above 3.5 (3.49). The table above indicates that the calculated value of the Chi-Square statistic was 3.000 at six degrees of freedom. Because the significance level (0.809) is greater than the rejection threshold of 0.05, H0 (Deforestation around wetlands leads to its degradation) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Deforestation around wetlands leads to its degradation.

Overall, Hunting from the wetlands destroys habitants. Since 28.5% were not sure, 22.5% disagreed (7.5% strongly disagreed) and it was indicated with a lower mean of 3.33. The table above indicates that the calculated value of the Chi-Square statistic was 3.783 at eight degrees of freedom. Because the significance level (0.721) is greater than the rejection threshold of 0.05, H0 (hunting from wetlands destroys habitants) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Hunting from the wetlands destroys habitants.

The study results still indicate that molding bricks in wetlands degrades it. This is because 40.5% were not sure and it was indicated with a lower mean of 3.18. The table above indicates that the calculated value of the Chi-Square statistic was 6.6973 at eight degrees of freedom. Because the significance level (0.157) is greater than the rejection threshold of 0.05, H0 (molding bricks in wetlands degrades it) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that molding bricks in wetlands degrades it.

Cultivating in wetlands leads to their degradation was indicated by not sure at 46.5% and it was indicated with a lower mean of 3.08. The table above indicates that the calculated value of the Chi-Square statistic was 9.312 at six degrees of freedom. Because the significance level (0.057) is greater than the rejection threshold of 0.05, H0 (cultivating in wetlands leads to their degradation) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that cultivating in wetlands leads to their degradation.

Bush fires degrade wetlands. Most of respondents remained unsure (48%) indicating the level of ignorance. And it was indicated with a lower mean of 3.01. The table above indicates that the calculated value of the Chi-Square statistic was 9.766 at six degrees of freedom. Because the significance level (0.350) is greater than the rejection threshold of 0.05, H0 (Bush fires degrade wetlands) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Bush fires degrade wetlands.

Releasing human and other wastes degrade wetlands. Most of respondents remained unsure (31.5%) indicating the level of ignorance. And it was indicated with a lower mean of 3.01. The table above indicates that the calculated value of the Chi-Square statistic was 10.333 at six degrees of freedom. Because the significance level (0.317) is greater than the rejection threshold of 0.05, H0 (Bush fires degrade wetlands) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Bush fires degrade wetlands.

Poor harvesting of fishes leads to their extinct. Most of respondents remained unsure (46.5%) indicating the level of ignorance. And it was indicated with a lower mean of 3.01. The table above indicates that the calculated value of the Chi-Square statistic was 11.540 at eight degrees of freedom. Because the significance level (0.542) is greater than the rejection threshold of 0.05, H0 (Bush fires degrade wetlands) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Bush fires degrade wetlands.

Change of drainage pattern degrades wetland ecosystem. Most of respondents remained unsure (43.5%) indicating the level of ignorance. And it was indicated with a lower mean of 2.13. The table above indicates that the calculated value of the Chi-Square statistic was 11.871 at eight degrees of freedom. Because the significance level (0.573) is greater than the rejection threshold of 0.05, H0 (Bush fires degrade wetlands) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Bush fires degrade wetlands.

Increased number of people in the area leads to wetland degradation. Most of respondents remained unsure (45%) indicating the level of ignorance. And it was indicated with a lower mean of 2.11. The table above indicates that the calculated value of the Chi-Square statistic was 15.126 at six degrees of freedom. Because the significance level (0.530) is greater than the rejection

threshold of 0.05, H0 (Bush fires degrade wetlands) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Bush fires degrade wetlands.

Grazing in wetlands leads to their degradation. Most of respondents remained unsure (55%) indicating the level of ignorance. And it was indicated with a lower mean of 3.01. The table above indicates that the calculated value of the Chi-Square statistic was 10.164 at six degrees of freedom. Because the significance level (0.148) is greater than the rejection threshold of 0.05, H0 (Bush fires degrade wetlands) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Bush fires degrade wetlands.

Lastly, Pesticide use destroys the wetlands. Most of respondents disagreed (40.5%) indicating the level of ignorance. And it was indicated with a lower mean of 1.86. The table above indicates that the calculated value of the Chi-Square statistic was 12.062 at six degrees of freedom. Because the significance level (0.254) is greater than the rejection threshold of 0.05, H0 (Bush fires degrade wetlands) could not be rejected but accepted. Using the Chi-Square test procedure, it was determined that Bush fires degrade wetlands.

On the other hand, it was indicated by most of the respondents that they had some knowledge of wetland ecosystems conservation since they said that: Deforestation around wetlands leads to its degradation. This is confirmed by a mean of 3.49, which confirms that they knew that deforestation destroys wetlands.

Table 4.2: Relationship between social background factors and factors influencing People's knowledge of wetland ecosystem conservation in Bussi islands

		1	2	3	4	5	6	7
Sex1	Pearson Correlation	1						

	Sig. (2-tailed)							
	N	64						
age 2	Pearson Correlation	.095	1					
	Sig. (2-tailed)	.456						
	N	64	64					
Education3	Pearson Correlation	-.108	.166	1				
	Sig. (2-tailed)	.694	.190					
	N	64	64	64				
marital status4	Pearson Correlation	-.047	-.141	.102	1			
	Sig. (2-tailed)	.715	.268	.421				
	N	64	64	64	64			
Time spent 5	Pearson Correlation	.011	-.008	-.107	-.239	1		
	Sig. (2-tailed)	.934	.949	.401	.057			
	N	64	64	64	64	64		
Household size6	Pearson Correlation	-.020	-.029	.021	-.079	-.027		
	Sig. (2-tailed)	.876	.823	.870	.534	.831		
	N	64	64	64	64	64		
Knowledge7	Pearson Correlation	-.029	-.025	.133	.078	.053	-.031	1
	Sig. (2-tailed)	.821	.842	.295	.541	.680	.807	
	N	64	64	64	64	64	64	64

*. Correlation is significant at the 0.05 level (2-tailed).

From the table above, the results from the study revealed that the people's knowledge negatively leads to wetland ecosystem degradation in Bussi islands at household level. This was based on the fact that, for most of the items in the correlation table above were indicated with negative coefficients**,** given the predetermined significance of 0.05. Detailed analysis of the variables follows below.

The results from the study showed that, overall; sex negatively influenced people's knowledge and beliefs about wetland degradations and this served a big role in degrading environment. The

table above indicates that the calculated value of the Pearson correlation statistic was -.290. Because the significance level (0.821) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that sex was a major determinant of people's perceptions towards the causes of wetland degradation in Bussi islands.

Age was also proved to have a differing negative influence on people's knowledge and beliefs. It was discovered that people of different ages had different perceptions on wetland degradation. Particularly, people above 50years had much positive knowledge and beliefs towards wetland protection than people who lived below 50years. The table above indicates that the calculated value of the Pearson correlation statistic was -.108. Because the significance level (0.842) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that age was a major determinant of people's knowledge and beliefs towards wetland degradation in Bussi islands. This may be because a number of youths have grown in the area who seeks to farm, burn charcoal and fish in wetlands.

Education was also another factor that established a difference in people's knowledge and beliefs. It was discovered that most of the people who came in Bussi islands were either illiterates or stopped in primary level of education. According to Susan (2009), she confirms that level of education impacts severely to wetland degradation in developing countries since uneducated fellows find no use in protecting wetlands. The table above indicates that the calculated value of the Pearson correlation statistic was .133. Because the significance level (.295) is less than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that education was a major determinant of people's perception on the causes, consequences and measures put in place to protect wetland degradation. This was congruent to

what was reported by one of the NEMA officials found in Bussi sub-county. He was quoted saying,

> *"I also believe that wetland degradation is being worsened in Bussi islands because our people in the area are not educated and lack the technical knowhow to protect them…they all fight to dig in wetlands and they feel that by harvesting small fish is profitable. Such beliefs are partly explained by lack of enough education and embedded on lack of awareness…"*

Marital status of respondents was also reported to have a moderate effect on wetland degradation. Marital status of respondents was also another factor that established a difference in people's knowledge. It was discovered that most of the people who in Bussi islands were either married. The table above indicates that the calculated value of the Pearson correlation statistic was .078. Because the significance level (.541) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that marital status had a moderate impact on people's perception on the causes, consequences and measures put in place to protect wetland degradation.

Time spent in Bussi Island was showed to have a negative influence on wetland degradation and this was showed with a positive and weak coefficient value of (.053) and significance level of (.680). This is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that time people hand spent in Bussi islands had made them to start destroying wetlands since most of them had spent in the area for above 30years. One of the NEMA officials was quoted saying:

"The biggest struggle is found with the people who have been living in this area, such people take NEMA officials for granted and they have been used by some corrupt staffs who they give some money to use wetlands and destroy forests around the islands…"

The number of people in the household also seemed to differentiate between different people. For instance, the more the numbers in rural areas, the high the possibility of destroying wetlands and the less the number of people in households, the lower the possibility of destroying wetlands (Mung'ong'o et al., 2004). This thus tell us that people in wetlands, do not choose to destroy wetlands but rather their expansion in numbers, leads them to encroach wetlands to seek for settlement and survival. Basing on the table above indicates that the calculated value of the Pearson correlation statistic was -.031. Because the significance level (0.807) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that household size was a major determinant of people's perception on causes of wetland degradation. One of the village leaders was noted saying:

"Families have expanded since 1990s and we have seen new people coming in Bussi islands seeking for what to do…I think that can explain very well why people encroach wetlands especially for you who is undertaking research."

Therefore, basing on the argument above, it is clear as to why a big number end up encroaching wetlands. This is because their knowledge on protecting wetlands is quenched and refurbished to think that is on their benefit to encroach wetlands directly and indirectly.

Table 4.3: Factors influencing people's beliefs related to wetland ecosystem degradation in Bussi islands

		1	2	3	4	5	6	7
Sex1	Pearson Correlation	1						
	Sig. (2-tailed)							
	N	64						
age 2	Pearson Correlation	.095	1					
	Sig. (2-tailed)	.456						
	N	64	64					
Education3	Pearson Correlation	-.108	.166	1				
	Sig. (2-tailed)	.394	.190					
	N	64	64	64				
marital status4	Pearson Correlation	-.047	-.141	.102	1			
	Sig. (2-tailed)	.715	.268	.421				
	N	64	64	64	64			
Time spent 5	Pearson Correlation	.011	-.008	-.107	-.239	1		
	Sig. (2-tailed)	.934	.949	.401	.057			
	N	64	64	64	64	64		
Household size6	Pearson Correlation	-.020	-.029	.021	-.079	-.027	1	
	Sig. (2-tailed)	.876	.823	.870	.534	.831		
	N	64	64	64	64	64	64	
Beliefs 7	Pearson Correlation	-.036	-.009	.153	-.018	.021	.259*	1
	Sig. (2-tailed)	.778	.943	.227	.887	.870	.039	
	N	64	64	64	64	64	64	64

*. Correlation is significant at the 0.05 level (2-tailed).

From the table above, the results from the study revealed that the people's knowledge negatively leads to wetland ecosystem degradation in Bussi islands at household level. This was based on the fact that, for most of the items in the correlation table above were indicated with negative coefficients**,** given the predetermined significance of 0.05. Detailed analysis of the variables follows below.

The results from the study showed that, overall; sex negatively influenced people's knowledge and beliefs about wetland degradations and this served a big role in degrading environment. The table above indicates that the calculated value of the Pearson correlation statistic was -.290. Because the significance level (0.821) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that sex was a major determinant of people's perceptions towards the causes of wetland degradation in Bussi islands.

Age was also proved to have a differing negative influence on people's knowledge and beliefs. It was discovered that people of different ages had different perceptions on wetland degradation. Particularly, people above 50years had much positive knowledge and beliefs towards wetland protection than people who lived below 50years. The table above indicates that the calculated value of the Pearson correlation statistic was -.108. Because the significance level (0.842) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that age was a major determinant of people's knowledge and beliefs towards wetland degradation in Bussi islands. This may be because a number of youths have grown in the area who seeks to farm, burn charcoal and fish in wetlands.

Education was also another factor that established a difference in people's knowledge and beliefs. It was discovered that most of the people who came in Bussi islands were either illiterates or stopped in primary level of education. According to Susan (2009), she confirms that level of education impacts severely to wetland degradation in developing countries since uneducated fellows find no use in protecting wetlands. The table above indicates that the calculated value of the Pearson correlation statistic was .133. Because the significance level (.295) is less than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it

was determined that education was a major determinant of people's perception on the causes, consequences and measures put in place to protect wetland degradation. This was congruent to what was reported by one of the NEMA officials found in Bussi sub-county. He was quoted saying,

> *"I also believe that wetland degradation is being worsened in Bussi islands because our people in the area are not educated and lack the technical knowhow to protect them…they all fight to dig in wetlands and they feel that by harvesting small fish is profitable. Such beliefs are partly explained by lack of enough education and embedded on lack of awareness…"*

Marital status of respondents was also reported to have a moderate effect on wetland degradation. Marital status of respondents was also another factor that established a difference in people's knowledge. It was discovered that most of the people who in Bussi islands were either married. The table above indicates that the calculated value of the Pearson correlation statistic was .078. Because the significance level (.541) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that marital status had a moderate impact on people's perception on the causes, consequences and measures put in place to protect wetland degradation.

Time spent in Bussi Island was showed to have a negative influence on wetland degradation and this was showed with a positive and weak coefficient value of (.053) and significance level of (.680). This is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that time people hand spent in Bussi islands had made them to start

destroying wetlands since most of them had spent in the area for above 30years. One of the NEMA officials was quoted saying:

> *"The biggest struggle is found with the people who have been living in this area, such people take NEMA officials for granted and they have been used by some corrupt staffs who they give some money to use wetlands and destroy forests around the islands…"*

The number of people in the household also seemed to differentiate between different people. For instance, the more the numbers in rural areas, the high the possibility of destroying wetlands and the less the number of people in households, the lower the possibility of destroying wetlands (Mung'ong'o et al., 2004). This thus tell us that people in wetlands, do not choose to destroy wetlands but rather their expansion in numbers, leads them to encroach wetlands to seek for settlement and survival. Basing on the table above indicates that the calculated value of the Pearson correlation statistic was -.031. Because the significance level (0.807) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that household size was a major determinant of people's perception on causes of wetland degradation. One of the village leaders was noted saying:

> *"Families have expanded since 1990s and we have seen new people coming in Bussi islands seeking for what to do…I think that can explain very well why people encroach wetlands especially for you who is undertaking research."*

Therefore, basing on the argument above, it is clear as to why a big number end up encroaching wetlands. This is because their beliefs on protecting wetlands are diverted to think that it is good.

Table 4.4: Descriptive Statistics on people's beliefs related to wetland degradation

Items	Mean	Std. Deviation
I believe that wetland degradation reduces water levels	1.16	1.023
I know that wetland degradation leads to habitant loss	1.49	1.183
Throwing executions in wetlands degrades environment	1.50	.701
Hunting wetland animals poses a big threat to wetland degradation	2.21	.686
There are some trees that cannot be cant down because of their cultural importance and attachment	2.37	.509
Some wetlands ecosystems serve as medicine or herb	2.42	.493

The results in table 4.4 above revealed that the means for most of the items were indicated by means above 3.5. It was found out that out of the 11-items that were introduced to respondents, 9-item had data means below 3.5 and 4-items had a data mean of above 3.5. Based on the scale of 1-strongly disagree to 5-strongly agree, any data mean of above 3.5 indicates non-existence of the variables understudy. This thus, statistically means that people's beliefs were the underlying cause of wetland degradation in Bussi Islands. Among the items that had means below 3.5 which confirms this claim included*; I know that wetland degradation leads to habitant loss (3.22); Throwing excretes in wetlands degrades environment (3.18); Wetland degradation leads to desertification (2.60); Wetland degradation leads to water scarcity (2.52); Wetland degradation leads to salty water (4.42); Wetland degradation leads to loss of fish (2.37); There are some trees that cannot be cut down because of their cultural importance and attachment (2.21); Wetland enrichment leads to change of seasons (1.50); Hunting wetland animals poses a big threat to wetland degradation (1.49); I believe that wetland degradation reduces water levels (1.16).*

Therefore, basing on the above perceptions people held towards wetland ecosystem degradation, it is crystal clear that their beliefs were the underlying cause to wetland ecosystem degradation. For instance, most people believed that habitant loss had nothing to do with wetland degradation and this is the reason why may most of them engage in hunting and poor fishing methods. Still when you look critically into their beliefs above, it shows that they did not know that desertification is caused by wetland degradation. But when in fact according to scholars like Mharapara et al (1997) had earlier found out that desertification is purely caused by wetland degradation since people encroach and reclaim swamps which are too important in rainfall formation and a bleeding ground for most of the organisms that participate in water formation and formation of green/chlorophyll in plants. Add on the fact that many people did not know that change of seasons is due to wetland encroachment.

However, the 4-item that indicated that to a small extent, people' beliefs in the area were not the underlying cause of wetland degradation. For instance, "*Some wetlands ecosystems serve as medicine or herb (4.60); Wetland degradation leads to soil erosion (4.55); I believe that deforestation leads to low rainfall (4.55); Wetland degradation leads to drought (3.47).* These items had means above 3.5 which means that they were agreed or strongly agreed by most of the respondents and hence confirms that people believed so much that wetland ecosystems and species were medical herbs, help in the formation of rainfall, and wetland degradation can be the underlying cause of soil erosion and drought. Therefore, such beliefs can act as the reason why people in the area can fight against wetland degradation.

Contrary to what key informants indicated. Most of them indicated that people's beliefs were too diverse and completely were the underlying cause of wetland degradation. For instance, one of the NEMA staff in the area reported,

> *…we have fought with people day and morning to avoid poor fishing methods in Bussi but this activity has been continuing…many people even tend to think that by cultivating in wetlands then, they do much in conserving them…such beliefs are too botanical and ill minded…that they can cause their degradation.*

For example, one of the UFA officials was quoted saying;

> *"We have tried to sensitize communities in this area regarding wetland conservation but because they look at forests and wetlands as a source of their income, they do not take any effort to see that they conserve them. We only employ rigorous measures to stop them…"*

On the other hand, one of the local leaders said,

> *"Our people naturally do not know that their actions to the environment is what destroys because when you pass via wetlands, you realize that people wash their clothes with soaps in waters were they also want to get fish. Others choose to urinate and defect or through garbage in water or forests. This is too bad and it is a complete truth of lack of knowledge…"*

Such beliefs confirms why wetland degradation in Bussi Sub-County is paramount since a big number of key informants indicate that most people still see wetlands as their source of income in terms fishing small fish, making bricks in wetlands, grazing in forests, hunting and so many more.

Mharapara et la (1997) confirms the above allegation or people use beliefs/ taboos as a way of conserving or degrading wildlife or wetlands. In relation to wildlife management, many natural/ cultural laws concerning conservation are practiced. Whoever is found guilty of committing "a taboo" is required to undergo a ritual cleansing. These taboos include: Killing a pregnant animal; killing big animals like elephants, buffaloes, hippopotamus, gorillas, and chimpanzee; in the case of the last two, because they resemble humans. Killing a chimpanzee is permissible if the chimpanzee has raped a woman. It is also believed that cat family (lions, leopard, cheetah, serval, caracal and golden cats) "have bad spirit," and that if a man kills one, all the children born in his family will die. It is an offence to cut a big tree species for the sake of honey, rather one has to climb or use a ladder. Urinating or defecating in water bodies like rivers and lakes are also a taboo. Kyasimire (2010) also noted that the Basongora tribe has a very strong taboo on wild meat; they still believe that if they eat bush meat, it brings bad omen to the cows. Taboos/laws such as these act as conservation management tools that control and check people's behavior/ characters, and attitudes towards wildlife. They also instill in them the respect and love for wildlife and make them aware that their survival and continuity are intertwined with wildlife conservation. These traditional by-laws help to protect the wildlife resources that are seen today in these Protected Areas.

Therefore, it is from the above findings that the researcher reached on the peak to conclude that people's beliefs in Baamunaanika Sub-County had very much been the cause of wetland degradation.

According to Kat (2003) ascertain that people's knowledge can either degrade or conserve wetland ecosystems. Specifically, knowledge especially indigenous knowledge is a very broad

term that comprises all aspects of life - food, farming, and hunting, medicine preparation and treatment, arts, crafts and technologies used by indigenous cultures around the world. What distinguishes this knowledge from western knowledge systems is its integration in the culture and cosmology as a whole. Each aspect of indigenous knowledge is but one strand of knowledge, intricately interwoven and inextricably linked to the whole web of existence. Indigenous knowledge on the other hand seeks to comprehend the interwoven aspects of its ecosystem by means of identification rather than by abstraction (Kat, 2003).

Therefore, Basing on the primary findings obtained from respondents, it is crystal clear that people's knowledge is the underlying cause of wetland ecosystem degradation as they work less to see that they conserve them. This was confirmed by most of the local community members, local leaders and authorities behind conserving wetlands in the area.

4.5 The relationship between background factors and people's beliefs related to wetland ecosystem degradation in Bussi islands

		1	2	3	4	5	6	7
Sex1	Pearson Correlation	1						
	Sig. (2-tailed)							
	N	64						
age 2	Pearson Correlation	.095	1					
	Sig. (2-tailed)	.456						
	N	64	64					
Education3	Pearson Correlation	-.108	.166	1				
	Sig. (2-tailed)	.394	.190					
	N	64	64	64				
marital status4	Pearson Correlation	-.047	-.141	.102	1			
	Sig. (2-tailed)	.715	.268	.421				
	N	64	64	64	64			
Time spent 5	Pearson Correlation	.011	-.008	-.107	-.239	1		
	Sig. (2-tailed)	.934	.949	.401	.057			
	N	64	64	64	64	64		
Household size6	Pearson Correlation	-.020	-.029	.021	-.079	-.027	1	
	Sig. (2-tailed)	.876	.823	.870	.534	.831		
	N	64	64	64	64	64	64	
Beliefs 7	Pearson Correlation	-.036	-.009	.153	-.018	.021	.259*	1
	Sig. (2-tailed)	.778	.943	.227	.887	.870	.039	
	N	64	64	64	64	64	64	64

*. Correlation is significant at the 0.05 level (2-tailed).

The results from the study revealed that there is a relationship between demographic characteristics of respondents and the people's beliefs on wetland degradation. And this was indicated a negative relationship which had further spurred wetland ecosystem degradation in Bussi islands at household level. This was based on the fact that, for most of the items in the

correlation table above were indicated with negative coefficients**,** given the predetermined significance of 0.05. Detailed analysis of the variables follows below.

The results from the study showed that, overall; sex negatively influenced people's knowledge and beliefs about wetland degradations and this served a big role in degrading environment. The table above indicates that the calculated value of the Pearson correlation statistic was -.360. Because the significance level (0.778) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that sex was a major determinant of people's perceptions towards the causes of wetland degradation in Bussi islands.

Age was also proved to have a differing negative influence on people's knowledge and beliefs. It was discovered that people of different ages had different perceptions on wetland degradation. Particularly, people above 50years had much positive knowledge and beliefs towards wetland protection than people who lived below 50years. The table above indicates that the calculated value of the Pearson correlation statistic was -.009. Because the significance level (0.943) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that age was a major determinant of people's knowledge and beliefs towards wetland degradation in Bussi islands. This may be because a number of youths have grown in the area who seeks to farm, burn charcoal and fish in wetlands.

Education was also another factor that established a difference in people's knowledge and beliefs. It was discovered that most of the people who came in Bussi islands were either illiterates or stopped in primary level of education. The table above indicates that the calculated value of the Pearson correlation statistic was .153. Because the significance level (.227) is less than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was

determined that education was a major determinant of people's perception on the causes, consequences and measures put in place to protect wetland degradation. This was congruent to what was reported by one of the NEMA officials found in Bussi sub-county. He was quoted saying,

> *"I also believe that wetland degradation is being worsened in Bussi islands because our people in the area are not educated and lack the technical knowhow to protect them…they all fight to dig in wetlands and they feel that by harvesting small fish is profitable. Such beliefs are partly explained by lack of enough education and embedded on lack of awareness…"*

Marital status of respondents was also reported to have a moderate effect on wetland degradation. Marital status of respondents was also another factor that established a difference in people's knowledge. It was discovered that most of the people who in Bussi islands were either married. The table above indicates that the calculated value of the Pearson correlation statistic was -.018. Because the significance level (.887) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that marital status had a moderate impact on people's perception on the causes, consequences and measures put in place to protect wetland degradation.

Time spent in Bussi Island was showed to have a negative influence on wetland degradation and this was showed with a positive and weak coefficient value of (.021) and significance level of (.870). This is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that time people hand spent in Bussi islands had made them to start

destroying wetlands since most of them had spent in the area for above 30years. One of the NEMA officials was quoted saying:

> *"The biggest struggle is found with the people who have been living in this area, such people take NEMA officials for granted and they have been used by some corrupt staffs who they give some money to use wetlands and destroy forests around the islands…"*

The number of people in the household also seemed to differentiate between different people. For instance, the more the numbers in rural areas, the high the possibility of destroying wetlands and the less the number of people in households, the lower the possibility of destroying wetlands (Mung'ong'o et al., 2004). This thus tell us that people in wetlands, do not choose to destroy wetlands but rather their expansion in numbers, leads them to encroach wetlands to seek for settlement and survival. Basing on the table above indicates that the calculated value of the Pearson correlation statistic was -.031. Because the significance level (0.807) is greater than the rejection threshold of 0.05. Using the Pearson correlation test procedure, it was determined that household size was a major determinant of people's perception on causes of wetland degradation. One of the village leaders was noted saying:

> *"Families have expanded since 1990s and we have seen new people coming in Bussi islands seeking for what to do…I think that can explain very well why people encroach wetlands especially for you who is undertaking research."*

Therefore, basing on the argument above, it is clear as to why a big number end up encroaching wetlands. This is because their beliefs on protecting wetlands are diverted to think that it is good.

4.3: The relationship between people's knowledge and beliefs on wetland ecosystem degradation

4.3.1 Regression analysis between people's knowledge and wetland degradation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.170[a]	.200	.140	.270

a. Predictors: (Constant), Knowlegde

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.090	1	.090	1.241	.269[a]
	Residual	4.519	62	.073		
	Total	4.609	63			

a. Predictors: (Constant), Knowlegde

b. Dependent Variable: wetland degradation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.012	.068		14.790	.000
	Knowlegde	.012	.011	.140	1.114	.269

a. Dependent Variable: wetland degradation

Results showed that people knowledge of wetland ecosystem conservation and degradation, predicted 14% of poor wetland ecosystem management in Bussi Islands (Adjusted R Square =.140). The remaining 86% was predicted by other factors outside the study. The regression model was valid (sig. <.01)

4.3.2 Regression analysis between people's beliefs and wetland degradation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.021[a]	.180	.160	.273

a. Predictors: (Constant), Beliefs

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	1	.000	.000	.996[a]
	Residual	4.609	62	.074		
	Total	4.609	63			

a. Predictors: (Constant), Beliefs

b. Dependent Variable: wetland degradation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.078	.073		14.733	.000
	Beliefs	4.836E-5	.009	.001	.006	.996

a. Dependent Variable: wetland degradation

Results showed that people's beliefs towards wetland ecosystem conservation and degradation, predicted 16% of poor wetland ecosystem management in Bussi Islands (Adjusted R Square =.016). The remaining 84% was predicted by other factors outside the study. The regression model was valid (sig. <.01)

It was also noted that people's knowledge (Beta = .140, sig. < .01) is a better predictor or cause of poor wetland ecosystem degradation in Bussi Island more than people's beliefs (Beta = .001, sig. <.01). This implies that there is a need to ensure that people are educated and sensitized on the importance of wetlands in the area

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summaries of the findings, discussions of objectives set for the study, conclusions derived from the findings, and the recommendations that will help in conserving wetland ecosystem in Bussi Islands based on the findings of the study.

5.1 Summary of findings

The study was carried out as an assessment of Wetland Ecosystem Degradation in Bussi Island Wakiso District. The specific objectives of the study were; to assess the people's knowledge of wetland ecosystem conservation in Bussi islands and to investigate people's beliefs related to wetland ecosystem degradation in Bussi islands. At the end below is what was found out each objective in summary;

5.1.1 People's knowledge of wetland ecosystem conservation in Bussi islands

The study findings indicated that people had no enough knowledge towards wetland ecosystem conservation in Bussi Islands. This was confirmed by the Pearson correlation co-efficient indicated that there was a significant relationship between people's knowledge and wetland degradation (.078). Additionally, even most of the items that were introduced to respondents were indicated with lower means below 3.5 (see table 8 above). According to Likert scale, all variables that are indicated with a mean below 3.5 confirm non-existence of the variables understudy. This thus, statistically means that people in Bussi islands did not have enough knowledge of wetland ecosystem conservation. For instance, most of the respondents indicated that they had little awareness that hunting from the wetlands destroys habitants; molding bricks

in wetlands degrades wetlands; cultivating in wetlands leads to their degradation; Bush fires degrade wetlands; Releasing human and other wastes degrade wetlands; Poor harvesting of fishes leads to their extinct; Change of drainage pattern degrades wetland ecosystem; increased number of people in the area leads to wetland degradation; grazing in wetlands leads to their degradation and use of pesticides destroys the wetlands. This position was further supported by key informants.

The above position was congruent with what earlier literatures and scholars indicated that people's knowledge is related to wetland ecosystem conservation. For instance, according to Chapungu (2003), hunting in wetlands degrades it as they keep killing animals which are too important wildlife conservation. People indicated that they were not aware that releasing human fecal and wastes degrades. This is too bad since earlier evidence indicate that releasing wastes including wastes in fresh waters degrades it (Bowden et la, 1987). Poor harvesting of fishes is confirmed as a bad practice by (Bowden et la, 1987) as degrading environment and so many others.

In addition, Kat (2003) ascertain that people's knowledge can either degrade or conserve wetland ecosystems. Specifically, knowledge especially indigenous knowledge is a very broad term that comprises all aspects of life - food, farming, and hunting, medicine preparation and treatment, arts, crafts and technologies used by indigenous cultures around the world. What distinguishes this knowledge from western knowledge systems is its integration in the culture and cosmology as a whole. Each aspect of indigenous knowledge is but one strand of knowledge, intricately interwoven and inextricably linked to the whole web of existence. Indigenous knowledge on the

other hand seeks to comprehend the interwoven aspects of its ecosystem by means of identification rather than by abstraction (Kat, 2003).

5.1.2 People's beliefs related to wetland ecosystem degradation in Bussi islands

The study findings indicated that people in Bussi Island on high extent have poor beliefs which lead to wetland degradation. This was confirmed by the Pearson correlation co-efficient that was positive and significant at (0.423). This was also supported by most of the items that were introduced to respondents which were indicated with relatively lower means below 3.5 (see table 9 above). According to Likert scale, all variables that are indicated with lower means below 3 indicate absence of the variables understudy. Among the items that were indicated that people had poor beliefs that lead to wetland degradation in the area included; they did not believe that wetland degradation leads to habitant loss; Throwing excretes in wetlands degrades environment; Wetland degradation leads to desertification; Wetland degradation leads to water scarcity; Wetland degradation leads to salty water; Wetland degradation leads to loss of fish; There are some trees that cannot be cut down because of their cultural importance and attachment; Wetland enrichment leads to change of seasons; Hunting wetland animals poses a big threat to wetland degradation and they did not believe that wetland degradation reduces water levels. These views were confirmed by most of the key informants undertook in the area.

These views are in line with what earlier scholars indicated. For instance Mharapara et al (1997) had earlier found out that desertification is purely caused by wetland degradation since people encroach and reclaim swamps which are too important in rainfall formation and a bleeding ground for most of the organisms that participate in water formation and formation of

green/chlorophyll in plants. Add on the fact that many people did not know that change of seasons is due to wetland encroachment.

Kyasimire (2010) confirms the above allegation or people use beliefs/ taboos as a way of conserving or degrading wildlife or wetlands. In relation to wildlife management, many natural/ cultural laws concerning conservation are practiced. Whoever is found guilty of committing "a taboo" is required to undergo a ritual cleansing. These taboos include: • Killing a pregnant animal; killing big animals like elephants, buffaloes, hippopotamus, gorillas, and chimpanzee; in the case of the last two, because they resemble humans. Killing a chimpanzee is permissible if the chimpanzee has raped a woman. It is also believed that cat family (lions, leopard, cheetah, serval, caracal and golden cats) "have bad spirit," and that if a man kills one, all the children born in his family will die. It is an offence to cut a big tree species for the sake of honey, rather one has to climb or use a ladder. Urinating or defecating in water bodies like rivers and lakes are also a taboo. Kyasimire (2010) also noted that the Basongora tribe has a very strong taboo on wild meat; they still believe that if they eat bush meat, it brings bad omen to the cows.

5.2 Conclusions

From the summary findings above, it can be concluded that people's knowledge and beliefs were the underlying causes of wetland degradation in Bussi islands. Below are conclusions made on each and every objective employed in the study;

5.2.1 People's knowledge of wetland ecosystem conservation in Bussi islands

It can be reached that people's knowledge in the area was inadequate and this had led to poor wetland ecosystem conservation in Bussi Islands. This thus means that the people's knowledge or awareness must be improved so as to know the importance of wetland ecosystem conservation.

5.2.2 People's beliefs related to wetland ecosystem degradation in Bussi islands

It can be concluded that people's beliefs had led to wetland degradation in Bussi Islands. This thus means that the people need to be sensitized to change the way they believe towards their practices on wetland ecosystems.

5.3 Recommendations

The study has a number of recommendations but most of them go to the government of Uganda, policy makers and academia as highlighted below;

i) If success in wetland conservation is to be realized some people beliefs are worth addressing. First, replication of the benefits to other villages is imperative, as it is illogical to expect success by changing the attitude of just a fraction of communities.

ii) Second, the benefits should be sufficient enough to offset the direct costs resulting from conservation and indirect costs of forgoing the ecologically destructive activities that local people perceive to be economically profitable.

iii) Third, the benefits should also be equitably distributed and their future access should be well guaranteed. However, economic, ecological and political factors may undermine the achievement of these ambitions. The most pragmatic solution to long-term success depends on improvement of local people's living standards by alleviating poverty. Provision of benefits to local people will hardly deter them from illegal activities if they

cannot meet their resource demands for survival. While protected areas can only minimally contribute to this goal, other sources should be secured locally and globally.

iv) Education also needs an emphasis, both as a way of creating awareness and changing attitudes and directing people to alternative income-generating activities that will relieve the pressure on conservation area resources. The focus should be on young people. The fact that people with high numbers of livestock were more negative to conservation suggests that attempts to solve human-wildlife conflicts should target this group of people. It may be well worth to create incentives that will motivate and assist them to convert their livestock into alternative forms of capital, which has less impact on the environment.

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APPENDICES

APPENDIX I: QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS

Dear Respondent,

The researcher is a student of Master of Science in Agro-ecology at Uganda Martyrs University (UMU), Nkozi, Uganda. He is undertaking a research to generate data and information on "An Assessment of Wetland Ecosystem Degradation in Bussi Island Wakiso District". You have been selected to participate in this study because the contribution you make to your organization is central to the kind of information required. The information you provide is solely for academic purposes and will be treated with utmost confidentiality. Kindly spare some of your valuable time to answer these questions by giving your views where necessary or ticking one of the alternatives given. Indeed your name may not be required. Thank you for your time and cooperation.

SECTION A: BACKGROUND DATA

- Respondents' gender (0 = Male, 1= Female) _____
- How old are you? _____
- How many years of school have you completed? _____
- How many years have lived in this island? _____
- What is your marital status? _____
- How many people do you look after in your household? _____

SECTION B: PEOPLE'S KNOWLEDGE ON WETLAND ECOSYSTEM CONSERVATION

In this section please tick in the box that corresponds to your opinion/view according to a scale of 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

No	Statement	1	2	3	4	5
1	I am aware that increased number of people in the area leads to wetland degradation					
2	I am aware that grazing in wetlands leads to their degradation					
3	I am aware that cultivating in wetlands leads to their degradation					
4	I am aware that use of pesticides destroys the wetlands					
5	Deforestation around wetlands leads to its degradation					
6	Poor harvesting of fishes leads to their extinct					
7	Releasing human and other wastes degrade wetlands					
8	Bush fires also degrade wetlands					
9	Hunting from the wetlands also destroys habitants					
10	Molding bricks in wetlands degrades it					
11	Change of drainage pattern degrades wetland ecosystem					

SECTION C: PEOPLE'S BELIEFS ON WETLAND ECOSYSTEM CONSERVATION

In this section please tick in the box that corresponds to your opinion/view according to a scale of 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

No.	Statement	1	2	3	4	5
1	I believe that wetland degradation reduces water levels					

No.	Statement	1	2	3	4	5
2	I know that wetland degradation leads to habitant loss					
3	Throwing executions in wetlands degrades environment					
4	Hunting wetland animals poses a big threat to wetland degradation					
5	There are some trees that cannot be cant down because of their cultural importance and attachment					
6	Some wetlands ecosystems serve as medicine or herb					
7	Wetland degradation leads to salty water					
8	Wetland degradation leads to water scarcity					
9	Wetland degradation leads to desertification					
10	Wetland degradation leads to soil erosion					
11	Wetland degradation leads to drought					
12	I believe that deforestation leads to low rainfall					
13	Wetland enrichment leads to change of seasons					
14	Wetland degradation leads to loss of fish					

2a. Do you have people in the area who encroach wetland ecosystems?

a) Yes No

b) If yes, what do they do in wetlands? (Mention different activities used in endangering wetlands)

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……

……

3a) Have you heard training or extension services regarding wetland ecosystem conservation?

a) Yes No

b) If yes, what did you learn? Mention some of the measures you learnt on how to conserve the wetland ecosystems in Bussi Island.

……

……

……

c) What measures do you use to conserve wetland ecosystems in Bussi Island?

……

……

……

THANK YOU FOR YOUR PARTICIPATION!

APPENDIX II: INTERVIEW SCHEDULE FOR LOCAL LEADERS AND NEMA OFFICIALS

1a) Do you think the community is aware of the causes of wetland ecosystem degradation? *Please tick the appropriate option.*

a) Yes ☐ No ☐

b) If yes, give reasons?

……

……

……..

c) If no, give reasons?

……

……

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…….

2a) Do you think the community is aware of the effects of wetland ecosystem degradation? *Please tick the appropriate option.*

a) Yes ☐ No ☐

b) If yes, give reasons to support your view?

……

……

……..

c) If no, give reasons?

……

……

……

3a). Do you think the community is aware of the measures that can be used to conserve wetlands? *Please tick the appropriate option.*

a) Yes ☐ No ☐

b) If yes, have they applied them?

a) Yes ☐ No ☐

c) If yes, what are some of the measures applied by the community to conserve wetland ecosystems?

.....……

…….

d) If No for 3(a), what have you done to see that the community becomes aware and prevent/control wetland degradation in the area?

……

……

……

…….

4) What are some of the beliefs held by people that are likely to conserve wetland ecosystems?

……

……

……..

e) What are some of the measures in place to combat wetland ecosystem degradation?

i) At government level

……

……

……..

ii) At the district level

……

……

……..

i) At the sub-county level

……
……
……..

ii) At the island level

……
……
……..

5) Have these measures successfully implemented? If no, why?

……
……
……
……
……..

THANK YOU SO MUCH

APPENDIX III: TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Source: Krejcie & Morgan (1970, as cited by Amin, 2005)

Note.—*N* is population size.

S is sample size.

Respondent's matrix

Respondent	Sex	Age	Education	Marital status	Household size	Time spent	Knowledge	Beliefs
1	1	1	0	2	2	1	2	1
2	1	5	0	2	2	2	1	2
3	2	5	0	2	1	4	3	13
4	1	5	1	1	2	5	5	4
5	1	3	6	2	1	6	4	14
7	1	6	4	2	1	3	6	12
8	2	2	2	2	2	2	8	4
9	1	4	1	3	3	1	7	3
10	2	6	6	3	1	2	9	4
11	1	1	0	2	1	1	10	6
12	1	5	6	4	1	2	11	7
13	2	5	4	2	2	4	4	9
14	1	5	1	2	1	5	2	11
15	1	3	2	5	1	6	1	10
16	1	6	0	1	2	3	3	8
17	2	2	5	1	2	2	5	9
18	1	4	6	2	3	4	4	10
19	2	6	0	2	2	2	6	11
20	1	1	0	2	2	4	8	3
21	1	5	0	1	1	5	7	5
22	2	5	0	2	2	6	9	1
23	1	5	2	2	1	3	10	2
24	1	3	3	2	1	2	11	13
25	1	6	0	3	2	4	4	4
26	2	2	0	3	3	4	2	14
27	1	4	6	2	1	4	1	12
28	2	6	4	2	1	5	3	4
29	1	1	1	4	1	6	5	3
30	1	5	2	2	2	3	4	4
31	2	5	5	2	1	2	6	6
32	1	5	5	2	1	4	8	7
33	1	3	6	2	2	4	7	9
34	1	6	0	2	2	1	9	11
35	2	2	0	2	3	2	10	10
36	1	4	0	2	2	4	11	8
37	2	6	4	1	2	5	2	9
38	1	1	2	1	1	6	1	10
39	1	5	3	2	2	3	3	11
40	2	5	0	2	1	2	5	3
41	1	5	5	5	1	1	4	5
42	1	3	6	3	2	1	6	1
43	1	6	4	1	3	4	8	2
44	2	2	1	4	1	4	7	13
45	2	4	0	3	2	5	9	4
46	1	6	4	2	3	4	10	14
47	1	1	1	4	1	3	11	12
48	2	5	2	4	1	2	4	4
49	1	5	0	2	1	1	2	3
50	1	5	0	2	2	2	1	4
51	1	3	0	2	1	2	3	6
52	2	6	0	1	1	4	5	7
53	1	2	0	2	2	2	4	9
54	2	4	0	1	2	4	6	11
55	1	6	4	2	3	5	8	10
56	1	2	2	2	2	6	7	8
57	2	3	3	2	2	3	9	9
58	1	6	6	2	1	4	10	10
59	1	5	5	2	2	1	11	11
60	1	6	6	2	1	2	4	3
61	2	4	4	3	1	2	3	5
62	2	1	1	1	2	1	1	1
63	1	2	2	2	3	3	1	11

64	1	1	1	2	1	2	1	10

NB: gender (Male=1, female=2)

Age (10-19years=1, 20-29years=2, 31-40years=3, 41-50=4, 51=60=5, 61++=6)

Education (illiterate=1, up to primary=2, 'O' level=3, Higher secondary and above =4)

Marital status (married=1, single=2, divorced=3)

Household size (1-5people=1, 5-10people=2, 10-15people=3, 15&above=4)

Time spent on the village (poor=1, middleclass=2, rich farmer=3)

Knowledge (

Beliefs (Yes=1, No=2)