THE IMPACT OF CULTURE ON WETLAND CONSERVATION IN NYANDO DISTRICT, KENYA.

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DECLARATION

Candidates Declaration

This Thesis is my Original work and has not been presented for a degree in any
other university or for any other award.

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Declaration by Supervisors

We confirm that the work reported in this thesis was carried out by the
candidate under our supervision as the university supervisors.

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To my immediate family for their constant encouragement and support and to
Dani Maria for all the prayers.
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DEFINITIONS OF OPERATIONAL TERMS / KEY CONCEPTS-

GLOSSARY

**Bimodal rainfall:** Rainfall occurring for a stated period of time at two specific points in the year.

**Biodiversity/Biological diversity:** Refers to the variety of life; different plants, animals and micro-organisms, their genes, and the ecosystems of which they are a part.

**Community:** A group of people living in, around or in close proximity to a particular natural resource. This group either utilises the resource, or its way of life is affected by the presence of the resource.

**Conservation:** An ethic of resource use, allocation and protection. It involves the sustainable use of natural resource for purposes of preservation and maintenance of the sam.

**Culture:** Refers to the ways of life of a community: including symbols, art, institutions and beliefs of a society/population, that are passed down from generation to generation.

**Customary Land Tenure:** Refers to unwritten land ownership practices by certain communities under customary law. Individuals/groups by virtue of their membership in some social unit of production or ethnic/political community have access to land and other natural resources.

**Endemic species:** that which is prevalent in or peculiar to a particular locality, region or people. A species confined to a particular region.

**Free Hold Tenure:** Refers to tenure that confers absolute right of ownership of land for an indefinite period of time or in perpetuity
**Gazetted land:** Is land held in trust by the government for particular usage/purpose e.g. forest reserves and national parks. Also referred to as public tenure and includes townships, urban centres and open water bodies.

**Indigenous Knowledge:** Local knowledge that is unique to a culture or society. It is at times referred to as traditional knowledge or folk knowledge.

**Land Tenure:** Defines the social relations between people and land and the methods by which individuals or groups acquire, hold or transfer property rights on land.

**Leasehold Tenure:** Refers to an interest in Land for a definite term of years. It may be granted by a freeholder subject to payment of a fee or rent and is subject to conditions relating to development and usage.

**Moribund:** State in which organisation/person is no longer performing effectively or usefully.

**Riparian Communities:** Refers to those communities living alongside or in close proximity to the river banks.

**Wetlands:** These are areas of land that are permanently or occasionally water logged with fresh, saline, brackish or marine waters. Includes swamps, marshes and bogs.
ABBREVIATIONS AND ACRONYMS

CBO: Community based organisation

EMAW: Efficient Waste Water Management

FAO: Food and Agricultural Organisation of the United Nations

ICRAF: International Centre for Research in Agroforestry.

KENRIK: Kenya Resource Centre for Indigenous Knowledge


NGO: Non-governmental organisations.

SAFR: Sub-regional Office for East and Southern Africa

UNESCO: United Nations Educational, Scientific and Cultural Organisation

UNICEF: United Nations Children’s Fund

UHAI: Swahili word meaning life.

VI: Swedish for We.

VIRED: Victoria Institute of Research and Development

WHO: World Health Organisation
ABSTRACT

The Lake Victoria wetlands serve many different purposes for the different communities living around them. They are valuable ecosystems and are of significance particularly to the biota and water quality of the lakes where they are thus situated. However, human settlements in and around Lake Victoria, coupled with rapid population growth, inappropriate land use policies and over-exploitation of natural resources has resulted in severe environmental degradation including loss of plant and animal species. Due to their ecological significance and importance to the livelihood of the local people, the wetlands of Lake Victoria need to be conserved and managed in a sustainable manner. Yet the daily lives and attitudes of the communities living around the wetlands are influenced to a certain extent by their culture. This study aimed at reviewing and documenting the existing cultural knowledge and belief systems that govern the exploitation of the Nyando wetlands by the surrounding communities and how the accompanying attitudes affect wetland conservation. Primary data collection was through the use of interviews and informal discussions with community members and conservation based organisations. Secondary data sources included documentation and computerised data that was relevant to the study. Observation walks to record the way of life of the local community also formed part of the study. Results revealed that there were a number of existing cultural beliefs among the Nyando communities. These however were rarely observed mainly due to the effects of modernisation. Some of these beliefs were not necessarily positive as concerns conservation and may even be considered prohibitive. Some of these prohibitive beliefs concern women’s rights to land ownership and tree planting. In summary some of the factors that would facilitate management of water as a resource and consequently conservation of its sources are assistance from external agencies to initiate water projects and leadership roles whereas ambiguous property rights, ownership and scale of water resources, poverty levels, gender relations and clan dynamics inhibit communities to undertake water management. It was noted that floods form an integral part of life in the Nyando wetlands. In
addition to environmental degradation, floods create a potentially hazardous health situation leads to loss of life hence loss of human labour. This indirectly aggravates the poverty situation giving rise to an attitude where people are more focused on survival than on environmental conservation. In spite of this, the local communities in the Nyando wetlands are engaged in some conservation activities. This has been facilitated by the presence of environmentally based non-governmental organisations in the region. A general perspective among the communities is that the government has previously simply thrust policies on the local communities to participate in natural resource management. It is the recommendation of the author that region specific environmental policy and agroforestry solutions be formulated by the government in consultation with scientists for the Nyando area. It is recommended that implementation of these solutions actively engage the participation of the local community based on their socio-cultural beliefs where such beliefs are favourable to conservation. Given that different Kenyan communities hold different cultural beliefs and views on the relationship between humans and nature, it becomes imperative to take into account the views and attitudes of the local communities around the Nyando wetlands in the formulation of conservation measures and policies.
CHAPTER 1: INTRODUCTION

1.1 Background to the Problem

The degradation of the wetlands and in particular papyrus swamps is for the greater part attributed to anthropogenic factors. The livelihood of poor rural communities that live around a swamp area depends solely on the exploitation of the swamp’s resources. Some of the activities involve fishing and harvesting of papyrus for construction material production. Since the 1990’s the presence of the water hyacinth (*Eicchornia crassipes*) has infested much of the waters of Lake Victoria thus extensively hindering fishing and forcing the fishermen to seek alternative sources of income. The next alternative became the harvesting of papyrus for local cottage industries or clearing it to create land for cultivation of food crops (Johnstone and Githongo, 1997). This together with an ever increasing human population and rising levels of poverty has led to the overexploitation of wetland resources to meet local needs for food, fuel and economic benefits as well as draining of the swamps to make room for agriculture and human settlement. It is these on-going land use changes that critically threaten the functioning and integrity of wetland ecosystems.

Lack of effective management mechanisms and proper appreciation of the value of wetlands and swamps has led to their over-exploitation through unplanned and unsustainable management practices, encroachments, pollution and inappropriate land use activities in their catchments. Consequently wetlands are either shrinking in size or drying up completely while the great biodiversity resources that they support are under threat of extinction. If this
current trend remains unchecked then not only will the swamps diminish but a wealth of culture based knowledge in the utilisation and conservation of the swamps will be lost due to lack of documentation. This calls for sustainable use of wetland plants. One of the ways that this can be achieved is by evoking long established practices or traditions which in the past enhanced preservation or protection of the swamps in the said area. “Cultural revival might be the only thing that stands between the conservation and destruction of the environment” (Maathai, 2004).

1.2 Statement of the Problem

A general lack of awareness and appreciation of the value of wetlands (Papyrus swamps inclusive) has contributed to mismanagement, unsustainable use and continued loss of the same. Together with these diminishing natural resources various cultural aspects that facilitate conservation are being lost. Sites previously held sacred and other revered resources are being exploited with impunity creating a real threat to biological diversity. Furthermore, culture based knowledge systems which traditionally provided checks and balances and regulated use and access are not yet fully recognised in the development process. Conventional approaches require that development processes obtain technology transfers from locations perceived to be more advanced. This has often led to overlooking the potential in local experiences and practices. Yet finding effective solutions for the sustainable management of wetlands lies in understanding how individuals, social networks or indigenous communities
value wetlands (Terer, 2004) especially those who have ownership and who
directly utilise the natural resources to sustain their livelihoods.

There is need, therefore, to document these cultural practices and value systems
to act as a reference for development agents, such as community development
officers and conservation organisations, and assist them in the strategising of
conservation measures. This study aims at identifying and documenting the
different cultural beliefs that have over time governed the preservation of
Nyando wetlands by the local community over time. It will also examine
whether or not these beliefs influence local conservation efforts.

1.3 Research Questions

This study was guided by the following questions:

1. What are the existing cultural belief systems that govern the use of
wetlands by communities living around the Nyando wetlands in the Lake
Victoria basin and how are they passed on from one generation to the
other?

2. What are the conservation measures adopted by the local people living
around the Nyando Wetlands in the Lake Victoria Basin?

3. How do the community's cultural belief systems affect wetland
conservation in the Nyando wetlands in the Lake Victoria basin?
1.4 Objectives of the study

The main objective of the study was to investigate the role played by culture in the conservation of Nyando wetlands. The specific objectives were:

1. To investigate and document the existing cultural belief system used to promote the utilisation of resources in the Nyando wetlands in the Lake Victoria basin, and understand how they are passed down from one generation to the next.

2. To investigate the current conservation measures adopted by the communities living around the Nyando wetlands

3. To assess how existing cultural belief systems affect wetland conservation in the Nyando wetlands.

1.5 Assumptions

1. Local communities living around the Nyando wetlands in the Lake Victoria basin have cultural belief systems that govern the use of the wetlands and have established ways of passing these beliefs down to successive generations.

2. Local communities living around the Nyando wetlands in the Lake Victoria basin employ conservation measures to preserve the wetlands.

3. The cultural belief systems of the local living communities around the Nyando wetlands have an effect on conservation of the wetlands.

1.6 Justification of the Study

Given that human activity is the primary threat to the existence of wetlands and subsequent loss of culturally based knowledge systems, it only follows that if
effective solutions for the sustainable management of the swamps are to be formulated, it is necessary to understand how the local communities value the swamps. Traditional knowledge is important in the development process since these local communities within the proximity of the natural resource have used it for years and have developed systems that favour their livelihood. These systems may either support or threaten the existence of the resource. Development agents particularly community based organisations, non-governmental organisations, governments, donors, local leaders and private sector initiatives therefore need to recognise it, value it and appreciate it in their interaction with the local communities. If conflicts are to be avoided while enforcing conservation measures, these measures must take into consideration how the local communities utilise the swamp resources at their disposal and whether conservation measures that can be built upon are incorporated into their usage. If the same community is to be involved in implementing strategies in natural resource management then it becomes necessary to see the value of the swamp from the local community’s perspective. This study seeks to supplement this knowledge base which is essential for sustainable development.

1.7 Significance of the Study and Gaps in Literature

Local people have always had a cultural, spiritual and historical relationship with the wetlands. This has often been used within the community to regulate access and use of resources through a mixture of spiritual beliefs and superstition. It is also worth noting that today many indigenous systems are at
risk of becoming extinct due to rapidly changing natural environment and fast pacing economic, political and cultural changes on a global scale. Many practices, survival skills, artefacts and problem solving strategies and expertise specific to indigenous communities are being lost. The main cause of this is the intrusion of foreign technologies or development concepts that promise short term gains or solutions to problems without being capable of sustaining local resources.

Most studies conducted in the Nyando wetlands focus on soil erosion and ecosystem degradation. Literature on the cultural aspects of wetland conservation is minimal. This study will further enhance awareness of the value of the swamps to the local people as well as elucidate those practices that need to be encouraged or curbed in the pursuit of sustainable management of the swamps. The research output may serve as a reference for scholars, researchers and students with a keen interest in the study area. It will supplement the database of indigenous knowledge already in existence. Consequently this may contribute to the adoption of the more effective indigenous practices by conservation strategists hence more sustainable management of the wetland.

1.8 Limitations of the Study

The study was confined to the impact of culture on wetland conservation. In order to supplement the indigenous knowledge base, a broader scope of study is required to cover all natural resources whose existence is threatened by communities living around and depending on them for their livelihood.
1.9 Theoretical Framework

The approach used in this study is a subjectivist approach which focuses on the experience of individuals in the creation of their social world. It is based on the theory of Constructivism, which suggests that by reflecting on our experiences, we construct our own understanding of the world we live in. Each of us generates our own "rules" and "mental models," which we use to make sense of our experiences (Bencze, 2005). In this particular case, the community as a result of social interaction among its members and their interaction with the environment creates, modifies and interprets the world in which it lives according to the experiences of these individuals. It therefore comprises a set of meanings and values which people use to make sense of their world and their behaviour within it.

The underlying paradigm is interpretive in the sense that the data yielded will contain meanings and purposes that are relevant to the community that is being studied and their perspective of the wetland as a natural resource. The main style of research can be more specifically narrowed down to symbolic interactionism. One of the central ideas projected by this theory is that people act as they do because of how they define their present situation. Through their interactions individuals create symbolic structures that make life meaningful to them. The value that the community attaches to these symbols will influence whether they choose to preserve or destroy environment. Through interaction, human beings create structures that multiple social actors experience and understand in similar ways. Symbolic interactionism allows the researcher to
understand how individuals negotiate, manipulate and change the structure of their reality (in this case the environment) to a certain extent. Basing cultural perspectives on this theory, then members of the community, through their daily interactions or use of common resources negotiate and agree on the relationship between their behaviour and its significance towards the common resources. It is from these established relationships arising from the interactions of the society with the environment that taboos, cultural beliefs and practices, myths, and folklore arise to influence acquired/learned behaviour towards a particular resource in this case wetlands and their resources. Although symbolic interactionism does not embrace a common set of assumptions and concepts accepted by all who subscribe to it, it postulates that human beings act towards things on the basis of the meanings they have for them (Blumer, 1969).

The process of attributing meanings to objects is continuous, always emerging in a state of flux and subject to change. All this takes place in a social context (Cohen, 2000). The argument arising here is that communities will value their natural resources based on their own experiences and the cultural significance it holds for them as a community.

The conceptual model in figure 1 represents the flow of interaction between the community and its environment. It portrays how time as an agent of change has led to the dilution or deliberate oversight of cultural values in modern conservation strategies. The resulting effect is a lack of co-operation by the community towards conservation initiatives that do not take into account its perspective on the resources targeted for conservation.
Figure 1. Conceptual Model for Interaction of Community with its Environment

**ENVIRONMENT**
Common Resources: Forests, swamps, rivers, wildlife, papyrus

**INTERACTION**
Group of people living in close proximity to and utilising a common resource

**COMMUNITY**

**CULTURE**
A set of ideas, norms, artefacts, symbols and way of life of the community based on their interaction with each other and their surroundings. Includes: Myths, Taboos, Folklore

**TIME FACTOR**

- **Negative aspect**
  - Environmental Degradation & Destruction resulting from unsustainable resource utilisation

- **Positive aspect**
  - Environmental Conservation through preservation of sacred sites, non-harvesting of certain plant species

**MODERNISATION/Globalisation:**
- Interaction with foreign cultures
- Increasing human population.
- Scientific advancement & Technologies
- Socio-economic & Political changes (Influence land use policies, ownership)

**Effects**
- Modern Conservation Strategies that do not take into account the people's cultural perspective

**Overall Effects**
- Mixing and dilution of Cultural values due to globalisation.
- Extinction & loss of Indigenous knowledge systems due to lack of documentation.

**Reaction from community**
- Hostile reception of conservation initiatives by agencies not part of the community such as government extension officers, local NGO's.
- Lack of co-operation on ideas considered to be alien or going against cultural practices.
- Recognition of the need for improved understanding of the community's perspective in formulating & implementing environmental policies. Hence the need to fill the literature gap on cultural practices and beliefs pertaining to the environment

Source: Author, 2009
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life. They occur where the water table is at or near the surface of the land, or where the land is covered by shallow water. Based on the Ramsar Convention of Iran in 1971, wetlands are defined as:

"Areas of marsh, fen peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt including areas of marine water, the depth of which at low tide does not exceed six metres. These areas may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands" (Ramsar Convention Manual, 2006).

Kenya ratified this convention in 1990 and has since designated Lakes Nakuru and Naivasha as wetlands of international importance (Ramsar Sites) in accordance with the requirements thereof. The convention definition however, seems to cater only for sectoral interests of conservationists whose concern is water birds. In this respect therefore, Kenya has through the National Wetlands Standing Committee (NWSC) defined Kenyan wetlands as:

"Areas of land that are permanently, seasonally or occasionally waterlogged with fresh, saline, brackish or marine waters at a depth not exceeding six metres, including both natural and man-made areas that support characteristic biota" (FAO-SAFR, 1998).
According to the Kenya National Environment Action Plan (NEAP), prepared in 1994, a substantial proportion of Kenya's water resources are found in wetlands, which cover 2 to 3% of the country's surface area. These wetlands are diverse in type and distribution. Some of the larger wetlands of Kenya include the shallow lakes Nakuru, Naivasha, Magadi, Kanyaboli, Jipe, Chala, Elmentaita, Baringo, Ol'Bolossat, Amboseli and Kamnarok; the edges of Lake Victoria and Lorian, Saiwa, Yala, Shompole swamps; Lotikipi (Lotagipi) and Kano plains; Kisii valley bottoms and Tana Delta; and coastal wetlands including the mangroves swamps, sandy beaches, sea grassbeds and coral reefs. The list also includes various seasonal and temporary wetlands that occur where internal drainage allows water to collect in some seasons or in some years. These are found all over the country, including rock pools and springs in the southern part of Nairobi, west of Ngong Hills, and at Limuru. Man-made wetlands include the dams, primarily meant for hydropower and water supply, and wetlands created for purposes of wastewater treatment. This inventory is still on-going. They are highly productive ecosystems and provide many important benefits both socio-economic and ecological (FAO-SAFR, 1998).

In Kenya major wetlands are restricted to river mouths of the main rivers draining into lakes such as Lake Victoria. They fall into three systems of land tenure in Kenya, namely, government, private (freehold and leasehold) and trust land. Due to the different tenure systems, wetlands have been subjected to diverse uses and management regimes some of which have affected them adversely (Republic of Kenya, 2005).
The wetlands of East Africa may be classified into 12 major categories based on the dominant plant species. For example, the swamp plant *Cyperus papyrus* that is found in fresh water wetlands. *C. papyrus* is large sedge renowned for its use as the first paper by Ancient Egyptian civilisations. It is largely confined to Africa forming a distinctive habitat type that supports a diversity of valuable animal and plant species inclusive of endemic species e.g. the Sitatunga antelope and Gonorek warbler (bird species). Wetlands in Kenya are diverse in type and distribution, but no coordinated national inventory has yet been carried out (Kiai and Mailu, 1998).

**2.2 Benefits Derived from Wetlands**

The benefits of wetlands include water supply, food production, construction materials, raw materials for cottage industries, tourism and recreation, flood control, water recharge and discharge, water filtration, nutrient storage and recycling as well as wildlife habitats (Mbaria, 2006). The wetlands of Lake Victoria also serve as refuge for some indigenous fishes from predatory species due to their structural complexity which may reduce hunting efficiency or deter encroachment by predators through low oxygen conditions prevailing in swamps. Wetland vegetation absorbs nutrients and toxic substances from inflowing water thereby improving the quality of water downstream. They are among the most effective ecosystems for carbon storage a factor important in reducing global warming. The wetland vegetation takes up carbon from the atmosphere and converts it into plant biomass during the process of photosynthesis.
Besides providing materials for building and thatching, the cottage industry, canoe construction, weaving of fishing baskets and traps, wetland plants are also used for medicinal purposes and as food sources. Wetlands are also important ecotourism and recreation centres. The presence of a wide range of wildlife species as well as their aesthetic value is important in tourism making wetlands an important foreign exchange earner. In East Africa five restricted range endemic bird species inhabit the papyrus swamps. They include the papyrus yellow warbler, white winged warbler, Caruthers Cisticola, papyrus gonolek and papyrus canary. All five are confined to the swamps in the western arm of the Rift Valley and around Lake Victoria. As historical sites, the wetlands comprise important components of Kenya’s cultural heritage. Local communities have strong attachments to the sites due to their social, cultural and spiritual importance. It is also recognised that these communities promote indigenous knowledge and practices on environmental functions and values essential for their survival (Republic of Kenya, 2005)

2.3 Problems Faced by Kenya’s Wetlands

Like most wetlands around the world, the papyrus swamps around Lake Victoria are under increasing human pressure. Papyrus swamps are very important for both the local human population of Lake Victoria as well as the stability of the ecosystem. At the moment, Uganda which controls a significant portion of Lake Victoria (43%), only protects 2.25% of its papyrus swamps in National parks or reserves. The implication is that over 90% of Uganda’s
Papyrus swamps are at risk of being drained as fertile agricultural lands (Maclean, 2003).

There is an imperative need for protection of the papyrus swamps. However it must be taken into account that all three countries surrounding Lake Victoria have growing populations which rely on the Lake for fish as a major source of protein and on the surrounding wetlands for papyrus and reeds with which they make products for household use or sale. Papyrus is harvested for making mats and roof thatching among others. Despite the presence of natural resources, poverty is endemic in this region while the human population density is high. The ever increasing human population coupled with other factors have led to the overexploitation of swamp resources by local communities. This has been compounded by inadequate environmental management which has led to the degradation of vegetative and aquatic life. As a result, the livelihoods of many locals are threatened due to diminishing resources.

Despite the importance of the range of goods and services provided by the wetlands they tend to be taken for granted. They are often regarded as 'wastelands' and are actually being degraded and lost through conversion to agricultural uses, settlement and industrial development (Kairu, 2001). The policy for most countries is to drain swamps to create land for agriculture. The degradation suffered by the swamps is induced by pollution, overexploitation and catchment destruction. In addition to the threats induced by human population, pressure on the swamps is exacerbated by the heavy infestation of
water hyacinth (*Eichhornia crassipes*) as is the case in the Lake Victoria basin. In a study conducted in the Lower Sondu Miriu several reactions were obtained from the interviewees regarding their perception on the status of the papyrus swamps. The perception that the resource was decreasing was attributed to the number of increased papyrus harvesters due to collapse of the fishery industry associated with water hyacinth infestation and introduction of exotic fish species (Dejace, 2005). The main underlying threat however, remains the lack of recognition of the value of wetlands and the roles they play.

According to a report by the Ornithology Department of the National Museums of Kenya the 3 main swamps on the Eastern shores of Lake Victoria (Dunga, Koguta and Kusa) are estimated to have lost 34% to 50% of their area over the past 30 years resulting in many small fragmented patches (Dejace, 2005). Based on models of local human population growth, Dunga and Koguta swamps are likely to disappear entirely by 2020 (Mwanikah, 2006). Together with them will be lost several species of endemic birds and a wealth of indigenous knowledge.

### 2.4 Consequences of Wetland Ecosystem Destruction

Some of the consequences resulting from swamp destruction include massive loss of biodiversity, soil erosion and sedimentation, decreased water table levels, loss of water sources for local communities and soil acidification. In essence swamp destruction results in changes that have eroded the ecological and socio-economic values and services derived from wetlands (Okeyo, 1999).
2.5 Perceptions on Conservation Strategies

It has been argued that conserving a habitat for its own sake or even that of the contrived existence of other species while people go hungry is difficult to justify. It is necessary therefore, that conservation efforts recognise the socio-economic value of the swamps to the local communities that directly depend on them for sustenance. Although some have argued that encouraging the use of papyrus to lower poverty levels will increase the risk of overexploitation, it could also mean that people will realise its value in sustaining their living standards and be in favour of conserving it. Long lasting sustainable utilisation, conservation and management of the swamp resources hinges on addressing the seemingly conflicting demands of biodiversity conservation, community utilisation and agro-industrial development (Abila, 2005).

Abila (2005) further argues that despite the economic value of the Yala and Sondu Miriu wetlands, they remain non-protected areas and lack proper wetland policies making them vulnerable ecosystems. Major management decisions are often implemented by government departments and institutions with very little community participation or involvement (Terer 2004). Therefore although reclamation of these wetlands has received political support, past studies show that it has been a source of conflict within the local communities (Abila, 2005).
2.6 Culture and Conservation

Culture may be defined as a set of shared values, beliefs, norms, knowledge and assumptions about nature that are transmitted from one generation to the next through the processes of socialisation, education and indigenous based communication such as folklore (Attiti, 2001). Different Kenyan communities hold different cultural views and beliefs on the relationship between humans and nature. It may be said that any attempt to change how a community views and relates to its environment without any understanding of its culture is bound to fail.

Cultural systems are dynamic and are continually influenced by internal creativity and experimentation as well as by contact with external systems (Agrawal and Gibson, 1999). It is the social capital of the poor, their main asset to invest in the struggle for survival, to produce food, provide shelter or to achieve control of their own lives. Culture encompasses the skills, experiences and insights of people applied to maintain or improve their livelihoods. ‘A country’s ability to build and mobilise knowledge capital is equally essential for sustainable development just as the availability of physical and financial capital’ (Kantai, 2002). In the past, plant resources have been protected through cultural practices and beliefs in many communities. Traditional forest management involved the use of elaborate taboos, myths, folklore and other culturally controlled systems to bring coherence within a predetermined community environmental ethic (Attiti, 2001). Many local communities still regard certain plant species as sacred in which case harvesting or cutting down
these species is considered unethical hence ensuring its conservation. Other than trees most communities still preserve specific sites for cultural reasons. These sites have been found to contain higher species diversity compared to the areas surrounding them (Attiti, 2001). Findings of a survey carried out by the Kenya Resource Centre for Indigenous Knowledge (KENRIK) in 1998 and funded by UNESCO, demonstrated a direct link between cultural values and biodiversity conservation. It was noted that areas that were held as sacred sites or preserved for customary rituals had a higher species biodiversity than those to which access was unrestricted.

For a long time the belief that the goals of conservation and the interests of the local community are in opposition formed the underlying logic for policies and scholarly writings about local communities. It has been argued that conservation requires protection of threatened resources and the creation of national parks and government reserves are a result of this type of thinking (Terer, 2004). Yet it is widely documented that members of local communities most often rely on these resources for their daily needs. For instance, the Nyando wetlands support a large human population that derives its income directly from activities like fishing, hunting, construction material production and agricultural production. Reserving these particular areas would limit the community’s access to the resources.

Previous thought patterns implied that the way to effective conservation was through the heavy hand of the state or through the equally heavy but less
visible hand of the market and private property rights. (Agrawal and Gibson, 1999). Though most of these beliefs still persist, the community’s role in conservation is currently receiving greater recognition. International agencies now direct large sums of money and effort towards community based resource management and conservation programs and policies. The new concept now is that communities down the millennia have developed elaborate beliefs systems, rituals and practices to limit off take levels, restrict access to critical resources and distribute harvests. In essence, all these cultural components were aimed at regulating human behaviour and interaction with natural resources, as well as control the utilisation, conservation and management of the same.

It has become evident over the years that the capacity of the state to coerce their citizens into unpopular development and conservation programs is limited. Where resources such as fodder, fuel wood, fish and wildlife are intrinsic to everyday livelihood and household budgets, even well funded coercive conservation initiatives generally fail. Local communities it is believed possess time and place specific knowledge that enables them to forge institutional arrangements to achieve successful local level resource management (Terer, 2004). Therefore recognising the limits of the state and emphasising community participation, the claim of researchers is that if humans have shaped and used their environments in sustainable ways for thousands of years it may be possible to establish partnerships that accomplish the same results today.
CHAPTER 3: METHODOLOGY

3.1 The Study Area

The study was carried out in the Nyando wetlands which are located in Nyando district, Nyanza province, Kenya. Nyando district is fairly new having been created in 1998. It is found within Nyanza province and is named after the Nyando River that runs through it. It is located on the equator at 35°10E and lies East of Lake Victoria. The district has a total land area of 1,168.4km$^2$ and is divided into 5 administrative divisions namely Upper Nyakach, Lower Nyakach, Nyando, Miwani and Muhoroni divisions. It has boundaries with Nandi district to the North, Kericho district to the east and Rachuonyo district to the south. It has a shoreline on the South-West where it touches Lake Victoria. The altitude of the district varies from 1,800m above sea level in Nyabondo plateau to 1,100m above sea level in the Kano plains (Vardhan, 2005).

Rainfall in this region is bimodal with long rains from March to May which frequently results in flooding. Short rains are from September to November. The mean annual rainfall ranges between 600mm to 1630mm. Altitude, proximity to the highlands and nearness to the Lakeshore causes considerable spatial variations in rainfall. The climate is sub-humid with temperatures range from 20°C to over 35°C with an annual mean of 23°C. The estimated population of the Nyando river basin according to the 1989 census is about 584,000 (Vardhan, 2005).

The study covered the following geographic regions within Nyando district-Ahero within Nyando Division and Gem Nam and Gem Rae within Lower Nyakach division. The interviewers visit was facilitated by village headmen (Ja Gweng) who had first to spread word of our impending visit so as not to alarm the local people. This was necessitated by the fact that at times the respondents would be hostile given the nature of our study and a misconception that we were there to provide aid or were government workers. The general fear based on the nature of our questions was that the government would take away their land based on their manner of usage.

3.2 Research Design:

Two administrative divisions with wetland areas were selected. In each of these divisions, one wetland area was randomly selected giving a total of two wetland areas. The target population was in Nyando division and Lower Nyakach divisions (within Gem Rae and Gem Nam locations). This was due to
the presence of large wetland areas in this region and the extensive exploitation of the papyrus swamps by the local community. The sample population was randomly selected from the local communities surrounding and utilising the swamp resources. Snowball sampling was later used to identify persons most likely to be aware of existing cultural belief systems. Stratification of the selected community was based mainly on age and economic activity. A total of 150 individuals were interviewed within the study area.

3.3 Data Collection.

Primary data as well as secondary data sources were used. The primary data collection methods included semi-structured interviews, informal conversations, and direct observation (Appendix 1.0). Data collection tool used was the interview schedule/questionnaires (Appendix 5.0).

*Interview Schedule/Questionnaire:* These were administered to community members to collect data on the cultural aspects of the human activities in the surrounding swamps. The interview schedule was used to obtain a general perspective on local views concerning the uses and conservation of the papyrus swamps. A total 150 interview schedules were administered to respondents. (Appendix 5.0)

*Focus group discussions* with key informants (conservation offices, youth groups, women’s groups all in conservation based activities). It was meant to identify issues concerning conservation and perceived threats to the swamps
arising from cultural belief systems. Although intended, they were not used due to lack of quorum (it was planting season after the November rains had destroyed the previous harvest and most people were busy on their farms. Instead individuals representative of each group formed part of the sample population.

Informal Conversations: involved casual conversations with groups or individuals such as local elders or elderly community members. (Appendix 5.0)

Observational Walks In the company of key informants were used to assess the extent of degradation of the papyrus swamps and activities taking place around the swamp area. Photographs of the level of degradation were taken.

3.4 Data Analysis and Presentation

The Statistical Package for Social Scientists (SPSS) was used in analysing the data obtained. This included use of descriptive statistics. Data analysed was presented as frequency tables portraying percentages of the sample population that directly utilised the papyrus swamps and who actively employ culturally based conservation measures.

Thematic and content analysis was carried out for the data obtained from the interviews and discussions. This was applied in analysing different views and perceptions on practices threatening existence of the swamps and their resources.
CHAPTER 4: RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings from the study and discussions. Data on the role played by culture in the conservation of the wetlands was obtained from Nyando district, Nyanza province. The interview schedule/questionnaire method of data collection was used to capture the responses. Out of 150 interview schedules/questionnaires administered, 130 were properly filled and returned, accounting for 86.7% response rate. The data collected was then captured in SPSS package, coded and analyzed. The analysis and study findings are summarized into percentages, frequencies and means upon which interpretations and conclusion were made. These are subsequently presented in frequency tables, graphs and charts.

4.2 Respondents profile and background

Male respondents were the majority forming 59% of the population, while females were the minority (41%).

Figure 4.1: Gender of the Respondents
It is worth noting that quite frequently upon approaching potential female respondents who were within their household compounds; they would direct us to their male counterparts. In other households, the mothers were out in the field or at the market and the elder male children represented them. The distribution represented above therefore, is not necessarily a reflection of the population gender distribution in the study area, but more the availability and willingness of respondents. According to the population structure for 2002 based on the 1999 population and housing census, the ratio of males to females is 100:104 in Nyando district (GOK, 1999).

4.2.1 Household head

![Figure 4.2: Household head in sampled households.]

Most of the household heads in the area were males accounting for 62%, while the households in which females were the heads were only 38% as shown in Figure 4.2.
4.2.2 Marital status

Most of the respondents were married (67%). (23%) were widowed and only a small percentage was single (10%) as shown in figure 4.3. The majority of those that reported that they were single were mainly composed of young male respondents who still resided within their families’ compounds. A common cause of spousal death among the widowed (who were mostly female) was reported to be HIV/AIDS. Other cases of death as reported by the respondents were old age, the floods or other illnesses. The Nyando basin is reported to have a high mortality rate from malaria, typhoid, tuberculosis, HIV/AIDS and cholera especially among the inhabitants based in the lower flood plains (Mbaria, 2006).

![Pie chart showing marital status of respondents.]

Figure 4.3: Marital status of the respondents.

4.2.3 Ages of respondents.

Ages of the respondents were important to this study to identify those in a position to recognize the traditional rules and beliefs in regard to the utilization and conservation of wetlands. 26.8% of the respondents were above 60 years of age.
Almost 30% were aged 30 years and below while 47% were between 31 and 50 years of age. Majority of the respondents therefore (approximately 73%) were below 60 years of age.

A high mortality rate is prevalent given the life of hardship and extreme poverty that is characteristic of the Lower Nyando basin. Life expectancy in the Nyando region is 49 years of age as compared to the National average of 55 years of age. About 212/1000 of children in the age bracket of 5 and below die before their fifth birthday (Food Security District Profile-Nyando, 2007). According to one respondent, not many survive to a "ripe old age" given the high incidence of disease, hunger and frequent floods. Elderly people often lose their lives during the floods. The interviewee reported that this was due to their refusal to relocate/be evacuated or restricted ability to move during the destructive floods. Their claim was that they have lived in Nyando all their lives, buried their relatives there and that if it was their time there was nothing they could do about it. The younger more agile members of the population who felt they had a future to look forward to have a greater chance of survival. On the other hand, the older respondents were of the opinion that modern day diseases were finishing off the younger population (An assertion linking the high death rates of the younger population to HIV/AIDS).
4.2.4 Education level

Majority of the respondents (54.8%) had attained primary education as their highest level of education. 15.1% reported that they had never attended school. 29.4% had received Secondary school education; of whom 28.6% and 0.8% respectively attained O level and A level education. Only a minority 0.8% had attained tertiary/University education as illustrated in Figure 4.4.

![Bar chart showing respondents' education levels](chart.png)

**Figure 4.4: Respondents level of education**

Seasonal floods are part and parcel of life in the Nyando wetlands. They affect all aspects of daily life including schooling. During the floods, schools as much as any other building are submerged under water or completely destroyed. This interrupts the learning process and quite often the students have to stay out of school until some form of normalcy returns to their daily lives. This disruption of family life and routine which includes being evacuated from the flooded areas means studies are put on hold until the floods subside. Unfortunately for these students National examinations will not take into consideration that they lost
valuable school time and opportunity to study each time there was a flood (Mungai et al., 2002). This factor combined with the extreme poverty under which some households live hinders and discourages the number of students willing to pursue a higher education. Households usually have to make difficult decisions on expending resources on survival and coping with poverty, or on investments such as education and healthcare. 2% of the young male respondents reported that they would rather start farming early and earn an income since responsibility demanded that they take care of their families. They claimed formal employment opportunities were not necessarily available after schooling and did not see the need to go beyond basic schooling. A minor 0.8% of the respondents reported having reached tertiary and university levels. The majority of these however, were from households that were involved in cash crop production (mainly sugarcane and rice farming) and could therefore afford the school fees. The majority of the respondents who made it to tertiary institutions were undertaking or had undertaken vocational training like carpentry and tailoring.

Natural disasters such as floods may exacerbate factors that cause children to drop out of school. Qualified teachers may find it difficult to take up jobs in such regions thereby causing a perennial shortage of qualified staff. Ultimately this affects enrollment, quality of education and overall performance of the students and schools. Historically education has been marginalized in disaster prone regions.
Yet education plays a pivotal role in enhancing sustainable development (Achoka and Maiyo, 2008). This encompasses environmental education and development. The overall effect therefore is that learning institutions which instill socio-cultural values and pass on traditional and conventional knowledge to the younger generation, are constantly under threat and cannot effectively play their role (Achoka and Maiyo, 2008). Consequently the dissemination of both conventional and indigenous knowledge may be hampered.

### 4.2.5 Household Size in Nyando District

Majority (49.5%) of households in the study area comprised 4-6 members; while those which had more than 10 members were 18.3%. 16.5% of the households had 7-9 members while 15.7% had 3 and less members. The figures are representative of individual households both in nuclear and polygamous settings. There were reports of orphaned children being taken care of by their surviving relatives where members were more than 10 within one household.

**Table 4.1 Household size in the study area**

<table>
<thead>
<tr>
<th>Number of members</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 and below</td>
<td>18</td>
<td>15.7</td>
</tr>
<tr>
<td>4-6</td>
<td>57</td>
<td>49.5</td>
</tr>
<tr>
<td>7-9</td>
<td>19</td>
<td>16.5</td>
</tr>
<tr>
<td>10 and above</td>
<td>21</td>
<td>18.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>115</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Lower frequency since respondents of the same family were interviewed as one.
4.2.6 Duration of Respondents Stay within the study Area.

Table 4.4 categorizes the respondents according to their duration of stay within the study area. All the respondents expressed that they were residents in the area with majority (85.4%) having stayed in the area for more than 10 years. Very few had stayed in the area for less than 10 years. It is characteristic that families will return to their original homes after the floods have subsided. When asked why they constantly returned to the same place after the destruction and devastation of the floods, the most frequent response was “Where would we go? This is where we have lived all our lives and this is our land…our dead are buried here”.

Despite their long stay in the area, most of the houses were temporary structures. This is because many of the houses and most property is destroyed during the floods. 75% of the households in Nyando district have houses whose floors are earth, 72% have mud walls according to the 1999 population census. Only 12.2% of households are permanent structures (Mungai et al., 2002).

Table 4.2: Duration of Respondents Stay in study area.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than a year</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>1-5 years</td>
<td>5</td>
<td>3.8</td>
</tr>
<tr>
<td>6-10 years</td>
<td>11</td>
<td>8.5</td>
</tr>
<tr>
<td>Over 10 years</td>
<td>111</td>
<td>85.4</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>100.0</td>
</tr>
</tbody>
</table>
The settlement patterns within Nyando district are mainly determined by the potential of the area with upper Nyakach division having the highest population density of nearly 368 people per square kilometer. At the time of field work, the communities in Gem Nam and Gem Rae were recovering from the November 2006 floods. Some had only rebuilt temporary shelters without any sanitation areas. There was food shortage consequent to the destruction of crops that were nearing harvest just when the floods struck. Environmental conservation was not a priority and a few were disillusioned and hostile.

4.2.7 Household Income

The researcher sought to know the wetland activities that generated the highest income to the households. The respondents were required to rank the given activities from 1=highest income generator to 7=least income generator. The responses are presented on table 4.3.

Table 4.3: Wetland activities and their contribution to household income.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop farming</td>
<td>1</td>
</tr>
<tr>
<td>Livestock farming/grazing</td>
<td>2</td>
</tr>
<tr>
<td>Fuel wood harvesting</td>
<td>3</td>
</tr>
<tr>
<td>Crafts(mats, baskets etc.)</td>
<td>4</td>
</tr>
<tr>
<td>Hunting/fishing</td>
<td>5</td>
</tr>
<tr>
<td>Building materials</td>
<td>6</td>
</tr>
<tr>
<td>Extraction of medicinal herbs</td>
<td>7</td>
</tr>
</tbody>
</table>
The main occupation of most households is crop farming (subsistence) which is fairly typical of the general population. Several constraints were associated with rearing livestock that possibly discouraged the farmers from keeping them. These included inadequate fodder, pests and diseases, low reproduction rates and marketing. Social demands such as funerals and school fees are a threat to livestock numbers. For this reason few homes rear livestock as a source of income.

Respondents reported that they preferred to keep goats since they were easier to graze in a fodder deficit area and reproduced faster. The low income levels among the study population may be attributed to low levels of education with only a quarter (24.5%) having gone beyond primary level. This trend could be associated with slow economic progress and low income per capita in the area (Nyakundi et al., 2007). The labour force is comprised of nearly 50% of the population.

Agriculture is the key livelihood activity employing 60% of the total population in the entire Nyando district and, supplying 52% of household earnings. Households in the cash cropping zones derive a larger share of their earnings from sugarcane and rice. However general output is low due to poor use of modern agricultural technology, poor infrastructure (roads) and poor storage. Earnings therefore from this sector are not maximized and most of the households still reel under the effects of poverty Food Security District Profile (2007). The women are mainly
involved in taking care of their households (tending to their families). Those engaged in commercial income earning activities mainly conduct small businesses in an organized manner as a group or informally by hawking their goods or selling them at the market. These goods often include fish from the lake or mats and baskets woven from papyrus. In Ahero the goods were sold on Market day at Ahero town while in Gem Nam and Gem Rae the goods were taken to Katito town Centre. The men are engaged in formal employment such as plumbing, hawking, carpentry, fishing and photography. It has been noted that households that lose the male income earner are likely to reduce their production of cash crops and reduce use of purchased inputs (Swallow et al., 2002). Poverty incidence in the district is approximately 61%. Nyando, Upper Nyakach and Miwani have the highest counts of poor people. Poor transport network, poor agricultural technology, lack of proper storage and frequent flooding, lack of title deeds, problems with the fishing industry, rice industry and the impact of HIV/AIDS which affects the labour force all disrupt economic activities and hinder development within the Nyando region (Food Security District Profile, 2007).

4.3 Land use, ownership and access

Majority of the respondents (73.8%) reported holding their land under leasehold, while a minority (3.1%) held their land under communal/ customary rights.
Table 4.4 Ownership of the swamp/wetland

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leasehold</td>
<td>96</td>
<td>73.8</td>
</tr>
<tr>
<td>Freehold</td>
<td>30</td>
<td>23.1</td>
</tr>
<tr>
<td>Customary/communal</td>
<td>4</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The word tenure as used in this study describes the social relations between people in respect of the object of tenure in this case land. In Kenya, land interests broadly fall under two groups; rights held through traditional African systems and rights that are derived from the English system and maintained through laws enacted by colonial and the national parliament (Waiganjo and Ngugi, 2001). The first may be loosely termed as customary tenure. It is bound through traditional rules (customary law). The latter is referred to as statutory tenure secured and expressed through national law.

Due to Kenya’s ethnic diversity, multiple customary tenure systems exist. This variation arises mainly from different agricultural practices, climatic conditions and cultural practices. Those individuals or groups holding land under customary law, by virtue of their membership in some social unit of production or political community, have guaranteed rights of access to land and other natural resources (Waiganjo and Ngugi, 2001). The rights of control over the natural resources are derived from sovereignty of the community/group over the area in which the relevant resources are located. These rights are important when it comes to
allocation of land, regulation of its use and its maintenance or conservation thereof.

Freehold and leasehold tenures, on the other hand fall under statutory tenure. Freehold tenure confers the greatest interest in land called absolute right of ownership. The individual/group holds possession of the land for an indefinite period of time or in perpetuity. This title has no restriction on the use and occupation of the land by the deed holder. A few however may restrict use to agricultural (rice growing) or ranching purposes only. Leasehold is an interest in land for a definite number of years and may be granted by a freeholder (Individuals or organizations). It is usually subject to payment of a fee or rent and may be subject to conditions such as, in relation to land use and development. Leases may also be granted by the government for government land, or by the local authority for trust land (Waiganjo and Ngugi, 2001).

Land and water in the Nyando basin are held under a wide variety of statutory property rights arrangements (Swallow et al.2003). Land use and property rights vary across the Nyando basin. The upper part of the basin is comprised of gazetted forests, commercial tea production and small scale agriculture on steep hillsides (activities frequently stated as contributing factors to the floods that occur in the lower basin) that were degazetted forests during the last 40 years. The mid-altitude areas are a mixture of small-holder farms and large scale commercial farms
(mostly sugarcane). The lower basin that is comprised of the flood-prone lakeshore area is mostly used for subsistence production of maize, beans and sorghum as well as the commercial production of irrigated rice and sugarcane production. The irrigated areas are typically owned by smallholder farmers and the moribund National irrigation board. Property rights influence the access of community members to resources-by either restricting or allowing access. Incentives to conserve and manage resources are thus encouraged or discouraged.

According to Swallow et al. (2005), land degradation problems appear to be most severe in sub-divided agricultural leaseholds and in freehold land in adjudication areas. In the first instance, there are problems associated with poor land use planning during the transition from large scale to small scale farms in the 1960’s and the early 1970’s. The reason stated is that land buying companies that purchased land on behalf of groups of shareholders did not consider the productive capacity of the land, the terrain or the need for public utilities. Their main interest was to allocate land to all their members. These land buying companies were formed along ethnic lines thus creating clusters of different cultures living next to each other on the same landscape. This resulted in the weakening of traditional systems. As a result statutory laws are more functional in these areas than are traditional laws. On the other hand, areas that were colonially designated as native reserves experienced high population pressure leading to over use of all land resources.
4.3.1 Crops grown in the study area

All the respondents reported that cultivation takes place in the wetlands and both cash and food crops are grown. Some of the cash crops and food crops grown in the area are shown in Tables 4.5 and 4.6

Table 4.5: Cash crops grown in the Nyando Wetlands

<table>
<thead>
<tr>
<th>Crop</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>64</td>
<td>48.1</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>41</td>
<td>30.8</td>
</tr>
<tr>
<td>Vegetables</td>
<td>21</td>
<td>15.8</td>
</tr>
<tr>
<td>Cotton</td>
<td>6</td>
<td>4.5</td>
</tr>
<tr>
<td>Maize</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>133</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Higher frequency due to multiple responses.

Among the cash crops grown by the residents in the study area rice is the main cash crop (48%) followed by sugarcane (30.8%), vegetables (15.8%) and cotton (4.5%). Only one respondent gave maize as a cash crop. In Gem Nam and Gem Rae divisions, respondents reported that CARE International provided them with Basmati rice seeds as well as training in growing the rice. CARE in turn provided market for their produce. The reason was to provide food security for these individuals living in flood prone areas. The households in the cash-cropping zone derive a larger portion of their household income from rice and sugarcane. These findings are consistent with those of the food security district profile which states that; households in the cash-cropping zone derive a larger share of their earnings from sugarcane and rice. The main industries in the district are sugar factories including Chemelil and Muhoroni and a few rice mills.
Plate 4.1: Harvested sugarcane in Ahero being transported to Chemelil Sugar factory which by agreement buys the harvested crop from the local farming community. The cane farmers are organized in cooperatives and outgrower companies.

Table 4.6: Food crops grown in the Nyando wetlands.

<table>
<thead>
<tr>
<th>Category label</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millet</td>
<td>39</td>
<td>18.6</td>
</tr>
<tr>
<td>Maize</td>
<td>72</td>
<td>38.2</td>
</tr>
<tr>
<td>Pulses</td>
<td>44</td>
<td>21.1</td>
</tr>
<tr>
<td>Vegetables</td>
<td>45</td>
<td>21.5</td>
</tr>
<tr>
<td>Yams</td>
<td>1</td>
<td>.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>201</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Higher frequency due to multiple responses of farmers growing a variety of crops.

Maize was the major food crop grown in the area as reported by 38.2% of the respondents, followed by vegetables (21.5%) and pulses (21.1%) including beans and peas. Millet was also grown as a food crop as reported by 18.6% of the respondents. Though yams do well in wet areas, only a minority (0.5%) said that...
they grew them as a food crop. The respondents gave different reasons for
growing different crops (Table 4.7).

**Table 4.7: Reasons for cultivating particular crops**

<table>
<thead>
<tr>
<th>Reason for growing crop</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistant to drought</td>
<td>6</td>
<td>3.1</td>
</tr>
<tr>
<td>Withstand water logging</td>
<td>21</td>
<td>10.8</td>
</tr>
<tr>
<td>Fast maturity</td>
<td>38</td>
<td>19.5</td>
</tr>
<tr>
<td>Produce good yield</td>
<td>60</td>
<td>30.8</td>
</tr>
<tr>
<td>Has high economic value</td>
<td>70</td>
<td>35.9</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>195</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Higher frequency due to multiple responses.

Majority of the respondents reported that their main reason for growing crops is
due to their high economic value (35.9%). Production of good yield and fast
maturity were the other major reasons given for planting different crops (30.8%
and 19.5% respectively). 10.8% expressed the ability to withstand water logging
and a minority (3.1%) reported that the crops were resistant to drought. Tomatoes
and Sukuma wiki particularly were grown for their direct use by households and
that they were easy to sell at the market.

Apart from growing crops, few households kept livestock as well. The most
common was the goat which they said was easier to feed/graze and that it matured
faster and reproduced faster than the cow. Most residents indicated that attempts
to raise poultry had failed miserably as they would reach a certain stage and then
all die; a pattern they had observed on several occasions.
These findings are in agreement with those of Kaudia and Kitalyi (2002) which state that village chicken suffers a very high mortality rate due to causes that are preventable. The main causes of mortality are disease and predators. The mortality of flocks in most cases is 50% rising to 100% in most farms with an average mortality of 89%. However community health groups such as Kalam Ochengo in Gem Nam sub-location was teaching its group members to vaccinate poultry to increase survival chances hence providing an alternative source of income. In most households it is mainly the women who own, rear and receive the income from the sale of chicken and its products. Agriculture is the main livelihood activity employing 60% of the total population and supplying over 52% of household earnings.

The foregoing findings are in agreement with those of the Food Security District Profile (2007). According to the profile, cropping patterns are dominated by production of subsistence crops such as maize, cassava, sorghum and sweet potatoes where as major cash crops are rice, sugarcane, cotton and coffee. The performance of cotton industry has been dismal leading farmers to opt for subsistence farming instead. Maize as a staple food for the majority was ranked the crop of highest priority followed by rice and sorghum (Ang’awa et al 2000). Output from the sector however is low due to poor use of modern agricultural technology, lack of proper storage, erratic and unreliable rainfall, and high costs of seeds and other inputs as well as poor road network (Republic of Kenya, 2005).
Apart from the rice which is grown under irrigation, all other crops in the basin rely on rainfall for their cultivation.

Nyando district is classified as a food deficit zone despite being considered 99% cultivable (Food Security District Profile-Nyando, 2007). Part of the cause is the erratic and unreliable rainfall. The norm is to prepare fields for planting within a certain period so that the crops can be planted in time for seasonal rains and mature in time. However the floods have a tendency of interfering with this pattern. This frequently leads to destruction of harvests and food shortages.

Since household income is crucial in determining access to food resources, this will mean heavy reliance on markets for food. Alternatively it may mean pursuing income generating activities other than farming. In the process overexploitation and degradation of natural resources may be observed. This further worsens the poverty situation and creates a vicious cycle of food insecurity, environmental degradation and poverty.
4.3.2 Use of Chemicals and Inorganic Fertilizers by Farmers

Majority of the respondents accounting for 54% reported the use of chemicals in their farmland while 46% denied using chemicals as shown in figure 4.5. Where chemicals were used, majority of the respondents indicated that it was mainly pesticide used in the rice fields and not inorganic fertilizers. Those growing maize claimed that they hardly used chemicals in their maize fields since it would result in bushy overgrowth.
Plate 4.3: A local farmer near Singida swamp stands next to his young maize crop. The local community takes advantage of the recent rains that cause flooding and enrich the soil with silt and alluvium to grow their crops without the use of inorganic fertilizers.

4.3.3 Reasons for Not Using Chemicals

As illustrated in Table 4.10, majority of the respondents who did not use chemicals gave their main reason for not doing so as prohibitive costs (34%).
Others reported that they were traditionally unaccustomed to using chemicals (28%) while another 28% reported that the soils were already fertile and did not require fertilizer. A minority (10%) reported that the chemicals had environmental effects and that is why they never used them on their land. According to a study conducted by Mati (2005) in Kusa (inclusive of upper Nyakach and lower Nyakach) in the Nyando region, the use of organic fertilizers is negligible. Farmers do not purchase it unless for irrigated vegetables grown as cash crops near the lake. Consistent with these findings he states that the farmers found it expensive while others believed fertilizer harmed the crops when rainfall was poor. According to the same study, low incomes and low financial returns from agriculture offer little motivation to invest in fertilizers.

Table 4.8: Reasons for not using chemicals Source: Research Data

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too expensive</td>
<td>17</td>
<td>34.0</td>
</tr>
<tr>
<td>Environmental effects</td>
<td>5</td>
<td>10.0</td>
</tr>
<tr>
<td>Traditionally unaccustomed</td>
<td>14</td>
<td>28.0</td>
</tr>
<tr>
<td>Good/fertile soils</td>
<td>14</td>
<td>28.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Total of 50 respondents was derived from those not using chemicals. The remaining number of respondents either used chemicals in form of pesticides or fertilizers or did not practice farming.

The soils of this area are generally not very fertile (black cotton soils). They are susceptible to hard setting after flooding. The farmers here are not motivated to use any input due to the cost and uncertain weather patterns that could result in loss of an entire crop.
4.3.4 Views on Existing land tenure system

When asked how they felt about the current land tenure system in the wetland, 86% of the respondents expressed their happiness, while 14% were not happy about it (Figure 4.6).

![Figure 4.6: Respondents views on land tenure in the wetland area](image)

The respondents main reasons for their happiness with the current land tenure system in Nyando wetlands was because it allows free for all grazing and cropping (44.1%) or locked non-owners out (31.5%). Others felt that the system allows conservation (12.6%) and others that it allowed each person to own a plot. Only a minority (0.7%) expressed their ignorance about the land tenure.

For the 14% (Figure 4.6) who said that they were not pleased with the land tenure in the wetland area, expressed that there was inequality in the distribution of the land and sometimes people fight over the land. Catchment levels are composed of different types of land, put to different uses and held under different property
rights insecure property rights to cropland are often cited as the major cause of soil erosion, sedimentation and low crop production (Swallow et al., 2005). Even though the land tenure in the area allowed the residents to cultivate and graze freely in the wetlands, certain areas were customarily restricted to human economic activities or to certain members of the community (Table 4.9).

**Table 4.9: Areas customarily restricted to human economic activities or to certain members of the community.**

<table>
<thead>
<tr>
<th>Restriction</th>
<th>Reason</th>
</tr>
</thead>
</table>
| Cultivation/grazing near the banks and some areas in the wetland in general | - The place is left for wildlife
                                             | - To control soil erosion                      |
| Settlements are not allowed in certain areas that are too close to the swamps. | - The place is left for wildlife
                                             | - Fear of attacks from wildlife
                                             | - Dangers of destructive floods                |
| No indiscriminate fishing                      | To protect the young fish                     |

Most of the restrictions are aimed at conserving the wetlands and the wildlife in general and also the protection of human beings from hazardous situations such as floods and animal attacks. Also they aimed at sustainable utilization of the wetland. However in contrast to the reports of the respondents, the researcher observed instances of farming and grazing along river banks. Respondents indicated that livestock needed separately constructed water sources to prevent destruction of dykes and erosion along the river banks and reduce sedimentation of swamps.
Plate 4.4. Cattle grazing along the banks of River Amira (a tributary of River Nyando) in Ahero where farming also takes place too close to the river banks leading to siltation.

Plate 4.5: Grazing activities taking place along River Banks. Dykes built along the river banks are often destroyed as a result of this.
4.4 Fuel use

It emerged that the main sources of fuel for household cooking and heating was firewood as 83% of the respondents expressed. Kerosine, charcoal and papyrus as illustrated on Figure 4.7. These findings are consistent with those of the Nyando district Food Profile, according to which 90% of the households rely on fuel wood for their energy needs.

![Figure 4.7: Sources of fuel for household cooking and heating.](image)

41% of the respondents used less than 10 bundles of firewood per week which they gathered from the wetland as 41.7%, 40% from the nearby bushes and another 14.2% bought fuel from the nearby markets. However a minority (4.2%), said that they out sourced the firewood from around the swamp area- Fig.4.8. Though not a frequent or common source of fuel, dried sugarcane, dry maize and millet stems were mentioned as applicable when the need arose.
The plant species which are utilized by the residents from the wetland as fuel wood include the following as provided in the Table 4.10. The most popularly used according to the frequency of their responses were *Sesbania sesban* (28.6%), *Acacia brevispica* (21.7%) and Eucalyptus (12.1%).

Fuelwood remains the principal energy source in many low income areas and countries and has continued to meet the domestic energy requirements for cooking and heating in the rural household. Rural communities meet most of their fuelwood demands from multiple and more accessible sources such as twigs gathered from hedges and fallen trees, or residues from other uses of wood in the rural economy as well as crop residues and animal dung (Mahiri 2002). Finding firewood for household use is the responsibility of the woman in the Nyando area. Crop residues such as dried sugarcane stalks and dried leaves are at times used which serves as an indicator of fuel wood scarcity.

**Figure 4.8: Sources of fuel wood in Nyando District**

The plant species which are utilized by the residents from the wetland as fuel wood include the following as provided in the Table 4.10. The most popularly used according to the frequency of their responses were *Sesbania sesban* (28.6%), *Acacia brevispica* (21.7%) and Eucalyptus (12.1%).
Table 4.10: Plant species used for fuel

<table>
<thead>
<tr>
<th>Category label</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acacia brevispica</em></td>
<td>44</td>
<td>21.7</td>
</tr>
<tr>
<td><em>Sesbania sesban</em></td>
<td>58</td>
<td>28.6</td>
</tr>
<tr>
<td><em>Phyllanthus fischeri</em></td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td><em>Ricinus communis</em></td>
<td>12</td>
<td>5.9</td>
</tr>
<tr>
<td><em>Cassia occidentalis</em></td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Senna siamea (iron wood)</em></td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td><em>Cyperus papyrus</em></td>
<td>32</td>
<td>15.8</td>
</tr>
<tr>
<td><em>Acacia abyssinica</em></td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Lantana camara/ trifolia bushes</em></td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>Thorn Acacia</td>
<td>8</td>
<td>3.9</td>
</tr>
<tr>
<td>Eucalyptus/Blue gum</td>
<td>25</td>
<td>12.1</td>
</tr>
<tr>
<td><em>Aeschynome elaphryxylon</em></td>
<td>8</td>
<td>3.9</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>203</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Higher frequency resulting from multiple responses.

According to a study conducted by Mahiri (2002), one of the respondents stated that “A woman cannot sleep hungry if she has food because of the fuel wood problem”. It may therefore be argued, based on this perception, that all possible sources of fuel wood must be exploited in order to survive. This means that conserving or preserving particular trees while there is scarcity of fuel wood does not arise as an option.

4.5: Craft industry
Besides harvesting plants from the wetland area for firewood, there are particular plants which are harvested from the swamp and used to make a variety of crafts which are later sold in the local market and help the residents to earn a living.
Table 4.11: Plants used for making crafts

<table>
<thead>
<tr>
<th>Plant</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cyperus papyrus</em></td>
<td>106</td>
<td>67.8</td>
</tr>
<tr>
<td>Sisal</td>
<td>24</td>
<td>16.7</td>
</tr>
<tr>
<td>Common reeds (<em>Phragmites spp</em>)</td>
<td>5</td>
<td>3.5</td>
</tr>
<tr>
<td>Grass/Straw</td>
<td>9</td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>144</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Higher frequency due to multiple responses.

As illustrated in table 4.11, mats were popularly made from the plant species extracted from the wetland areas as reported by 55.7% of the respondents, followed by the ropes (14.8%), baskets (14.1%) and fish traps (10.7%). Brooms (2.7%) and potholders (2.0%) (Oswaro) were produced on a small scale. Some respondents also indicated that besides the crafts made, plants such as papyrus reeds were also used for thatching houses.

Table 4.12: Crafts made locally within the Nyando wetland areas

<table>
<thead>
<tr>
<th>Craft</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mats (Par)</td>
<td>83</td>
<td>55.7</td>
</tr>
<tr>
<td>(Thol) Rope</td>
<td>22</td>
<td>14.8</td>
</tr>
<tr>
<td>Baskets</td>
<td>21</td>
<td>14.1</td>
</tr>
<tr>
<td>Brooms</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>Oswaro(pot holders)</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Fish traps (Sienyo)</td>
<td>16</td>
<td>10.7</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>149</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

High frequency resulting from multiple responses

According to one respondent papyrus reeds were previously used for building (*oguntho*) but due to modernization have since reduced. However in Gem Rae,
Oremo womens group were using rice jamb to make bricks for building houses and to make fuel conserving jikos.

In the craft industry both men and women are involved in the whole process from the extraction of materials, transportation, weaving and the selling of the finished crafts. However, men had an additional role of roofing the houses using the papyrus reeds which women could not do. Children on the other hand gave their parents a hand in either of the processes. The rate of harvest of the papyrus is however currently viewed to be largely unsustainable. This may be attributed to some extent to changes in the local fishing economy and possibly increased population in recent years (Mwanikah, 2006).
Plate 4.7: A woman weaves a basket in front of her home after collecting reeds from the lakeside. These baskets are then sold to some of her neighbours while others are transported to the local town of Katito for sale.

Even though the respondents portrayed that they utilized wetland plants for firewood and making of crafts, they expressed that there were some wetland plants which are not traditionally harvested. The respondents only reported three plant species as not traditionally harvested. These were Euphorbia, Eucalyptus (White gum) and Kalader.

Majority (85%) of the respondents expressed that they experience difficulties in obtaining raw materials from the swamp as the Figure 4.9 indicates.
Some of the problems experienced during the extraction of raw materials from the surrounding swamps include inaccessibility of the materials since they are deep in the swamp as 63.5% of the respondents expressed, the materials are seasonal (14.4%), scarcity of the raw materials (9.6%).

Table 4.13: Problems experienced in obtaining raw material from the swamp

<table>
<thead>
<tr>
<th>Problem</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scarce</td>
<td>10</td>
<td>9.6</td>
</tr>
<tr>
<td>Deep in the swamp (difficult to access)</td>
<td>66</td>
<td>63.5</td>
</tr>
<tr>
<td>Swamp owners do not allow</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Seasonal</td>
<td>15</td>
<td>14.4</td>
</tr>
<tr>
<td>Species extinction</td>
<td>10</td>
<td>8.16</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>104</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The frequency represents only those respondents who utilize the swamps to obtain raw materials.

Respondents pointed out that particularly during and immediately after flooding, raw materials within the swamp were very difficult to access due to increased water volume. Fire outbreaks during the dry season and while clearing land were also cited as a cause of scarcity. The presence of dangerous animals in the swamp...
waters was also said to hinder access to raw materials. According to local residents snakes and hippos are at times found in these waters although at the time of field work none of these were observed.

Accessibility of these raw materials from the swamp has changed over time either negatively or positively according to the respondents' view (Table 4.14).

4.14 Reasons for change in accessibility of Raw Materials.

<table>
<thead>
<tr>
<th>Change</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials are deep into the swamp</td>
<td>38</td>
<td>38.0</td>
</tr>
<tr>
<td>Drought leading to unavailability of reeds</td>
<td>13</td>
<td>13.0</td>
</tr>
<tr>
<td>Water level has reduced making accessibility easier</td>
<td>29</td>
<td>29.0</td>
</tr>
<tr>
<td>Extinction of the long papyrus reeds</td>
<td>20</td>
<td>20.0</td>
</tr>
</tbody>
</table>

| Total responses                                 | 100       | 100.0   |

Frequency is exclusive of those who have not observed any changes over time or are not aware of any changes.

Majority of the respondents (38%) expressed that changes have occurred in the accessibility of the materials since these materials were deep into the swamp and therefore inaccessible. They attributed this to overexploitation of these materials, overcultivation of the area around the swamp and also due to the effect of existing floods. A good number (29%) of the respondents observed that the area around the swamp was accessible because the water level had reduced and this could be attributed to cultivation and prolonged dry spells. Absence of papyrus reeds either due to drought (13%) or extinction (20%) in certain areas was reported by some of the respondents as a reason for change in accessibility of raw materials.
4.6 Water use

Though the respondents live in a wetland or areas around the swamp, the study findings indicate that they do not use this water for domestic purposes. The following are the sources of water for domestic use (Figure 4.10)

![Bar chart showing sources of water for domestic use]

Figure 4.10: Sources of water for domestic use.

Majority (53.9%) of the respondents said that they obtained water from the boreholes, 15.5% from ponds (yawo), while 10.5% each obtained water from the local streams and rivers. Only a minority (9.2%) reported having access to tap water. The common belief is that water is meant for every person’s use and as such there should be no restriction on its usage. This in effect provides little incentive for private individuals or small groups to protect existing water sources or to create new ones.
As observed during the study, in Gem Nam, several water pumps (originally the initiative of community groups and local NGO'S) had fallen into disuse due to damage. Due to the high level of poverty no single individual could afford to fix the pumps. However, when asked the reason as to why a fundraising was not initiated to cover the cost, the general attitude was that certain individuals were reluctant to contribute yet were more than ready to use the services once the pump was functional. This discouraged the rest of the villagers and hampered any attempts at collective water management.

Poverty recurs as a factor contributing to the non-involvement of communities in water management reason being that they lack investment power. According to Swallow et al. (2003)), there are certain conditions that trap a community in low levels of action when it comes to investing in water management. Some of the conditions he states for Western Kenya are the high fixed cost associated with water management alongside the poverty level in the community, non-availability of credit to finance community investments, social capital present in the community to undertake collective water management, issues of property and tenure security and the interference of neighboring communities.

Plate 4.8 shows members of the local community collecting water for domestic use. It is this same water that is to be used for cooking, washing clothes and watering the animals.
Plate 4.8: A pond dug up by the local community to help retain water during flood season and act as a source during the dry spells.

Traditional norms and beliefs governing water use and collection from the wetlands by men, women and children are illustrated below.

- A woman, whose husband has just died, was not allowed to fetch water from the wetland since it was believed that storms will occur.
- No body was allowed to fetch water from the swamp/lake after 6.30 pm because of a belief that witchdoctors had already arrived there and therefore they might be bewitched.
- No one was allowed to cross another home when carrying water—According to one respondent, when coming from the river, one is not allowed to pass through another person’s homestead for you are likely to fall down
- The role of fetching water for domestic use was specifically for girls
• People were not allowed to bath, wash clothing or utensils around the water source particularly the wells, boreholes and the springs.

• No throwing of objects into wells which also have to be kept covered when not in use.

• Both women and men had their separate water collection points

• Men were charged with the responsibility of cleaning the place and provide security.

• Children were not allowed to go to the wetland without being accompanied by elderly people

• No urination was allowed near/around the borehole

• Drawing of water is only done using plastic jugs and not tins because of fear of the rust.

According to Meinzen-Dick and Pradhan(2002), The laws that govern access and control of resources are not confined to rules and regulations enacted by state organs, but include norms and rules of behaviour that are generated by various forms of social organization including villages, ethnic groups, associations or the state. Access and control of resources are influenced by property rights which are in turn influenced by various types of law namely statutory law, religious law, customary law, project law and a range of local norms. These different social authorities tend to have different types of strengths and weaknesses and those with claims or complaints regarding watershed resources are likely to appeal to these different types of law and social authorities to support these claims.
Under the Luo customary law, women have very little independent access to land. This access is limited to small homegardens known as *orundu* that even junior wives are entitled to (Swallow et al., 2002). Consequently access to water resources is also limited since almost all water sources are established on private land. The women therefore have full responsibility for domestic water provision with almost no authority to manage the water sources. Where water projects do exist, they are supported by the Ministry of health, Ministry of Water, Ministry of Agriculture and NGOs like Oxfam and CARE International.

In the lower Nyando region property rights are held under a system that prevents other users from accessing the river. The riparian zones occurring in this region fall under adjudicated land. The implication here therefore is that Riparian zones are private property under statutory law and anyone whose land does not lie along the river has no right to access the river. Adjudicated land is however also governed under customary law which requires that nobody should be denied water and access should be open to all. This access is however insecure and subject to frequent negotiations with the land owners along the river. In effect a contradiction of rules arises whereby customary law allows free access to the river while property rights to the land through which the river passes discourages access. This in turn inhibits community initiative to undertake management of these resources (Swallow, et al. 2005).
The problems the respondents face in obtaining water from the wetlands in terms of accessibility, availability and portability are illustrated in tables 4.15, 4.16, 4.17

**Table 4.15 Problems related to water accessibility**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>21</td>
<td>47.7</td>
</tr>
<tr>
<td>Over-flooding</td>
<td>6</td>
<td>13.6</td>
</tr>
<tr>
<td>Poor roads</td>
<td>4</td>
<td>9.1</td>
</tr>
<tr>
<td>Droughts</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>Slippery area</td>
<td>6</td>
<td>13.6</td>
</tr>
<tr>
<td>Low capacity</td>
<td>5</td>
<td>11.4</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>44</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Frequency is representative only of those with water accessibility problems as some respondents do not experience these problems due to their use of piped tap water or boreholes.

Water for domestic use was inaccessible due to the distance one has to travel in order to reach the source as reported by 47.7% of the respondents. Inaccessibility is also caused by over flooding in the area, poor roads, droughts, slippery area especially around the wells and the low capacity of the water source.

**Table 4.16: Problems related to water availability**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of water during the dry spell</td>
<td>28</td>
<td>68.3</td>
</tr>
<tr>
<td>Destruction of catchment areas</td>
<td>2</td>
<td>4.9</td>
</tr>
<tr>
<td>Over flooding</td>
<td>6</td>
<td>14.6</td>
</tr>
<tr>
<td>Low capacity</td>
<td>2</td>
<td>4.9</td>
</tr>
<tr>
<td>Pollution</td>
<td>3</td>
<td>7.3</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>41</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
During the dry season, water level reduces creating a temporary water shortage as expressed by 68% of the respondents. Over flooding during the rain season is a problem since the ponds are covered by dirty water at the same time pollution also makes clean water unavailable. The low capacities of these water sources in relation to the population in the area forces people to queue for a long time for them to be able to fetch water,

Table 4.17: Problems related to water potability

<table>
<thead>
<tr>
<th>Problem</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not safe for drinking</td>
<td>32</td>
<td>60.4</td>
</tr>
<tr>
<td>Easily polluted because of openness</td>
<td>10</td>
<td>18.9</td>
</tr>
<tr>
<td>Low capacity</td>
<td>5</td>
<td>9.4</td>
</tr>
<tr>
<td>Salty water</td>
<td>6</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>Total responses</strong></td>
<td><strong>53</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The major problem in regard to potability is that the water was not safe for drinking as expressed by 60.4% of the respondents and therefore forced to treat the water using chemicals or boiling it. Other problems include open water sources and therefore easily polluted (18.9%), salty water (11.3%) and also the low capacities of the water source to support the population which depends on it.

Some of the respondents in lower Nyakach complained of residents who washed clothes upstream thereby polluting their drinking water. Health communities such as Odindo Womens group in Gem Nam and Gem Rae however were now providing Chlorine and water guard for local residents to use in their drinking water. The flooding caused by River Awach bursting its banks often resulted in
pollution of other water sources and a sanitation hazard. Reason being that waste from pit latrines and all forms of debris all mixed with waters from different sources during the floods.

According to the Food Security district profile (2007), adequate access to potable water points is a major problem in Nyando district. Only a third of the households have access to water within a kilometer, with 50% of them drawing water from piped outlets. Water quality in the Nyando is extremely low. Frequent flooding as well as sharing of ponds with livestock causes contamination of water. This leads to waterborne diseases. These findings are in agreement with those of Swallow et.al (2003) which state that the waters of the Nyando river experience exceptionally high levels of turbidity during rainfall. ‘This turbidity is hundreds of times higher than that which would be healthy for drinking water’. It goes on to state that ‘the human health effects arising from the floods indicate an increase in the incidence of malaria and water borne disease the probable causes of which are deforestation and lack of any kind of water control.’ The resulting pollution may also be attributed to discharge of partially treated effluent from the sugar processing factories, poor hygienic conditions, water hyacinth infestation and poor farm management upstream all resulting in siltation downstream.

4.7 Wetland management

The researcher sought the respondents’ opinion on the state of the swamps (Figure 4.11). Most of the respondents (49%) indicated that the swamps were increasing,
30% stated that the swamps were decreasing while 21% did not know about the status of the swamps

![Pie chart showing respondents' opinions on whether or not swamps are increasing.]

Figure 4.11: Respondents' opinions on whether or not swamps are increasing.

Plate 4.9: Scattered Reeds and bulrush growing in previously swampy areas but now overgrown with grass in Ahero. A possible reason for some respondents claims that the wetlands are decreasing.
For those respondents who reported that the swamps are decreasing 70% of them attributed this to cultivation, grazing (11%), settlement (9%), floods (7%) and infrastructure (3%). Increased cultivation in search of alternative food sources meant that most of the wetland areas were being drained to make room for crops.

**Table 4.18: Reasons as to why swamps are decreasing**

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivation</td>
<td>70.0</td>
</tr>
<tr>
<td>Grazing</td>
<td>11.0</td>
</tr>
<tr>
<td>Settlement</td>
<td>9.0</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>3.0</td>
</tr>
<tr>
<td>Floods(Sedimentation)</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Source: Research Data*

Plate 4.10: Maize farm and Banana plantation in the swamps of Ahero. Notice the water logged regions. This farm had encroached close to the banks of the local swamp. (Singida swamp)
The recession of the lake due to the decline in water levels meant that most of the land that was formerly covered in water was now exposed to drying. Such areas it was noted are sources of conflict and squabbles as individuals scramble to acquire the land left behind by the receding lake due to its richness in nutrients. Sedimentation as a result of soil deposits carried from the upper catchment to the lower catchment areas during floods was also used as explanation by those who said the wetlands were decreasing. Over the years a historical trend towards higher levels of sedimentation from the outlet of River Nyando into Lake Victoria has been observed (Swallow et al 2003). Strong peaks in sediment deposition were observed during high rainfall events associated with ‘El Nino’.

The increased nutrient and sediment loads in the Nyando are associated with both point and non-point sources of pollution (Swallow et al 2003.). The key point sources are sugar processing and Agro-chemical factories while non-point sources are the thousands of small farm families operating throughout the basin. The land in the Nyando basin has been categorized as sediment ‘source’ areas and sediment ‘sink’ areas. 61% of the land is sediment source area with average net erosion rates of 43 tonnes/ha/year while 39% of the land in the basin is sediment sink area that accumulates 45 tonnes/ha/year. Areas with the highest rates of erosion are the flood prone Kano plains and some of the steep hillsides in the upper and mid-altitude parts of the basin. Net sediment sinks are the upland forests and wetlands.
and some of the sugarcane and small holder farming areas in the mid-altitude zone (Swallow et al., 2003).

All the respondents acknowledged utilizing the papyrus swamp directly in one way or another as illustrated in Table 4.19:

Table 4.19: Utilization of the wetlands/swamps

<table>
<thead>
<tr>
<th>Method</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvesting papyrus</td>
<td>57</td>
<td>32.6</td>
</tr>
<tr>
<td>Farming</td>
<td>69</td>
<td>39.4</td>
</tr>
<tr>
<td>Fishing</td>
<td>30</td>
<td>17.1</td>
</tr>
<tr>
<td>Grazing</td>
<td>19</td>
<td>10.9</td>
</tr>
<tr>
<td>Total responses</td>
<td>175</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The respondents stated that they do utilize the papyrus swamps directly through Crop farming (39.4%), harvesting of papyrus (32.6%), fishing (17.1%) and grazing of the animals.

Table 4.20: Responsibility for Control of the quantity of papyrus harvested

<table>
<thead>
<tr>
<th>Responsible Person</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local elders</td>
<td>48</td>
<td>31.2</td>
</tr>
<tr>
<td>Government</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Nobody</td>
<td>101</td>
<td>65.6</td>
</tr>
<tr>
<td>Community based organizations</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Owners since the swamps</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Total responses</td>
<td>154</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Higher frequency resulting from multiple responses.
Even though the papyrus swamps are directly utilized through the harvesting of the papyrus, nobody controls the quantity harvested as 65.6% of the respondents reported. Some of the respondents (31.2%) said that the exercise is controlled by the local elders. A minority reported that it is controlled by government, community based organizations, and some owners who have bought the land (Table 4.20).

It must be noted however, that in the process of utilizing these papyrus swamps they get degraded. Individual farmers to a greater extent as portrayed by 69.7% of the respondents degrade these swamps, followed by the papyrus harvesters (15.7%), catastrophic floods, the grazing of animals and even the local industries. Shown in Figure 4.12.

![Figure 4.12: Opinions on who is degrading the papyrus swamps](image)
Plate 4.11: A Culvert in Gem Rae in lower Nyakach. Local residents claim the culverts are ineffective due to poor engineering techniques. These culverts according to respondents are too few and too small rendering them useless as drainage systems.

In general, the wetlands are degraded by uncontrolled human activities which include clearing for agricultural purposes as expressed by 85% of the respondents, over harvesting of the papyrus (12%) and industrial pollution as a minority (3%) indicated.

![Figure 4.13: Ways in which the wetlands are being degraded](image)

Figure 4.13: Ways in which the wetlands are being degraded
The overharvesting of papyrus was a cause of land degradation according to 12% of the respondents. Clearing swamps for agriculture formed the main cause of degradation as reported by 85% of the respondents. These two factors can be attributed to a reduction in fishing activities over the years that has been brought on by the recession of the lake and diminishing quantities of fish in the lake as a result of water hyacinth.

The third manner of degradation is due to pollution and industrial waste deposition which are interlinked with the two given that it leads to eutrophication of the lake waters. This in turn results in nutrient rich waters that facilitate growth of more hyacinth leading the fishermen to seek alternative sources of food and income namely papyrus harvesting and farming.

Plate 4.12: Sisal plant is commonly used as demarcation bordering many parcels of land in Gem Nam. The sisal's fibre is however too thin and weak to be used in craft making. Those who had it as borders along their farms indicated that it prevents soil erosion by spreading its roots which on dying leaves the soil fertile.
Despite the degradation of the wetlands by the residents around the place, the local community has discouraged the degradation by the following ways as illustrated in Table 4.21.

**Table 4.21: Activities carried out by local community to discourage wetland degradation**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conserve the area by heaping soil along the banks to avoid water overflow to dry land</td>
<td>17.3</td>
</tr>
<tr>
<td>Dig drainages</td>
<td>13.5</td>
</tr>
<tr>
<td>Done nothing because they are the ones degrading wetlands</td>
<td>3.8</td>
</tr>
<tr>
<td>Set up committees to cater for degradation</td>
<td>3.8</td>
</tr>
<tr>
<td>Caution people on the dangers of wetlands degradation</td>
<td>17.3</td>
</tr>
<tr>
<td>Control papyrus harvesting and other swamp resources</td>
<td>17.3</td>
</tr>
<tr>
<td>Cultivate other lands apart from wetlands</td>
<td>21.2</td>
</tr>
<tr>
<td>Planting more trees</td>
<td>3.8</td>
</tr>
<tr>
<td>Proper settling schemes. Residents opt to steer clear of areas bordering swamps.</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Among the ways the local community has been discouraging the degradation of the wetland includes; restricting cultivation to other areas apart from the wetlands (21.2%), heaping the soil around the banks to prevent water from overflowing to the dry land hence conserving the area (17.3%), Where there is an overflow due to floods, drainages are dug (13.5%), people are cautioned on the dangers of wetlands degradation (17.3%), control papyrus harvesting and other swamp resources among others. On the other hand a few respondents (3.8%) felt that
nothing has been done since the community is the one responsible for the degradation of the wetlands.

Plate 4.13: A papyrus harvester in Gem Nam transports the plant home late in the afternoon. This is a common form of transportation for the fibre that is collected at least 3 km away from early morning. A bicycle ride at most times is too costly.

4.8 Attitudes towards wetland conservation

As shown in figure 4.14, the respondents had positive attitudes towards the conservation of the wetlands as most of them (59%), expressed that it was good to conserve. However, 38% felt that it was a waste of land while a minority (3%) reported that it denied benefits to the local people. Cumulatively 41% had negative attitudes towards the conservation of the wetlands. As illustrated in Figure 4.14.
Nyando district on a general scale is characterized by very high rates of poverty at 66% accompanied by high prevalence of HIV/AIDS (Food Security District Profile). Studies have indicated a strong link between poverty, environment and investment in Natural Resources. Some of the respondents cited that their communities often times were unwilling to participate even in the digging of channels to drain the flood waters unless they were told it was a food for work venture.

In relation to cultural beliefs that govern the use and conservation of the swamps, majority of the respondents 92% were not aware about them except for 8% as illustrated in Figure 4.15.
Figure 4.15: Whether the respondents are aware of cultural and traditional rules that govern the use and conservation of the papyrus swamps.

Those who were aware about the cultural beliefs and traditional rules that govern the use and conservation of the papyrus swamps, enumerated them as:

- A woman, whose husband has just died, could not eat fish from the wetland since it was believed that the quantity of fish could reduce. Neither was this widow allowed to fetch water from the wetland since it was believed that storms will occur.

- God had blessed water, and therefore it cannot cause any harm to human beings even though it is contaminated.

- When carrying papyrus the whole bundle should face up (top-up) to avoid stormy rains from damaging other crops.

- In terms of cultivation, a man could not dig/prepare his land before the father does. Since the fathers were the elders, they were one to determine which area to be cultivated and which one should not. In this way, cultivation was controlled hence preserving the wetland. Socio-cultural values pertaining to tree
establishment do not allow a woman to plant trees during particular seasons. She is not allowed to take the initiative and plant trees even when the husband is away. This particular belief applied to mainly perennials. Women were/are however permitted to plant shrubs.

- A belief that witchdoctors arrived at the wetland by 6.30 pm made the villagers to draw water only at limited times during the day. This eliminated a lot of ill-planned activities of destruction which could be carried at night and hence preserve the area.

From the study findings, it was noted that the cultural beliefs on the utilization of wetland resources exist among the residents of Nyando. However, only a few individuals reported knowing them and they had learnt them from their parents. Others had learnt about them through observing what others did. Modernization and more so Christianity are partly to blame for non-compliance to these traditional beliefs and their absence in the current generation. Original resettlement schemes and constant disruption of their way of life due to floods have contributed in part to the erosion of these traditional systems.

The mass destruction and displacement caused by seasonal floods have led the people to adapt to a different way of life that is more focused on survival than on the preservation of traditional systems. These floods that also result in fatalities and constant displacement have resulted in a population that is not accustomed to nor has known the traditional way of life.
The respondents were asked whether any authority was in charge of ensuring existing rules were followed. Community members ensured these rules are followed as 38.7% of the respondents indicated, 29% said that the local elder ensured that, while 12.9% attributed this to the individuals. On the other hand, 19.4% said that nobody was charged with the responsibility of ensuring that the rules were followed as indicated in table 4.22 below.

Table 4.22: The person who ensures that these rules are adhered to

<table>
<thead>
<tr>
<th>Person</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local elders</td>
<td>9</td>
<td>29.0</td>
</tr>
<tr>
<td>Community members</td>
<td>12</td>
<td>38.7</td>
</tr>
<tr>
<td>Individuals</td>
<td>4</td>
<td>12.9</td>
</tr>
<tr>
<td>Nobody</td>
<td>6</td>
<td>19.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>31</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Besides the contribution of the traditional beliefs in the utilization of the wetlands, the local communities living in the Nyando wetland have tried to conserve the area by preventing its degradation mainly due to intervention of environmental organizations earlier named. Since much of the degradation is as a result of anthropogenic activities, the elders have cautioned people on the dangers of wetland degradation, papyrus harvesting and utilization of other swamp resources are also controlled. Grazing is prohibited in certain areas while human settlement is also restricted to specific areas. Due to the natural catastrophes, drainages are
dug to ease water flow during floods, soil is heaped along the banks to avoid water overflow to the dry land and more trees are planted in the area.

Even though beliefs exist they are only known by a minority, seldom are they adhered to. However, those who strongly adhere to them feel that they are effective in the conservation of the wetlands since they protect fish and wetland in general and also a belief that non-compliance to them results in death. Modernization brought about by Christianity and education in general, has removed the traditional bondage from these people as the respondents expressed. Therefore, they no longer worry about the consequences of not following them. They further expressed that these beliefs were outdated and they should not be followed since improved technologies of conserving the wetlands have emerged. This has led to a more deteriorating situation in terms of wetland degradation. However, a few existing beliefs aimed at and did conserve fish, indigenous plant species and also prevented reckless degradation of the wetland in general, albeit to a small extent.

The existing cultural beliefs on the utilization of wetland resources have helped the conservation of the wetland only to a small extent. Others may even be considered prohibitive. Some of the drawbacks arising from these customs include those concerning the land and water governance as well as tree planting by women and cutting down of trees believed to be a bad omen. The association of trees with a bad omen also means that they cannot be planted within the compound or crop fields thus limiting options available for agroforestry tree species that can perform
well in the area. The fact that women cannot plant trees yet it is the women who are willing to sit in for workshops and seminars on the benefits of conservation also hinder conservation efforts. This lack of access to and lack of control of resources serves as a demotivating factor to the women who actively till the land. Those who do manage to plant agro forestry tree species and obtain a good yield have either all or most of the proceeds going to the husband. This further discourages their participation in conservation and tree planting activities. In addition they have to obtain permission from their husbands to attend training sessions and in the long run will see it as too much trouble and opt to attend to other domestic issues.

An opinion was sought from the respondents on whether residents around wetland areas should be stopped from exploiting the swamp resources (Fig.4.16),

![Pie chart](image)

**Figure 4.16: Views on whether exploitation of the swamp resources should be stopped.**

For those who reported that the people should not be stopped from exploiting the swamp resources, they defended this by stating that it was the only source of
livelihood in terms of income generation. On the other hand, those who reported that they should be stopped supported their opinion by saying that this could encourage sustainable utilization of wetland resources and prevent the lake and swamp from encroaching into the mainland.

In a study by Mwanikah (2006) in the Kusa area, majority of the respondents despite being aware of the importance of papyrus swamps to their social lives and in favour of conservation, lacked awareness on conservation methods and alternatives to supplement their daily income. Consequently, the high levels of poverty cannot be overlooked when it comes to discussing issues pertaining to natural resource management in the Nyando basin. This is because most of the destruction and over-exploitation of the natural resources results from a need for the community members to survive (obtain food) or eke a living out of their meager resources. This is done however without consideration of the resulting negative impacts, and what is important becomes what is available at that point in time and not in the future. As one of the respondents put it, 'How can I think of the future and preserving what sustains me when I can barely get enough to feed my family at the present.'
4.9 Perceptions of Locally Based Environmental Non-governmental Organisations on the Effects of Culture on Wetland Conservation.

Three different environmentally based organizations were interviewed. Two of these Victoria Institute for Research on Environment and Development (VIRED) and VI were based within Nyando district. The third UHAI Lake forum was based in Kisumu town but had projects within Nyando district. The general perception from all three organizations was that the wetlands were decreasing. They attributed this however to receding water levels in Lake Victoria.

Plate 4.14: Sedimentation taking place on a formerly water-logged region after recent floods.

According to VIRED, the findings of one of their studies indicated that destruction of the Environment co-related with the Poverty Index within the Nyando basin. The level of destruction was based on the poverty levels of the community which
influenced their level of education and was interlinked to their source of income. This source of income resulting from a heavy reliance on the readily available natural resources like papyrus without recognizing or being able to invest in their conservation.

According to the interviewee a lack of food security and drought quite often forces the surrounding communities to move deeper into the wetlands, encroaching further as the Lake recedes in order to claim more fertile areas for cultivation of food crops. Lack of finances did not allow them to engage in efficient water harvesting activities as the cost of water tanks was beyond their reach whereas openly dug ponds to hold the water quite often resulted in waters being polluted. The cost of tanks is often beyond the reach of many poor households and therefore most rainwater harvesting projects are often funded or subsidized by development jeans (Mati and Mutunga, 2005). A direct relationship was observed between the floods and the pollution of water sources based on the impact of fast moving waters on sanitation and soil erosion. This, they stated resulted from a poorly drawn culvert, roads and bridge system. The water volume of the river was too high for its narrow channel.

A problem was also noted of too much water during the floods and a scarcity of the same after the floods had subsided. To solve this problem VIRED had engaged the local communities in digging canals to drain excess water during floods and
the construction of water pans to retain the water for the dry spell. This was through a Food for Work Flood Mitigation Program. VIRED had also initiated a waste water management programme-EMAW (Efficient Waste Water Management) based at Chemelil Sugar. It involves the construction of wetlands at Chemelil sugar factory to minimize pollution load in River Nyando hence reduce the subsequent eutrophication of Lake Victoria. The principle behind this is that waste passing or flowing through papyrus comes out clean at the other end.

VI (Swedish for we) is a Lake Victoria Development initiative in collaboration with the Swedish Development Agency. A visit by the researcher to its office at Katito in Gem Rae indicated that the agency plays a role in conservation related activities covering the whole of Nyando District. VI is engaged in Agroforestry activities where they encourage farmers to plant agroforestry tree species. They provide starter seeds, give training and monitor progress of the plants and problems encountered by the farmers. Given the frequent flooding and water logged nature of the wetlands, VI encourages the use of local germplasm and local seed collection and sisal suckers, in the process they manage to retain the naturally found flora in the region.

The development objectives of VI are threefold:

1. To ensure local communities have sufficient fuel wood for which they encourage the growth of *Crotolaris spp.* and *Sesbania sesban* which are annuals that have been observed to survive in these wetland areas.
2. Food and nutrition; to which end VI encourages the planting of fruit trees *Carica papaya*, mangoes and guavas.

3. Provision of fodder to improve the nutrition of malnourished livestock by encouraging the growth of Calliandra, Lucena and Acacia.

The responses of the local community to these initiatives was mixed. They are both negative and positive. Negative outlook arises from the fact that it takes too long to receive returns and the farmers prefer to dedicate their time to growing fast maturing food crops as compared to agroforestry tree species. The two extremes of weather patterns do nothing to help the situation either. Dry season tree species die when the floods set in particularly those sensitive to water logging like *Carica papaya* while those in need of sufficient water dry up during the dry spell. Establishment of the seedlings is often interrupted by the erratic weather patterns. Due to the labour and time invested in these activities, farmers reach a point where they become reluctant to plant after so many losses caused by alternating floods and dry seasons. Another factor affecting the establishment of the saplings was the lack of knowledge by the women who did the weeding and would at times accidentally uproot them in the process of weeding.

According to the interviewee, the unconsolidated pieces of land pose a challenge to the farmers in deciding where to plant the trees since an individual may have different portions of land in different areas. These are in most cases small portions
that cannot handle both sufficient food crop and the presence of trees. Socio-cultural values earlier discussed also pose a challenge to tree-planting initiatives. For instance, the women who were often targeted for training and capacity building could not attend due to social restrictions (had to ask permission from husbands) and were tied down with social responsibilities. While concurring with the VIRED official, the VI officer indicated that the poverty level accelerated environmental degradation. In his opinion the micro and macro-catchments serving Lake Victoria basin had their acreage of tree cover drastically reduced due to the felling of trees. This included a heavy reliance on charcoal burning in Nyakach division as a source of livelihood. There were instances reported where the community members would turn to wetlands as buffer zones during drought to clear vegetation and plant food crops. All this has contributed to the reduction of volume and surface area of Lake Victoria. This effect was so compounded that in 2005, River Awach which is supposed to be a permanent river almost dried up.

The scale of resources has also been cited as another factor that influences collective management of resources hence their conservation. Spatially extensive resources (in this case the wetlands in the Lake Victoria Basin), are better managed by regional groups as compared to isolated communities given that the inputs required for their management are substantial. Although reforms on Kenya’s Water Act 2002 create room for rural community participation in water management, it in turn dampens community initiative; the reason being that
ownership of all water resources in the country is vested in the state. In spite of this, state-run water provision is still limited in Kenya’s rural areas.

To counter the problem of extensive tree felling UHAI (meaning life in Kiswahili) lake forum in Kisumu has engaged the women of Ahero and Gem Nam/Rae in a rice husk recycling project. This is to provide an alternative source of fuel and building blocks. It involves training female groups to make energy efficient stoves from rice husks hence reducing wood fuel consumption. Use of rice husks is also applied in making cheap building blocks. Tree planting activities have also been initiated along the streams and river banks to discourage constant scooping of the moist black cotton soils to make ceramics.

According to our informant, tree planting initiatives have not been very successful because other than interference from floods, land is becoming scarce with increasing populations thus creating competition between planting trees and food crops.

Water hyacinth which has been perceived by many to be an environmental hazard was a source of conflict between the NGO’s and the local communities at some point. Reason stated was that among the water hyacinth there live small fishes called (Catfish fingerlings) *Nyapus* in dholuo. An attempt to clear the hyacinth by environmental organizations came to a head when the local communities would
not compromise stating that it was a source of food and raw material for crafts. This point may therefore be argued within the context of Schouten & Moriarty, (2002) statement that 'where the government (or external agencies) simply thrusts policies on communities to participate in natural resource management does not imply that communities are willing or are capable of undertaking these responsibilities. It may be further stated that the non-involvement of communities in water supply management and inappropriate institutional structures has been identified as one of the constraints to development of the water sector in Africa. (WHO/UNICEF,2000b). It becomes increasingly clear that any attempt by conservation agencies no matter how well meaning is bound to fail in cases where the community’s perspective and value of wetland resources are not taken into account.
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, conclusions are drawn and recommendations made based on the study findings. Research gaps are also identified for future studies. The study was a survey on the role played by culture in the conservation of the Nyando wetlands. It aimed at; determining and documenting the existing cultural belief systems in the utilization of resources in the Nyando wetlands in the Lake Victoria basin and how they are passed down from one generation to the next; investigating the existing conservation measures employed by the communities living around the Nyando wetlands and finally determining how existing cultural belief systems affect wetland conservation in the Nyando wetlands.

5.2 Conclusions drawn from the study findings

Despite the many benefits derived from wetlands which may include water supply, food production, construction materials, products for cottage industries, tourism and recreation, flood control among others, there has been minimal efforts tailored to their conservation. This has been attributed to the general lack of awareness and appreciation of the value of wetlands, the increased human pressure on the exploitation of wetland resources, the diminishing of certain cultural beliefs that facilitated conservation of natural resources due to modernization and the absence of community participation on conservation initiatives either by exclusion or through their own reluctance.
Based on the foregoing summary and objectives of this study, the following conclusions are drawn:

• Few cultural beliefs pertaining to environmental conservation exist among the communities living in the Nyando wetlands of Lake Victoria. Results showed that only a small percentage (8%) of the community was aware of their existence. Furthermore where they do exist, respondents reported having inherited them from their parents or learnt about them through observation. However, mass destruction and displacement caused by seasonal flooding has led residents to adapt to a way of life that is more focused on survival than on the traditional way of life or belief systems.

• Communities living in the Nyando wetlands of Lake Victoria have to a certain extent adopted conservation measures such as planting agroforestry tree species. This however is mainly due to the intervention of external agencies such as non-governmental environmentally based organizations such as VI, VIRED and UHAI Lake forum. However, labour, time and cost constraints tend to hamper some conservation initiatives particularly agroforestry initiatives where returns may not be immediate or where the unpredictable weather patterns interfere with tree seed establishments.

• Existing cultural beliefs are seldom observed and therefore their contribution to environmental conservation is minimal. However certain aspects of existing
cultural beliefs do negatively impact on conservation efforts. Among these are those concerning tree planting rights and access to land rights as far as women are concerned. These have to a large extent hampered agroforestry efforts in parts of the Nyando wetlands. As a consequence, women who actively participate in workshops concerning community development seldom have the power and rights over resources to change their situation without their male counterpart's permission.

5.3 Recommendations

Based on the study findings, the following recommendations are made:

- Floods are an integral part of the Nyando Basin and their influence and impact in the way of life of these communities cannot be ignored. The land use practices of tens of thousands of farm families operating throughout the catchment results in sedimentation of the Nyando river system. Minimizing the extent of environmental degradation caused by floods will require channeling of the waters to other positive production purposes such as irrigation and fish farming. Increasing vegetative cover through agroforestry technologies, enhancing water infiltration or redirection by construction of larger and more effective culverts can all play a role towards this end.

- The lack of public or collective land on which to locate water storage structures has been cited as reason for the lack of public infrastructure for water management. Given the poor management of water sources in the study area and
the inadequate supply of potable water, adequate investment will be required at different concerned levels such as the local authorities, Non-governmental organizations and the local community. Rainwater harvesting technologies need to be promoted for both domestic and agricultural use. Once again funding needs to be available to facilitate the purchase of water storage tanks if the water is to be free from pollution

- Given the different organizations working in these areas, networking among agencies is important if the services delivered are to be more effective for purposes of learning from past experiences and obtaining new and already perceived insights into wetland issues.

- Effective management of the watershed hence wetlands will require social organization around upstream and downstream linkages. In the Awach subcatchment small community groups organize themselves to manage water resources by contributing to the provision of boreholes for communal use and creating environmental awareness among their community members.

- It is necessary to seek high value fast growing trees to curb an already accelerated problem of soil erosion. These trees need to be region-specific with an ability to generate income for the Riparian communities thereby acting as an incentive towards their participation in environmental conservation. Agroforestry initiatives
in the region have the great responsibility therefore of focusing on tailor-made solutions in the development of problem specific agroforestry techniques that can both enhance soil fertility, counter soil erosion and withstand the two extremes of erratic weather patterns in the Nyando while providing alternative income for residents who own small parcels of land. This is likely to minimize reliance on a single source of resources hence reduce its over-exploitation.

- Awareness campaigns by the government, catchment authorities, environmental committees and NGOs on the importance of conserving the wetlands and the dangers associated with the degradation of these areas should be carried out, targeting those people living and utilizing the wetlands. Without understanding the community’s way of life or the reasons behind this way of life, trying to enforce rules and regulations pertaining to environmental conservation is a futile activity. In order to be effective therefore a high level of community participation is required.

- Socio-cultural concerns need to be integrated in the planning and design and implementation of conservation projects to enable local community members to embrace and identify with government initiatives. The mainstreaming of gender at all levels of programme development and community initiatives will boost the numbers in the population that are willing to participate actively in community development particularly where it gives them a sense of usefulness and self-worth.
Empowering /capacity building and leadership training should form the basis of community workshops rather than spoon feeding.

5.4 Indications for Future Researchers

Since the study was limited to only Nyando wetlands in the Lake Victoria basin, there is a need to carry out an extensive, similar study on other wetlands in Kenya so as to determine and document the existing cultural belief systems in the utilization of wetland resources. This will promote indigenous cultures of various communities in Kenya and enhance sustainable utilization of wetland resources without degrading them.
6.0 REFERENCES


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Appendix 1.0: Observation Section: Life In The Nyando Wetlands

Plate 1.1: A local herdsboy grazing cattle on the rice fields in Ahero.

Plate 1.2: The Rice fields of Ahero leased by local community members from private owners.
Plate 1.3: Sugarcane Plantation in Ahero

Plate 1.4: Fishing takes place at one of many inlets of Lake Victoria left after recent floods. The rise in water levels on the Lake during floods leads to shoals of fish being carried further ashore creating an alternative income source for the local community.
Plate 1.5 Land left bare and cracked after the floods have subsided and most of the top soil been carried off making it difficult to till and unable to sustain crops. Massive soil erosion is estimated to affect 120,000ha within the Nyando basin and is believed to have started 100 years ago.

Plate 1.6: Craftswoman at work. This elderly widow is weaving mats (Par in Luo) from dried papyrus to sell at the local market.
Appendix 2.0 Map

2.0 (a) Map – Administrative Divisions of Nyando District

Fig. Study Area- Nyando Division and Lower Nyakach Divisions
Appendix 3.0 Observation Sheet:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>NAME OF WETLAND AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drained areas for farming</td>
<td>Areas around Singida Swamp as the swamp recedes.</td>
</tr>
<tr>
<td>Sacred sites/preserved areas</td>
<td>NONE other than graveyards within homes</td>
</tr>
<tr>
<td>Grazing areas</td>
<td>River banks along River Awach and surrounding marshy areas.</td>
</tr>
<tr>
<td>Waste dumping</td>
<td>No collective waste dumping site for the local community. Individual homes dispose of their own waste by burying it, burning it, using as manure or feeding organic waste to the animals.</td>
</tr>
<tr>
<td>Water collection points</td>
<td>Singida Swamp, River Awach, River Amira, taps, boreholes.</td>
</tr>
<tr>
<td>Areas with conservation activities</td>
<td>Individual homesteads that incorporate growth of agroforestry tree species within their compounds. River banks where soil is heaped up to prevent water overflow during heavy rains.</td>
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</tbody>
</table>
### Appendix 4.0

**Work Plan**

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<td>Interviews with Key Informants</td>
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</tbody>
</table>
Appendix 5.0. HOUSEHOLD QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS

<table>
<thead>
<tr>
<th>Date</th>
<th>Division</th>
<th>Location</th>
<th>Sub-location</th>
<th>Village</th>
<th>Name of local swamp</th>
<th>Household Number</th>
<th>Name of Interviewer</th>
</tr>
</thead>
</table>

1.0 General Information

101 Name of Respondent ________________________________

102 Gender  (1)Male   (2) Female

103 Status in household (1) Father  (2) Wife  (3) Son (4) Daughter

104 Household Head  (1) Father  (2) Mother

105 Marital Status.
   (1) Married  (2) Widowed  (3) Separated/Divorced  (4) Single

106 Age _______ years

107 Highest level of education
   (1) None  (2) Primary  (3) O level  (4) A level  (5) Tertiary/University

Household Details:

108 Household size ((Total No. of persons) ________________________

109

<table>
<thead>
<tr>
<th>Wetland Related Occupations</th>
<th>% Contribution to annual Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop farming</td>
<td></td>
</tr>
<tr>
<td>Livestock farming/grazing</td>
<td></td>
</tr>
<tr>
<td>Extraction of medicinal herbs</td>
<td></td>
</tr>
<tr>
<td>Fuelwood harvesting</td>
<td></td>
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<tr>
<td>Crafts (Mats, baskets etc)</td>
<td></td>
</tr>
<tr>
<td>Building materials extraction</td>
<td></td>
</tr>
<tr>
<td>Hunting/Fishing</td>
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<tr>
<td>Others(Specify):</td>
<td></td>
</tr>
</tbody>
</table>
110 Are you a resident of this area?

(1) Yes  (2) No

112 If yes how long have you lived here?

(1) Less than a year (2) 1-5 years (3) 6-10 years (4) Over 10 years

113 If NO what distance do you travel everyday to search for a livelihood here?

2.0 LAND USE, OWNERSHIP and ACCESS

201 Who owns the swamps/wetland area?

(1) Leasehold (2) Freehold (3) Customary/Communal (4) Gazetted (5) Others
(specify) _______________________

202 Do you cultivate the wetlands? (1)Yes [ ]  (2) No [ ]

203 If yes which crops do you cultivate?

Cash Crops
(specify) _______________________

Food crops
(Specify) _______________________

204 Why do you choose to cultivate these particular crops?

______________________________________________________________

205 Do you use chemicals on your farmland? (1)Yes [ ]  (2) No [ ]

206 If No, what are the reasons? (1) Too expensive (2) Environmental effects

(3) Traditionally unaccustomed (4) Other (specify) _______________________

207 Are you happy with the present land tenure system in the wetland area?

(1) Yes  (2) No
208 Please give a reason/s for your answer in 207

(1) Allows Free for all grazing/cropping

(2) It locks Non-owners out

(3) It allows Conservation

(4) I don’t know

(5) Others (specify)________________________

209 Are certain areas of the wetland customarily restricted to human economic activity or to certain members of the community?

(1) Yes (2) No (3) I Don’t Know

210 If yes what are the reasons for these restrictions?

<table>
<thead>
<tr>
<th>RESTRICTION</th>
<th>REASON</th>
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<tbody>
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<td>(1)</td>
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</table>

3.0 FUEL USE

301 What is the main source of fuel for household cooking and heating?

(1) Kerosene/Gas  (2) Firewood  (3) Charcoal  (4) Papyrus  (5) Others (specify)

302 If firewood or charcoal is used, how many bundles or bags do you use per week? (1) Less than 5 (2) 5-10 (3) Over 10

303 Where do you mostly obtain the fuel stated above?

(1) Nearby market  (2) Nearby bushes  (3) Wetlands  (4) Others (specify)

304 If from the wetlands, which plant species do you use as fuelwood?
305 Are there any wetland plants that you do not traditionally harvest?

(1) Yes  (2) No

306 If yes, give the plant name and state the reasons-

<table>
<thead>
<tr>
<th>PLANT</th>
<th>REASONS FOR NOT HARVESTING</th>
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<tbody>
<tr>
<td>1)</td>
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<td>2)</td>
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<td>4)</td>
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</table>

**4.0 CRAFT INDUSTRY**

401 Do you make any crafts using resources from the swamps?

(1) Yes  (2) No

402 If yes give the following details?

<table>
<thead>
<tr>
<th>Plant used</th>
<th>Part of plant used</th>
<th>Method of Harvesting</th>
<th>Crafts Made</th>
</tr>
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<tbody>
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</table>

403 Briefly describe any traditional roles of the following in the craft business

Men

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

Women

________________________________________________________

________________________________________________________
404 Has it been difficult to obtain craft materials? (1) Yes (2) No

405 What problems do you face in obtaining raw materials from the surrounding swamps?
(1) Scarce
(2) Deep in the swamp
(3) Swamp owners do not allow
(4) Seasonal
(5) Species Extinction
(6) None
(7) Other

406 What do you think has changed on the access of raw materials from the swamp?

5.0 WATER USE

501 Where do you obtain water for domestic use?
(1) Local stream (2) Wetlands/swamps (3) Local river (4) Boreholes
(5) Tap (6) Others (specify)

502 Briefly describe any traditional rules governing water use and collection from the wetlands by men, women and children
503 What problems do you face in obtaining water from the wetlands?

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>SUGGESTED SOLUTIONS</th>
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</thead>
<tbody>
<tr>
<td>1. Accessibility</td>
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<td>2. Availability</td>
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<td>3. Purity</td>
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<td>4. Others(Specify)</td>
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</tbody>
</table>

6.0 WETLAND MANAGEMENT

601 In your view are the swamps diminishing or increasing?
(1) Yes (2) No (3) I don’t know

602 Please give reasons for your answer in 601 above
(1) Cultivation
(2) Grazing
(3) Settlement
(4) Infrastructure
(5) Others (specify)

603 Do you directly utilise the papyrus swamps?
(1) Yes (2) No

604 If Yes, in what way do you directly utilise the swamp?
(1) Harvesting papyrus (2) Farming (3) Fishing (4) Grazing
(5) Other (specify)

605 Who is degrading the papyrus swamps?
(1) Individual farmers (2) Local industries (3) Papyrus harvesters
(4) Others (specify)
606 In what way are the wetlands being degraded?

(1) Overharvesting of papyrus (2) Clearing for agriculture (3) Pollution/Industrial wastes deposition (4) Others (specify)

607 What does the local community do to discourage this degradation?

608 Who controls the quantity of papyrus harvested from the swamps at any one time?

(1) Local elders (2) Government (3) Nobody (4) Community based organisations (5) Don’t know

7.0 ATTITUDES TOWARDS WETLAND CONSERVATION

701 What are your feelings towards wetland conservation?

(1) Good to conserve (2) Waste of land (3) Denies benefits to local people (4) Other (specify)

702 Are you aware of any spiritual beliefs & traditional rules that govern the use and conservation of the papyrus swamps?

(1) Yes (2) No

703 If yes, briefly describe some of the beliefs/traditional rules you know governing the conservation of the wetlands (include taboos)

704 Do you adhere to the beliefs/rules stated above?

(1) Yes (2) No

705 Where did you get this knowledge from? (1) Parents (2) Relatives (3) Observation (4) Others (specify)

706 Who ensures that these rules are adhered to?

(1) Local elders (2) Community members (3) Individuals (4) Nobody
707 Do you think this system is effective in preserving the wetlands?
(1) Yes    (2) No    (3) Don’t know

708 For Yes or No give your reasons

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

709 Do you think traditional systems concerning the use of the wetlands are
(1) Good to retain (2) Outdated (3) I don’t know

710 Give reasons for your answer above

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

711 Do you think people should be stopped from exploiting the swamp resources?
(1) Yes    (2) No

712 Give reasons for your answer above

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
INTERVIEW GUIDE FOR RESPONDENTS IN ENVIRONMENTAL BASED ORGANISATIONS/ACTIVITIES

Name of Organisation:

Nature of activities;


Year started

1.1 Do you own part of the wetlands? (1) Yes (2) No

1.2 Are you involved in any type of conservation activities in the wetlands?
   (1) Yes (2) No

1.3 If yes what is give a brief description of the nature of your activities?


1.4 Briefly describe your objectives in this undertaking


1.5 What problems have you encountered with the local community in trying to implement them?


1.6 How do you go about solving these problems?


1.7 How would you describe the state of the wetlands?
   (1) Decreasing (2) Increasing (3) No change

1.8 What in your experience are the causes of the above changes in the wetlands?
   (1) Harmful cultural practices (2) Overexploitation of the wetlands
   (3) Pollution (4) Other (specify) _____________________________

1.9 Have you engaged the local community in any conservation based activities?
   (1) Yes (2) No

1.10 If yes, list the action and its specific purpose?

<table>
<thead>
<tr>
<th>ACTION</th>
<th>PURPOSE</th>
</tr>
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<tbody>
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1.11 What has been the response of local community members?
   (1) Good (2) Poor

1.12 Give reasons for your answer
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

1.13 Are you familiar with the cultural systems/beliefs of the local people that concern the use of the wetlands? (1) Yes (2) No
1.14 If yes, please list them below


1.15 How do these cultural beliefs affect your conservation efforts particularly where the community is involved?


1.16 As far as you know does conflict ever arise between the local community and conservationists based on cultural beliefs concerning wetlands? (1) Yes (2) No

1.17 If yes, please explain


1.18 What in your view can be done to improve the situation concerning cultural beliefs alongside conservation of the wetlands


5.1 INTERVIEW GUIDE: 
Guide questions to obtain In-depth information from key informants who are local community members

1.1 Who owned the wetlands within this area as far back as you can remember?

1.2 What have been the uses of the wetlands in the past?
   a. 
   b. 
   c. 

1.3 Were there traditional norms and regulations that governed the use of the wetland resources (water, plants, birds & wildlife) at that point in time? List and explain:
   a. 
   b. 
   c. 
   d. 

1.4 Who ensured that these rules were adhered to?

1.5 How were these rules passed on to the next generation?

1.6 Was there a penalty for those who failed to adhere?
1.7 Are you aware of any that are still in place & followed by the local community members?

_________________________________________________________________________

1.8 What of those rules that are no longer followed, what led to their abandonment?

1.9 Has this affected the state of the wetlands in any way? How

1.10 Have you noticed any major changes in the swamps over the years? Explain:

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

1.11 Are you aware of materials that were previously obtained but are now not available?

_________________________________________________________________________

_________________________________________________________________________

1.12 Are you aware of any wildlife/bird/plant species previously found in the wetlands but now absent?

_________________________________________________________________________

_________________________________________________________________________
DETERMINANTS OF HIV-VCT UTILIZATION AMONG SECONDARY SCHOOL TEACHERS IN THIKA DISTRICT, KENYA.

BY:

ENOCK OBURI MARITA

(I57/CM/0259/04)

DEPARTMENT OF PUBLIC HEALTH

A THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH IN THE SCHOOL OF HEALTH SCIENCES OF KENYATTA UNIVERSITY.

JUNE, 2008

Marita, Enock Oburi
Determinants of HIV-VCT utilization
DECLARATION

This thesis is my original work and has not been presented for a degree in any other University or any other award.

Enock Oburi Marita.
157/CM/0259/04.

Sign: ........................................
Date: 12.6.2008

We confirm that the work reported in this thesis was carried out by the candidate under our supervision.

Dr. Isaac Mwanzo.
Department of Public Health,
Kenyatta University.

Sign: ........................................
Date: ........................................

Dr. Margaret Keraka.
Department of Public Health,
Kenyatta University.

Sign: ........................................
Date: 17.6.2008
DEDICATION

My loving wife Gladys, my dear sons Kelly, Alvin and my determined parents; the late Peter Marita and Ephisiba Marita.
ACKNOWLEDGEMENT

I thank God to have enabled me accomplish this very informative process. I
highly appreciate the tireless guidance, assistance and support of my supervisors
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blessed abundantly.
ABSTRACT

Globally, PLWHA continues to rise, despite the fact that effective prevention strategies exist. At least 95% of the new infections occur in developing countries, including Kenya. Unless effort is made to co-ordinate a massive response to the pandemic, there will be 45 million new HIV infections by 2010 in the world. This has led to new dimensions of health care delivery worldwide such as Voluntary Counselling and Testing (VCT). Despite its proven benefits, high knowledge of VCT and its availability, its uptake is varied and often poor. It is commonly argued that teachers in Sub-Saharan African (SSA) countries have relatively higher HIV prevalence rates than the adult population. AIDS is claiming teachers more quickly than they can be trained in many countries and is the leading cause of death among teachers in the SSA countries. Teachers do play a significant information dissemination role in schools and the community in general. This study was conducted in Thika District (Kenya) to establish determinants of HIV-VCT utilization among secondary school teachers. The objectives were to establish secondary school teachers’ HIV-VCT utilization levels, to identify factors that motivated teachers to utilize HIV-VCT services, to identify factors that hindered teachers from utilizing the VCT service and to establish relationship between various factors and HIV-VCT utilization among the teachers. The study employed Cross-sectional survey, where quota and simple random sampling were used. A questionnaire, interview schedule and focused group discussion guide were used to collect data. Quantitative data was analyzed using SPSS software and qualitative data was described and used to illustrate the main ideas. 246 teachers were sampled; almost half were females, 13% were in private schools. HIV-VCT utilization among secondary school teachers was 30.5%. The younger and less experienced teachers were more likely to utilize HIV-VCT services than the older and more experienced ones (Likelihood ratio, P = 0.004). Private school teachers were more likely to utilize HIV-VCT services than those of the public schools (OR = 2.356, 95% CI, 1.082-5.128). Teachers who were scared by the HIV prevalence in their area were three times less likely to utilize HIV-VCT services (OR = 0.312, 95% CI limit, 0.104-0.936). The teachers who had not sought HIV-VCT service were less likely to perceive HIV-VCT services as beneficial (Likelihood ratio, P =0.027). Various factors were identified as barriers to HIV-VCT uptake; most of them were post test implicated. A number of factors that made some teachers to seek HIV-VCT services were also identified; HIV/AIDS awareness campaigns and urges ‘to know status’ were most cited factors. In conclusion, the teacher HIV-VCT utilization level was higher than the general population. The study identified socio-demographic and other factors that influenced use of VCT services and indeed some factors were found to be related to HIV-VCT use. It is recommended that the VCT promotion programs has to focus on enhancing positive perception of VCT services more specially; messages that aim at enhancing the use of VCT service should mainly target older teachers and alleviating barriers related to the use of VCT services. “HIV-VCT services are good let the teachers use them.”
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<tbody>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>ART</td>
<td>Anti-Retroviral Therapy</td>
</tr>
<tr>
<td>ARV</td>
<td>Anti-retroviral drug</td>
</tr>
<tr>
<td>CBO</td>
<td>Community Based Organisation</td>
</tr>
<tr>
<td>CDC</td>
<td>Centres for Disease Control and Prevention</td>
</tr>
<tr>
<td>DASCO</td>
<td>District AIDS and STD Control Office</td>
</tr>
<tr>
<td>DEOs</td>
<td>District Education Officers</td>
</tr>
<tr>
<td>Fcf</td>
<td>Fenite correction factor</td>
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<tr>
<td>FGD</td>
<td>Focused Group Discussion</td>
</tr>
<tr>
<td>GOK</td>
<td>Government of Kenya</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>KDHS</td>
<td>Kenya Demographic and Health Survey</td>
</tr>
<tr>
<td>KEMSA</td>
<td>Kenya Medical Supplies Agency</td>
</tr>
<tr>
<td>KEMRI</td>
<td>Kenya Medical Research Institute</td>
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<tr>
<td>MOE (K)</td>
<td>Ministry of Education, Kenya</td>
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<tr>
<td>MOH (K)</td>
<td>Ministry of Health, Kenya</td>
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<tr>
<td>NACC</td>
<td>National AIDS Control Council</td>
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<tr>
<td>NASCOP</td>
<td>National AIDS/STD Control Programme</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Government Organization</td>
</tr>
<tr>
<td>OI</td>
<td>Opportunistic Infection</td>
</tr>
<tr>
<td>PLWHA</td>
<td>People Living With HIV/AIDS</td>
</tr>
<tr>
<td>PMTCT</td>
<td>Prevention of Mother-to-Child Transmission</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>STD</td>
<td>Sexually Transmitted Disease</td>
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<td>TB</td>
<td>Tuberculosis</td>
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<tr>
<td>VCT</td>
<td>Voluntary Counselling and Testing</td>
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<tr>
<td>UNAIDS</td>
<td>Joint United Nations Committee on HIV/AIDS</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
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<td>WHO</td>
<td>World Health Organization</td>
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CHAPTER ONE

INTRODUCTION

1.1 Background Information
The statistics available on HIV/AIDS are worrying. Globally, the number of
people living with HIV/AIDS continues to rise, despite the fact that effective
prevention strategies exist. Already, more than twenty five million people around
the world have died of AIDS-related diseases since the first cases of AIDS were
identified in 1981 (UNAIDS, 2004). In 2007, around 2.1 million men, women and
children lost their lives. 33.2 million People around the world are now living with
HIV, and most of these are likely to die over the next decade or so
(UNAIDS/WHO, 2007).

The need, therefore, is to go beyond the mere numbers and percentages of the
infected, ill, and dead to the impact that such numbers will have on individuals,
families, communities, and nations. Perhaps it is only with clearer evidence of
such impact - anecdotal and descriptive, as well as statistical - that the magnitude
of HIV and AIDS will become apparent and that all nations of the world and all
sectors of society - even those not now visibly affected - will realize that the
epidemic is their concern and not someone else's (Sheldon, 1994).

And such evidence concerning the implication and impact of HIV infection and
AIDS on the development of families, communities and of nations is beginning to
appear. The impact in many regions of the world is already widespread, profound, and complex - and promises to be even more so in the future. The subsequent scenarios being written for the future of heavily affected regions of the world - and for some only now beginning to be affected - are quite devastating. And they come at a time when many societies, because of recession, debt, war, and natural disaster, are simply unable to cope with the "routine" demands of development let alone assess the impact of AIDS and respond effectively to it (Sheldon, 1994).

The impact of HIV/AIDS on the education sector, especially in high prevalence countries is multi-faceted and very complex. It is widely asserted that teachers in Sub-Saharan African (SSA) countries are a high-risk behavior group and that HIV prevalence among the teaching profession is higher than the adult population (Bennell et al., 2002; Walters, 2002). For example in Ghana, teachers are among the worst hit group, Apia (2000) reported an estimated prevalence rate of 9.2% in the education sector, which is far higher than the national rate of 4.6%. AIDS is claiming teachers more quickly than they can be trained in many countries (Schemo, 2002) and is the leading cause of death among teachers in the SSA countries (Jones, 2001; Walters, 2002).

In some countries, a tenfold increase in teacher mortality and absenteeism due to HIV and AIDS has severely reduced both teaching time and quality. Permanent or
temporary absenteeism of one teacher can have strong repercussions on up to 100 children (Rispel, 2006).

The Permanent Secretary of the Ministry of Education in Kenya, reported in 2004 that between four and six teachers a day were dying of AIDS-related illnesses, which means the AIDS-related mortality rate was in the region of 0.7-1.0 percent (Muito et al., 2005). In Kenya, over 14,500 teachers are thought to be HIV-positive (UNESCO and EFAIDS, 2006).

In Swaziland, primary and secondary school teacher deaths increased from 40 in 2001 to 100 in 2004. The overall teacher mortality rate was 1% in 2004. Probably around 80-85% of the 2004 deaths were AIDS-related (Bennell, 2006). In Malawi, according to Ministry of Education data, teacher deaths accounted for 12% and 9% of all teacher turnover at primary and secondary schools respectively in 2004 (Bennell and Kadzamira, 2003).

The mortality rate for primary school teachers, in Botswana, increased slightly from 0.71% in 1999 to 0.88% in 2002. The corresponding figures for secondary school teachers are 0.37% and 0.46%. Teacher deaths accounted for around 20% of total attrition and 5% of total turnover (transfers plus attrition) in both years. (Bennell, 2006).
Every month, 100 Tanzanian primary school teachers are estimated to die of AIDS-related illnesses and in 2006 alone an estimated 45,000 additional teachers were needed to replace those lost to the epidemic (Beckmann and Rai, 2004).

It is widely believed that teacher recruitment will have to expand rapidly in order to make up for much higher levels of AIDS-related attrition (Bennell et al., 2002). The education system is under a profound threat (Walters, 2002). In 1999, when the pandemic was not as severe as it is now, approximately 860,000 students in SSA lost their teachers to AIDS (CDC, 2005).

However, experience has also shown us that the right approaches, applied quickly enough with courage and resolve, can and do result in lower national HIV infection rates and less suffering for those affected by the epidemic. We have learned that if a country acts early enough, a national HIV crisis can be averted (UNAIDS/WHO, 2006).

HIV/AIDS is a global health problem whose emergence has introduced new dimensions to health care delivery worldwide. One of this is Voluntary Counselling and Testing (VCT). VCT is an intervention tool for early access to HIV prevention as well as to care and support services. It is the process by which an individual willingly undergoes counselling enabling him/her to make an informed choice about being tested (UNAIDS, 2000a). VCT clients, who are
tested, learn their serostatus and receive specific counselling based on their test results and are referred appropriately. Knowledge of personal risk behaviours and serostatus is power (UNAIDS, 2000a, 2001; Kamenga et al., 1991; CDC 2005; Van de Perre, 1999; NASCOP, 2001). VCT services have been conducted in Kenya since 1998 and there are over 620 VCT sites in the country (CDC, 2005).

The global demand for HIV counseling and testing services is growing dramatically due to the intensified effort to expand access to antiretroviral therapy (ART). Donors and international public health organizations accordingly regard HIV-VCT as a critical component of comprehensive HIV/AIDS programs (WHO, 2003).

Research has shown that globally there is generally high knowledge of HIV/AIDS services, but its uptake is low (Ekanem and Gbadegesin, 2004; Duffy et al., 1998; Day et al., 2003; Shitaye et al., 2004; KEMRI-JICA, 2003; Baggaley, 1997; Michael, 2001). A survey among primary and secondary school teachers in Kenya showed 25% of the teachers had tested for HIV (Kiragu and Kimani, 2005). A cross-section study among primary school teachers in Mwanza region, Tanzania found about 20% of the participants had voluntarily tested for HIV (Kakoko et al., 2006). Another study among general public in Uganda realized 17% HIV-VCT utilization (Nuwaha et al., 2003).
Various factors including cost, social, delivery of the service, lack of perceived benefit, and cultural issues may affect VCT uptake (UNAIDS 2000b; Karim et al 1995; Kalichman and Simbayi, 2004; Coulibaly et al, 1998; Ginwalla, 2002; Damesyn, 1998).

Recognizing the vital role that VCT has to play within a comprehensive range of measures for HIV/AIDS prevention and support, there is urgent need to support its good course in every aspect. This study endeavored to establish determinants of HIV-VCT uptake among secondary school teachers in an effort to establish appropriate VCT services, mitigate for possible barriers and increase its usability.

1.2 Statement of the Problem
The HIV epidemic is growing, and efforts to fight it need to grow at an even greater rate if they are to be successful. An ever-growing AIDS epidemic is not inevitable. However, unless action against the epidemic is scaled up drastically, the damage already done will seem minor compared with what lies ahead. This may sound dramatic, but it is hard to play down the effects of a disease that stands to kill more than half of the young adults in the countries where it has its firmest hold. Entire families, communities and countries will begin to collapse if this situation is allowed to occur.

HIV/AIDS presents a major crisis that is increasingly affecting the most productive segments of the population across development sectors. The education
sector, which is vital to the creation and enhancement of human capital, is equally affected. The loss of skilled and experienced teachers due to HIV/AIDS related deaths and the long-term HIV/AIDS related illnesses are increasingly compromising the provision of resources and quality Education in the country. Its impact if not controlled, will be profound and is considered to be highly destructive.

VCT is an entry point to prevention, treatment and care of people infected or affected by HIV/AIDS and has served well in checking the impact of the pandemic.

Despite the proven benefits of VCT and even in areas where VCT services are available as well as high knowledge, uptake of the services is often poor. Kenyans including teachers are generally aware of HIV/AIDS but there are high rates of new infections and low use of HIV-VCT services. These new infections and many people (over 80%) not using VCT services to know their HIV status and change behaviour is worrying hence the dire need to address the situation, through specific populations like the teachers.
1.3 Objectives of the Study

1.3.1 Broad Objective
To identify determinants of HIV-VCT utilization amongst secondary school teachers.

1.3.2 Specific Objectives
a) To establish secondary school teachers’ HIV-VCT utilization level
b) To identify factors that motivates teachers to utilize HIV-VCT services.
c) To identify factors that hinder teachers from utilizing the VCT services.
d) To establish relationship between various factors and HIV-VCT uptake among the secondary school teachers.

1.4 Research Questions
➢ What is the secondary school teachers’ HIV-VCT utilization level?
➢ What motivating factors do teachers who have sought HIV-VCT identify with?
➢ Which barriers do teachers who have not sought HIV-VCT identify with?
➢ Which factors are associated with HIV-VCT service uptake amongst secondary school teachers?

1.5 Null Hypotheses
➢ The age, sex, experience, marital status, HIV sero-prevalence, type of school, alcohol and drug use have no association with HIV-VCT uptake.
1.6 Justification of the Study
The effectiveness of the HIV/AIDS prevention strategies to a large extent depends on how well the inherent differences among the key population groups are focused. It may be appropriate to provide specific resources for HIV-VCT for given groups rather than providing a comprehensive service for the general population. HIV-VCT services that are acceptable to one group may not be acceptable to other groups. Therefore there is need to focus on teachers and realize the best HIV-VCT service for them.

This study focused on teachers because some studies have shown that teachers in SSA countries have relatively high HIV prevalence rates and that AIDS is the leading cause of death among the teachers (Schemo, 2002; Jones, 2001).

Teachers play a key custodian role within the education system. They serve as role models, mentors and guardians. They are also central to efforts to achieve the Education for All (EFA) and Millennium Development Goals (MDGs), as education is seen both as a right and as a central pillar of efforts to eradicate poverty (Buss and Patel, 2005). Like all members of the population, however, teachers are susceptible to HIV. In countries with high HIV infection rates, most notably in Sub-Saharan Africa, this susceptibility is increasingly noticeable. As more and more teachers die, an already weakened educational system is left with the dual challenge of increasing numbers of pupils and decreasing numbers of
teachers (Buss, and Patel, 2005). Hence the need to assess the teachers’ VCT utilization which is an entry point to HIV prevention, treatment and care.

The Kenya government intended to test over 2.5 million people, have 90% of schools to provide skills-based HIV education and counselling services by December 2007, as well as, have over 90% of VCT centres offer quality service in accordance to the National VCT Guidelines (NASCOP, 2004). These projections can safely be achieved through support of all stakeholders, and such a study is deemed to contribute to realization of this goal.

The results of this study, therefore, will support decision making to improve the coverage and quality of VCT services to teachers. The outcome will contribute to the development of relevant interventions on HIV/AIDS prevention and comprehensive AIDS in work programs (AIWP) in education sector. The findings should help stakeholders in understanding limiting as well as positive factors influencing VCT uptake among teachers and its potential success in the country by increasing ways of combating HIV/AIDS.
1.7 Conceptual framework
The utilization of HIV-VCT services has been found to be influenced by various factors. The influence would vary from one group of population to another. HIV-VCT service is a key to several services that are essential for proper management of people affected and infected with HIV/AIDS. Below (Figure 1.1) is a conceptual model showing the variables that may influence use of HIV-VCT service which is an entry point for HIV/AIDS prevention, treatment and care.

Figure 1.1: A conceptual model showing some variables that may influence HIV-VCT services utilization (Designed by self).
CHAPTER TWO

REVIEW OF LITERATURE

2.1. Situation of HIV/AIDS in the world

Globally, the number of people living with HIV/AIDS continues to rise, despite the fact that effective prevention strategies exist. Already, more than twenty five million people around the world have died of AIDS-related diseases since the first cases of AIDS were identified in 1981 (UNAIDS, 2004). In 2007, around 2.1 million men, women and children lost their lives. 33.2 million People around the world are now living with HIV, and most of these are likely to die over the next decade or so. The most recent UNAIDS/WHO estimates show that, in 2007 alone, 2.5 million people were newly infected with HIV (UNAIDS/WHO, 2007). At least 95% of new infections occur in less developed countries.

Unless effort is made to co-ordinate a massive response to the pandemic, there will be 45 million new HIV infections by 2010 in the world (UNAIDS, 2001). SSA has just over 10% of the world’s population, but is home to close to two-thirds (over 25 million) of all the PLWHA (UNAIDS, 2004), followed by South and South East Asia’s 6 million (14.3%). The least affected is Australia and New Zealand, both have 15,000 (0.03%) infected persons (UNAIDS, 2004).
When AIDS first emerged no-one could have predicted how the epidemic would spread across the world and how many millions of lives it would change. There was no real idea what caused it and consequently no real idea how to protect against it (UNAIDS/WHO, 2006). Now we know from bitter experience that AIDS is caused by the virus HIV, and that it can devastate families, communities and whole continents. We have seen the epidemic knock decades off countries' national development, widen the gulf between rich and poor nations and push already-stigmatized groups closer to the margins of society. We are living in an 'international' society, and HIV has become the first truly 'international' epidemic, easily crossing oceans and borders (UNAIDS/WHO, 2006).

HIV has now finally been recognized as a global threat, and people are beginning to take action to prevent it killing many more millions than those who have already died. This action needs not only to continue, but to be speeded up considerably. The HIV epidemic is growing, and efforts to fight it need to grow at an even greater rate if they are to be successful. An ever-growing AIDS epidemic is not inevitable. However, unless action against the epidemic is scaled up drastically, the damage already done will seem minor compared with what lies ahead. This may sound dramatic, but it is hard to play down the effects of a disease that stands to kill more than half of the young adults in the countries where it has its firmest hold. Entire families, communities and countries will begin to collapse if this situation is allowed to occur (UNAIDS/WHO, 2007).
It has been noted that a country with a very high HIV prevalence rate will often see this rate eventually stabilize, and even decline. In some cases this indicates, among other things, that people are beginning to change risky behavior patterns, because they have seen and known people who have been killed by AIDS. Fear is the worst and last way of changing people's behavior and by the time this happens it is usually too late to save a huge number of that country's population (UNAIDS/WHO, 2007).

It is in Africa, in some of the poorest countries in the world, that the impact of the virus has been most severe. In four countries, all in the southern cone of the continent, at least one adult in five is living with the virus. In Botswana, a shocking 24.1% of adults are now infected with HIV, while in South Africa, 18.8% are infected. With a total of around 5.5 million infected, South Africa has more people living with HIV than any other country (UNAIDS/WHO, 2007). Rates of HIV infection are still extremely high in sub-Saharan Africa, and an estimated 1.7 million people in this region became newly infected in 2007. This means that there are now an estimated 22.5 million people living with HIV/AIDS (UNAIDS/WHO, 2007).
Whilst West Africa is relatively less affected by HIV infection, the prevalence rates in some large countries are creeping up. Côte d'Ivoire is already among the twelve worst affected countries in the world, and in Nigeria nearly 4% of adults have HIV. In West Africa the epidemic displays a diversity not seen to such an extent in other parts of the continent. National prevalence rates can remain low, while infection rates in certain populations can be very high indeed (UNAIDS/WHO, 2007).

Infection rates in East Africa, once the highest on the continent, hover above those in the West but have been exceeded by the rates now seen in the southern cone. In 2005, the HIV prevalence rate among adults in Kenya, Tanzania and Uganda exceeded 6%. In Uganda the estimated prevalence rate fell to around 5% from a peak of about 15% in the early 1990s. This trend is thought in part to have resulted from strong prevention campaigns, and there are encouraging signs of the same effect happening in parts of Zambia, Kenya and Zimbabwe (UNAIDS/WHO, 2006).

It is widely thought that North Africa managed to sidestep the global AIDS epidemic - perhaps due to its strict rules governing sexual behavior. However, the latest UNAIDS estimates indicate that 35,000 people in North Africa and the Middle East acquired an HIV infection in 2007, bringing the total number of
people living with HIV/AIDS in the Middle East and North Africa to an estimated 380,000. AIDS killed a further 25,000 people in 2007 (UNAIDS/WHO, 2007).

The diversity of the AIDS epidemic is even greater in Asia than in Africa. The epidemic here appears to be of more recent origin, and many Asian countries lack accurate systems for monitoring the spread of HIV. Half of the world's population lives in Asia, so even small differences in the infection rates can mean huge increases in the absolute number of people infected (UNAIDS/WHO, 2006).

Following new surveys conducted in 2005-2006, India is now thought to have between 2 million and 3.1 million people living with HIV. Other large epidemics are present in China (700,000), Thailand (580,000) and Myanmar (360,000). The total number of people living with HIV in Asia is thought to be around 4.8 million (UNAIDS/WHO, 2007).

National adult prevalence is still under 1% in the majority of this region's countries. However some of the countries in this region are very large and national averages may obscure serious epidemics in some smaller provinces and states. Although national adult HIV prevalence in India for example, is below 1%, some states have an estimated prevalence well above this level (UNAIDS/WHO, 2007).
Around 1.6 million people were living with HIV in Latin America at the end of 2007. During that year, around 58,000 people died of AIDS and an estimated 100,000 were newly infected. The HIV epidemics in Latin America are highly diverse, and are fuelled by varying combinations of unsafe sex (both between men, and between men and women) and injecting drug use. In nearly all countries, the highest rates of HIV infection are found among men who have sex with men, and the second highest rates are found among female sex workers (UNAIDS/WHO, 2007).

In high-income nations, HIV infections have historically been concentrated principally among injecting drug users and gay men. These groups are still at high risk, but heterosexual intercourse accounts for a growing proportion of cases. In the United States about 1.2 million were PLWHA in 2005 (UNAIDS, 2006) and more than a quarter of people diagnosed with HIV in 2004 were female. HIV infection remains unsafe sex between men (accounting for about 44% of HIV or AIDS cases reported in 2001-2004, followed by an unprotected heterosexual intercourse (34% of cases) and use of non sterile drug injecting equipment (17%) (US Centers for Disease Control and Prevention, 2006). In several countries in Western Europe, including the United Kingdom, heterosexual contact is the most frequent cause of newly diagnosed infections (UNAIDS/WHO, 2006).
Very early in the epidemic, once information and services for prevention had been made available to most of the population, the level of unprotected sex fell in many countries and the demand rose for reproductive health services, HIV counseling and testing and other preventive services. However prevention activities are now lagging behind as the epidemics move beyond their traditional at-risk groups (UNAIDS/WHO, 2007).

Many high-income countries suffer from the belief that HIV is something that affects other people, not their own populations. On a national level, this belief prevents policy-makers and budget-setters from seeing the epidemic on their own door-steps, looking instead to the situation in areas such as Africa. Some high-income countries fund medication provision for low-income countries whilst failing to provide medicines for their own citizens who have AIDS. Even in the US, there are people who are unable to afford to buy the drugs they need (UNAIDS/WHO, 2007).

However, experience has also shown us that the right approaches, applied quickly enough with courage and resolve, can and do result in lower national HIV infection rates and less suffering for those affected by the epidemic. We have learned that if a country acts early enough, a national HIV crisis can be averted (UNAIDS/WHO, 2006).
In Kenya, the first AIDS case was reported in 1984 and currently it is estimated that about 1.1 Million Kenyans are HIV positive and that 1.5 million have already died due to HIV related illness (UNAIDS, 2004). The national prevalence rate is currently 6.1% (NASCOP, 2005). Kenya has the 7th highest number of HIV-infected people of all countries in the world, and is ranked 15th highest in terms of the proportion of its population infected (UNAIDS, 2004).

In 2003, Nyanza province had the highest HIV prevalence (15.1%), followed by Nairobi (9.9%), Coast (5.8%), Rift Valley (5.3%), Central (4.9%), Western (4.9%), Eastern (4.0%), and Eastern North eastern (0.1%), respectively (NACC, 2005). HIV prevalence in Thika district was 8.3% (DASCO-Thika, 2006)

Table 2.1 gives a summary of various indicators of HIV/AIDS as compared with SSA countries and the world
Table 2.1: HIV/AIDS in Kenya compared with SSA and the world.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Kenya</th>
<th>Sub-Saharan Africa</th>
<th>Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated number of people living with HIV/AIDS, 2003</td>
<td>1.2 million</td>
<td>25 million</td>
<td>37.8 million</td>
</tr>
<tr>
<td>Percent of adult population estimated to be living with HIV/AIDS, 2003</td>
<td>6.7%</td>
<td>7.5%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Estimated number of deaths due to HIV/AIDS, 2003</td>
<td>150,000</td>
<td>2.2 million</td>
<td>2.9 million</td>
</tr>
<tr>
<td>Women as percent of adults estimated to be living with HIV/AIDS, 2003</td>
<td>65%</td>
<td>57%</td>
<td>48%</td>
</tr>
<tr>
<td>Percent of young women, ages 15-24, estimated to be living with HIV/AIDS, 2001</td>
<td>12.4 – 18.7%</td>
<td>8.9%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Percent of young men, ages 15-24, estimated to be living with HIV/AIDS, 2001</td>
<td>4.8 – 7.2%</td>
<td>4.4%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Estimated number of AIDS orphans, 2003</td>
<td>650,000</td>
<td>12.1 million</td>
<td>15 million</td>
</tr>
<tr>
<td>Number of people estimated to be receiving antiretroviral therapy (ART), June 2005</td>
<td>33,000 – 46,000</td>
<td>500,000</td>
<td>970,000</td>
</tr>
<tr>
<td>Number of people estimated to be in need of ART, June 2005</td>
<td>233,000</td>
<td>4.7 million</td>
<td>6.5 million</td>
</tr>
</tbody>
</table>

(Source: UNAIDS, 2004)

2.2 HIV/AIDS among teachers

It is widely accepted that the HIV/AIDS epidemic will seriously affect the education sector in SSA countries. However, little systematic empirical research has been undertaken, particularly in the high prevalence countries that seek to assess the actual and likely future impacts on the supply of and demand for educational services (Bennell et al., 2002). The education system is under a
profound threat (Walters, 2002). In 1999, when the pandemic was not as severe as it is now, approximately 860,000 students in SSA lost their teachers to AIDS (CDC, 2005).

It is widely asserted that teachers are a high-risk behaviour group and that HIV prevalence among the teaching profession is higher than the adult population (Bennell et al., 2002). In Ghana, teachers are among the worst hit group, Apia (2000) reported an estimated prevalence rate of 9.2% in the education sector, which is far higher that the national rate of 4.6%. It is widely believed that teacher recruitment will have to expand rapidly in order to make up for much higher levels of AIDS-related attrition (Bennell et al., 2002). Replacements of teachers, who are younger and less experienced, may have even higher risk of HIV infection rates than their predecessors. The net effect is that there will be less and less qualified graduates (Walters, 2002).

Teacher deaths account for less than 20 percent of total teacher attrition in most countries and less than 10 percent of total teacher turnover (attrition and transfers). Overall teacher attrition rates are considerably higher in some developed countries. In the United Kingdom, for example, the attrition (wastage) rates for primary and secondary school teachers were 10.0 percent and 7.2 percent respectively in 2004 (Smithers and Robinson, 2005).
According to official Ministry of Education data, primary school teacher deaths in Tanzania have increased fairly steadily from 345 (mortality rate 0.37 percent) in 1991 to 893 (0.75 percent) in 2003. Male mortality rates have been consistently slightly higher than female rates since 1991. The findings of the AIDS Mortality Monitoring Project suggest that AIDS-related mortality in rural districts is as low as 25 percent of total adult deaths, but increases to 50-60 percent in Dar es Salaam. Overall attrition from resignations, retirements and deaths remained constant at around one percent between 1991 and 2004 (Bennell and Mukyanuzi, 2005).

2.3 HIV-VCT services
HIV counseling and testing service was initiated in USA in March 1985 and has spread to other countries (U.S.A Department of health & Human Service, 1994). VCT service has been conducted in Kenya since 1998 when it was started on a pilot basis but officially began in March 2001 with the launch of rapid testing (CDC, 2005). The Kenya government declared HIV/AIDS a national disaster in 1999 and VCT became the cornerstone of the Kenya national response to HIV/AIDS pandemic. With such a commitment, over 620 VCT sites have been set up, over 1500 VCT counselors have been trained in the country and 1.5 million people have been tested. (NASCOP, 2004).
A complete VCT package is provided comprising pre-test counselling, HIV testing and post-test counselling. Referrals are made to such other services as each individual case may warrant (NASCOP, 2001).

_HIV Counseling Testing services serve two principal purposes:_

- They determine who requires care and treatment. A person must know his or her HIV status to access these services. This includes both ART and interventions to prevent mother-to-child HIV transmission (PMTCT).
- They help prevent HIV acquisition and transmission. Knowing their HIV status may encourage infected people to avoid transmitting the virus to others, as well as motivate those who are uninfected to remain so through risk reduction counseling. HIV Counseling and Testing can lead to a reduction in the number of sexual partners, increased condom use, fewer sexually transmitted infections and safer injecting practices. (UNAIDS/WHO, 2004).

Counseling Testing services may also promote a positive community response to the disease. Knowledge about HIV might stimulate discussion and reduce stigma and discrimination. It could also result in community action to address the issue, including adoption of HIV/AIDS-sensitive policies (UNAIDS/WHO, 2004).

A client's rights should be respected in all VCT settings. International public health organizations suggest providers:
• Ensure an ethical testing process where the purpose of the test and its benefits are explained to the client. The process should also include counseling, and guarantee the confidentiality of all medical information.

• Make certain the testing is voluntary and accords the client the right of refusal.

• Address the implications of a positive test result, including the need for access to sustainable treatment and care (WHO, 2004; UNAIDS/WHO, 2004).

The following should be present for high-quality, comprehensive HIV Counseling and Testing:

• Political will and government policies: Political commitment to provide adequate funding for HIV Counseling and Testing must be present. This should be accompanied by government policies that protect people affected by HIV, including those using HIV Counseling and Testing services. Stigma and discrimination are common, limiting access to key services for people either known or believed to be HIV-positive, such as health care, employment and housing. Sometimes there is also violence against those whose HIV status is disclosed. Therefore anti-discrimination laws need to be enacted and enforced.

• Personnel: Counselors and lab staff need to be trained in HIV Counseling and Testing. Increasingly these roles are performed by the same people. This helps to improve client flow, provide results to clients and facilitate immediate client
enrollment in appropriate treatment, care and support services. The staff members must be trained in HIV/AIDS awareness, pre- and post-test counseling, rapid HIV testing, ways to address difficult issues (such as death and dying), HIV prevention and ongoing referral mechanisms. High-quality HIV Counseling and Testing service delivery also requires proper personnel management. This includes skillfully supervising staff and identifying capacity-building needs.

• *Infrastructure:* The minimal physical requirements for HIV Counseling and Testing include a counseling space that ensures auditory and visual privacy, and a space that can accommodate HIV testing and waste disposal. The need for an elaborate laboratory infrastructure is declining because of rapid HIV tests.

• *Commodities and supplies:* HIV Counseling and Testing services require adequate supplies of tests and reagents, prevention materials (including condoms) and other medical products. Systems and procedures must be in place for the forecasting, procurement and management of these medical supplies.

• *Quality assurance:* Mechanisms should be established to ensure that ethical and technical medical standards are upheld for both counseling and testing services.
• **Linkages and referrals:** Relationships should be established among HIV Counseling and Testing points of service, health facilities and community organizations so that clients receive comprehensive prevention, care, treatment and support services. This will also help ensure that all HIV Counseling and Testing clients (both infected and uninfected) have access to ongoing services, such as psychosocial and legal services (WHO, 2004; UNAIDS/WHO, 2004).

### 2.4 The role of VCT

VCT is a cornerstone for early access to prevention as well as to care and support services such as opportunistic infections prevention, preventing mother-to-child HIV transmission [PMTCT] (UNAIDS, 2001; Van de Perre, 1999; NASCOP, 2001). VCT programs have been found to be effective in behaviour change and knowing HIV status strengthens prevention efforts, encourages infected persons to avoid ongoing transmission to others, and motivates those who are uninfected to remain so through risk reduction strategies.

Also VCT services can help decrease the anxiety, stigma and sense of hopelessness associated with fearing that one has AIDS. Knowledge of HIV status is a powerful weapon in the national effort to respond to the pandemic. (Weinhardt and Lance, 1999; Coulibaly *et al.*, 1998; Cartoux, 1998; NASCOP, 2001; Kamenga *et al.*, 1991; Bentley *et al.*, 1998)
VCT services are cost effective. Sweat, a researcher from Johns Hopkins University, School of Hygiene and Public Health said, “VCT saves money, as the cost of the intervention is far less than the cost of even minimal HIV treatment, not to mention the cost of orphans, lost productivity, loss of skilled labour, OIs, and the enormous impact on individuals and communities.” (Grinstead, 2005)

VCT plays an essential role at many levels viz:

*The community level*

- Changes the image of HIV/AIDS from illness, suffering and death to living positively with HIV.
- Generates optimism as large numbers of persons test HIV negative.
- Reduces stigma and enhances the development of care and support services
- Reduces transmission.
- Enables access to preventive prophylaxis, and antiretroviral therapy where available, and access to needed clinical services (antenatal clinics, STI and TB clinics, primary care clinics).

*Couples and family level*

- Enables planning for the future (marriage, pregnancy, relationships, orphan care, financial and property arrangements).
- Enhances faithfulness.
- Encourages family planning.
For the individual

- Empowers uninfected persons to protect themselves from HIV.
- Assists infected persons to protect others and live positively. (WHO, 2002)

2.5 Factors affecting uptake of VCT

Several studies have shown that HIV-VCT awareness is generally high, over 93%, but is inversely related to its uptake, less than 20% (Michael, 2001; Day et al., 2003; Damesyn, 1998; Ekanem and Gbadegesin, 2004; Shitaye et al. 2004; KEMRI-JICA, 2003; Kalichman and Simbayi, 2004). A survey among primary and secondary school teachers in Kenya showed 25% of the teachers had tested for HIV (Kiragu and Kimani, 2005). A cross-section study among primary school teachers in Mwanza region, Tanzania found about 20% of the participants had voluntarily tested for HIV (Kakoko et al., 2006). Another study among general public in Uganda realized 17% HIV-VCT utilization (Nuwaha et al., 2003).

Although VCT is becoming increasingly available in the developing countries, there is still great reluctance for many people to be tested. There are several possible contributing factors that must be addressed if VCT is to have an important role in HIV prevention and care. These factors may include: lack of perceived benefit and societal factors such as presumed negative outcomes of VCT (abandonment and abuse/violence, marital break up, discrimination, stigma,
psychological distress and depression). Other factors are associated with delivery of the service (convenience, confidentiality, limited treatment option for people living with HIV/AIDS [PLWHA], access, operational issues (UNAIDS 2000b; Vermund and Wilson, 2002). Difference in testing schedules, maturity of the epidemic, sero-prevalence in the community and attitudes to and availability of VCT in the community are also thought to be important (UNAIDS 2004).

Although it is important to know one’s sero-status, HIV infection, in many communities, is a stigmatizing condition, and this can lead to negative outcomes for people after testing (Karim et al., 1995; Michael, 2001). As the result stigma may actively prevent people accessing care, gaining support, and preventing onward transmission. Societal attitude towards HIV can be a strong impact on individual choices, and if people known to have HIV face discrimination and stigma, VCT is likely to be unpopular intervention (UNAIDS, 2000b). A study in South Africa showed that people who embraced the conviction that spirits and the supernatural are responsible for AIDS were more likely to be misinformed about the virus and were more likely to condone isolation and social sanction of people living with HIV/AIDS (Kalichman and Simbayi, 2004).

Lack of legislation on discrimination may make some people reluctant to undergo VCT (UNAIDS, 2000b). A common barrier for VCT is the lack of perceived benefit (Baggaley, 1994). If VCT is linked with medical care, and effort made to
improve medical services for people with HIV, this will help to reduce this barrier to testing. HIV-VCT services combined with STD diagnosis, treatment and economic development services have been found to motivate at risk individuals and couples to receive counselling and testing (Balmer et al., 2000; UNAIDS 2000b). The knowledge of availability of treatment options has been demonstrated to affect the attitudes of people to VCT. (Coulibaly et al., 1998)

It is also proposed that counsellor’s attitudes towards testing at the sites may be a key factor in uptake (UNAIDS, 2000b). A research done in South Africa found that nurse counsellors were more successful than community volunteers in establishing communication with clients, and more confident in giving information and answering questions. The study also found one barrier that caused clients to hesitate to accept VCT was concern about confidentiality (Ginwalla, 2002).

There may also be great differences in the theoretical and actual uptake rates. For example in Lusaka, when students were asked if they wished to be tested for HIV there was a very high rate of interest. When the service was provided initially, uptake was very low. However, with time, there has been increasing demand for VCT in Lusaka (Baggaley, 1994). Another study from Zambia examined the readiness to utilize the VCT services offered to 4812 participants from rural and
urban sites. Although 37% initially expressed willingness to use VCT service only 3.6% actually came for the service (Rosenvard, 1998).

A study conducted in Uganda showed that interest in VCT is often “social”, with clients showing interest in knowing their sero-status before getting married, embarking on a new relationship, or making plans for the future. Pre-marital testing has increased over time and no doubt explains the increasing parentage of couples who come together. “Medical” reasons for VCT, such as falling ill or having symptoms of AIDS, are cited less frequently (UNAIDS, 1999).

A study in Mwanza, Tanzania among primary school teachers, showed that teachers who were aged between 21 to 30 years, reported easy access to VCT services (Kakoko, 2006). In the pilot phase of a study of young couples in rural areas of Western Kenya, of those participated 95% reported would accept a free HIV test. However, when asked a small payment for service (a $4 fee), the potential demand reduces significantly down to 31-40% (Damesyn et al., 1998).

In summary, the epidemic continues to spread despite existence of effective prevention strategies. VCT, one of the prevention strategies, is still under-utilized hence the need to emphasize it in each specific populations. As seen from the various countries and various studies mentioned above, some factors have been associated with the utilization of HIV-VCT services among general and specified
populations. It would be essential to come down to specific sub-populations like teachers to establish their concerns in relation to HIV-VCT utilization with the aim of fighting the fast spreading disease. Owing to assertion that teachers are a high risk behaviour group and that HIV prevalence among them is higher than the adult population coupled with their important role of information dissemination then it would be prudent to find out the determinants that influence their HIV-VCT utilization
CHAPTER THREE
MATERIALS AND METHODS

3.1 Study Area
The study was carried out in Thika District, which is located in the southern part of Central Province, Kenya (See appendix 4). Thika District shares common boundaries with several districts both within and outside Central Province. It borders Nairobi City, to the south, Kiambu District to the west, Murang’a District to the north and Machakos District to the east. It lies between latitudes 3° 53” and 1° 45” south of the equator and longitudes 36° 35” and 37° 25” East (MOH, 2004).

Thika District has 6 Divisions and 20 Locations, with a population of about 680,000 people. The population density is 329 people/km². Health facilities are fairly distributed in the district with about 23 VCT centres (MOH, 2004). HIV prevalence in the district is 8.3% (DASCO-Thika, 2006).

There are 15 Educational Zones, 128 secondary schools with about 1,500 teachers in Thika District (MOE-unpublished). The district has good road network, it is served by railway and has several industries.

3.2 Study Population
Secondary schools teachers in Thika District constituted the study population. This study population was chosen considering many VCT sites (23) in the
District. The government’s projection was at least five VCT sites per district by 2007 (NASCOP, 2004).

3.2.1 Inclusion criteria
Teachers working in secondary schools within Thika District

3.2.2 Exclusion criteria
Teachers not working in secondary schools within Thika District

3.2.3. Ethical consideration
The teachers were enrolled into the study after obtaining their informed consent and hence participation was voluntary. Privacy and confidentiality of information given was observed and their names were not recorded anywhere. Clearance from Kenyatta University and the Ministry of Education was sought before conducting the study. All study participants willing to consume VCT services were referred to appropriate VCT sites.

3.3. Study Design
The study was a cross-sectional survey. Data was collected at one point in time cutting across all cadres of secondary school teachers. The survey aimed at quantifying the distribution of various variables among secondary school teachers in relation to VCT uptake at one point of time. Unlike a census the survey covered a sample of the teachers.
3.4. Definition of variables

Dependant and independent variables: The dependant variable was HIV-VCT utilization. Independent variables were used to establish if they had any influence on the use of HIV-VCT services. They included sex, age, marital status, residence, academic disciplines, location of the schools, professional qualifications, nature of schools, income levels, working experience, religion, sexual partners, condom use, consumption of alcohol, addictive drug use, perceived benefit of VCT service, societal factors, attitude towards HIV/AIDS, sero-prevalence of HIV, confidentiality in VCT sites and VCT service costs. The scales of measurement for the variables were either nominal (like sex, marital status) or ordinal (like knowledge of level of HIV prevalence, attitude).

3.5 Sampling method and sample size determination

3.5.1 Sampling Method
A list of all secondary schools in Thika District was made from which a sample of schools was randomly (simple) chosen from every educational zone. The schools made up the sampling units. All the teachers in the selected schools were eligible to participate in the study. Using proportion to size sampling, the number of teachers from each school to participate was reached and finally simple random sampling (using random numbers) was used to pick actual participants.
3.5.2 Sample size determination

The method as used by Fisher et al., (1998) was employed. Teachers’ HIV-VCT uptake (p) is about 25% (Kiragu and Kimani, 2005).

\[ n = \frac{1}{d^2} \left( \frac{s^2}{pq} \right) \]

Where: \( n \) = sample size

\( Z \) = value of the Z score corresponding to the level of the confidence

\( p \) = the estimated proportion of teachers taking HIV-VCT service

(prevalence rate of HIV-VCT uptake)

\( q = 1 - p \)

\( d \) = the tolerable error margin in our estimate (absolute precision)

At 95% confidence level,

\( Z = 1.96, \)

\( p = 0.25 \) and

Error margin of 5% a sample size of 288 was obtained.

\[
\left[ \frac{1}{0.05^2} \left\{ 1.96^2(1-0.25) \cdot 0.25 \right\} \right] = 288
\]

Because study population was below 10,000 fenite correction factor (Fcf) was applied as follows:

\( \text{Fcf} = \frac{1}{1+n/N} \)

\( \text{nf} = \frac{n}{1+n/N} \)

\[ = \frac{288}{1+288/1,500} \]

\[ = 241 \]

Where: Fcf = Fenite correction factor
Considering attrition, 2% was added to the desired sample size when the study population is less than 10,000 (n_d). 

\[
(102/100) \times 241 = 246
\]

Therefore the sample size for this study was 246

3.6. Data collection and Research instruments.

3.6.1 Research instrument development
A questionnaire was developed which consisted of socio-demographic characteristics based on questions focusing on the study objectives. The instrument was in English language and both closed and open-ended questions, as well as, Likert scale items were included. Focused Group Discussions (FGD) guide and interview schedule were also used.

3.6.2 Data quality control
Data quality control was ensured through pre-testing of the study instruments and training the research assistants.

3.6.2.1 Pre-testing of the study instruments
Pre-testing of the research instrument was done before the actual data collection among teachers in non-participating schools. This assisted to modify the tool and
ensure that validation of the data was easy. It also helped to check whether or not the questions were relevant, acceptable, analyzable, and could generate the required information.

### 3.6.2.2 Training of research assistants

Two research assistants were recruited, trained and oriented on the study. Confidentiality and privacy was emphasized. Pre-testing of data instruments stage served as an orientation to the enumerators.

### 3.6.3 Data collection

The data was collected during second term in May to July 2006. A questionnaire was administered to the teachers and Focused Group Discussion (FGD) was employed for clarification of issues. Apart from the questionnaires on teachers, other key informants like health professionals were interviewed especially on qualitative information using FGD and interviews. A team meeting was held at the end of every FGD to review and complete the notes during the meeting, as well as evaluating how the focus group fared.

### 3.7 Data management

The quantitative data was edited, coded, entered, and processed using SPSS software. Descriptive statistics were used to describe data while in measurement of association between categorical variables; Chi-square and Fishers Exact Test were performed. Odds ratio and likelihood ratio were also used appropriately.
Key statements, ideas, and attitudes expressed during FGD and interviews were evaluated and the information so obtained was used to illustrate the main ideas. The results were presented in figures, tables, charts and descriptions. Discussion of the results in relation to other findings from similar studies conducted elsewhere was done. Conclusion and recommendations were finally drawn.
4.1 Socio-demographic characteristics of the respondents

4.1.1 Sex distribution of the respondents

A total of 246 teachers participated in the study. About 119 (48.4%) were males, 121 (49.2%) were females and 6 (2.4%) of them didn’t indicate their sex (figure 4.1).

![Pie chart showing sex distribution of respondents]

**Figure 4.1 sex distribution of the respondents**

Majority (57.3%) of the respondents were aged between 31 and 40 years, 18.7% were aged 18 to 30, while 23.1% were above 40 years. About 0.9% did not indicate their age. This is illustrated in figure 4.2.
4.1.3 Distribution of respondents by the subjects they taught.

There were 29 (12.2%) Mathematics teachers, 68 (28.7%) Science teachers, 69 (29.1%) Humanities teachers, 58 (24.5%) Languages teachers and other subject teachers 13 (5.5%). This is shown in figure 4.3. Some teachers had a combination of more than one subject of specialization. Male teachers dominated in science and mathematics subjects, while female teachers were more in languages and humanities.

Figure 4.2: Age distribution of the respondents
4.1.4 Marital status of the secondary school teachers

Majority of the teachers (74.0%) were married/living together, while some (16.3%) were never married, and 8.4% divorced, widowed or separated/estranged while 1.3% gave no response (See figure 4.4).
4.1.5 Residential location of the secondary school teachers

Majority of the teachers (39.8%) resided in urban areas as compared to 26.8% in rural and 31.7% in peri-urban. About 1.7% gave no response. Figure 4.5 illustrates the distribution of residential locations of the teachers.
4.1.6 Professional qualifications of the secondary school teachers
Out of the 246 teachers, 160 (65%) were Bachelor of Education graduates, 9 (3.7%) had Master of Education, 46 (18.7%) were Diploma in Education holders. Those with other qualifications including no professional qualification, Post Graduate Diploma in Education (PGDE) and PhD accounted for 9.3%. About 3.3% did not indicate their professional qualification. See figure 4.6.

![Figure 4.6 Distribution by professional qualification](image)

4.1.7 Nature of schools where the teachers worked
About 13% of the teachers worked in private schools, while 84.1% worked in public schools and 2.9% did not give a response (figure 4.7). About 129 (52.4%) of the teachers worked in mixed schools, 60 (24.4%) in boys schools while 53 (21.5%) in girls schools and 1.7% did not respond (figure 4.8). Those who taught in boarding schools were 105 (42.7%), day schools 95 (38.6%), and those worked
in both boarding and day facilities were 45 (18.3%) while 0.4% did not respond. This is shown in figure 4.9. About 132 (53.7%) teachers worked in rural schools, 49 (19.9%) in peri-urban and 60 (24.4%) in urban schools. About 2% gave no response (figure 4.10).

Figure 4.7 School status

Figure 4.8 Type of school
4.1.8 Income levels of the teachers
Some of the respondents (28%) were in Kshs.20,001 and Kshs.30,000 income bracket, 24.4% earned Kshs.30,001 to Kshs.40,000, and 23.2% were in Kshs.10,001 to Kshs.20,000 income bracket. About 12.3% earned less than Kshs.10,000, 4.5% earned between Kshs.40,001 and Kshs.50,000 a few (3.9%) earned above Kshs.50,000. About 3.7% did not indicate their income level. This is illustrated in figure 4.11 below.
4.1.9 Teachers' working experience

About 73 (29.8%) had 5 to 10 years of experience, 58 (23.7%) had 11 to 15 years of experience, 47 (19.1%) had 16 to 20 years experience. The teachers who had less than five years of experience were 47 (19.1%), while those with more than 20 years experience were 20 (8.3%). Figure 4.12 shows the distribution by working experience.
Figure 3.12 Distribution by working experience

4.1.10 Religion
The Christians who were Catholics formed 36.6%, and Christian-non-Catholic were 60.2%. There were 0.8% Muslims, 1.6% traditional believers while non religious were only 0.8%. This is illustrated in figure 4.13 bellow.

Figure 4 Distribution by religion
4.1.11 Number of sexual partners in the last one year.
Most teachers 218 (88.6%) reported to have had only one sexual partner in the last one year while 23 (9.3%) had more than one and 2.1% did not respond (figure 4.14).

![Figure 5 Distribution by sexual partners](image)

4.1.12 Condom use
About 30.5% of the teachers could not encourage use of condoms; some teachers (39%) reported they sometimes encourage use of condoms while 25.2% encouraged use of condoms all the time. Roughly 5.3% did not comment on the use of condoms. Figure 4.15 illustrates the condom use distribution.
4.1.13 Alcoholic and addictive drug use

Alcoholic beverages and addictive drugs are not commonly used by the teachers. About 33.3% took alcohol and only 5.3% used addictive drugs (figure 4.16). The drugs mentioned include tobacco, cocaine and bhangi (*cannabis sativa*). Tea and coffee were also mentioned as addictive drugs.
4.1.14 Perceived benefit of VCT services

Majority, 92.7% of the teachers agreed that VCT services were important while only 2.8% disagreed and 4.5% did not respond. Some (67.1%) teachers agreed that their peers found VCT services important but 18.2% disagreed while 14.6% were not sure of their peers' stand. About 80.1% supported the idea that everybody deserves to go for VCT as opposed to 14.6% who were against the idea and 5.3% had invalid answers or did not respond.

4.1.15 Societal factors

A larger percentage of the teachers (81.3%) said they should attend VCT with their partners while a small percentage (13.4%) was against it and 5.3% had invalid answers or did not respond. Despite this, 58.9% said they would not ask for permission from their partners before attending VCT, while 34.6% said they would and 6.5% had invalid answers or did not respond. The issue of being seen from a VCT centre by a relative or colleague had almost equal response, with 47.5% saying there was no bother as opposed to 43.9%, but 6.5% had invalid answers or did not respond. It was almost unanimously agreed (82.6%) that VCT did not violate their cultural/social status.

4.1.16 Attitude towards HIV/AIDS

About 62.2% of the teachers strongly agreed and 31.8% agreed that HIV/AIDS education should be included in school curriculum while 2% disagreed and 2% strongly disagreed while had invalid answers or did not respond. On being asked
if it should be the teacher's responsibility to teach HIV/AIDS education in schools, 32.5% strongly agreed, 36.6% agreed, 19.5% disagreed and 7.3% strongly disagreed while 4.1% had invalid answers or did not respond. The study also sought to know if future teachers should be trained on HIV/AIDS in colleges, 54.9% strongly agreed, 37.8% agreed, 2.8% disagreed while 1.6% strongly disagreed and 2.9% had invalid answers or did not respond. They were further asked if they should talk freely with their colleagues about HIV/AIDS and 46.7% strongly agreed, 44.7% agreed, 4.5% disagreed, while only 1.2% strongly disagreed and 2.9% had invalid answers or did not respond.

Teachers gave varying opinions on being encouraged to undertake VCT services; 33.7% strongly agreed, 48.8% agreed, 9.8% disagreed and 2.8% strongly disagreed to undertake VCT while 4.9% had invalid answers or did not respond. About 45.9% of the teachers strongly agreed that one should not drop a friend because of learning his/her HIV positive status, 38.6% agreed, 5.3% disagreed and 5.7% strongly disagreed while 4.5% had invalid answers or did not respond. About 44.3% strongly agreed, 35.4% agreed, 11.4% disagreed and 4.1% strongly disagreed that there was no problem buying food from HIV positive shopkeeper or food vendor while 4.8% had invalid answers or did not respond. Over 80% of the teachers had positive attitude towards VCT.
**Table 4.1a:** Distribution by perceived benefit of VCT, societal factors and attitude towards HIV/AIDS

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived benefit of VCT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>171</td>
<td>69.5</td>
</tr>
<tr>
<td>Negative</td>
<td>36</td>
<td>14.6</td>
</tr>
<tr>
<td>No response</td>
<td>39</td>
<td>15.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>246</td>
<td>100</td>
</tr>
<tr>
<td><strong>Societal factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>110</td>
<td>44.7</td>
</tr>
<tr>
<td>Negative</td>
<td>104</td>
<td>42.3</td>
</tr>
<tr>
<td>No response</td>
<td>32</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>246</td>
<td>100</td>
</tr>
<tr>
<td><strong>Attitude towards HIV/AIDS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>41</td>
<td>16.7</td>
</tr>
<tr>
<td>Positive</td>
<td>184</td>
<td>74.8</td>
</tr>
<tr>
<td>No response</td>
<td>21</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>246</td>
<td>100</td>
</tr>
</tbody>
</table>
4.1.17 Sero-prevalence of HIV in the area

The teachers gave varying rating of HIV in their neighbourhood. About 29.7% said HIV was high, 35.4% rated it moderate, and 7.7% said it was low. About 23.6% did not know the rate of HIV in their neighbourhood and 3.6% were invalid (see figure 4.17).

Figure 8 Respondents’ rating of HIV in their area

On asking the teachers if they could be scared from attending VCT services due to HIV prevalence in their area, 11.4% affirmed Yes while 83.3% said No and 5.3% did not respond (fig 4.18).
4.1.18 Confidentiality in VCT centers

Some teachers (43.9%) did not know about confidentiality with VCT centres, 27.6% acknowledged that there was confidentiality, while 25.2% reported to the contrary and 2.8% did not respond (figure 4.19).

4.1.19 VCT services costs

Majority of the teachers (69.9%) reported that the cost of VCT services was not a
hindrance to access. Only 24.8% felt Paying for VCT is a hindrance to accessing VCT services and 5.3% did not respond. Table 4.1b illustrates the costs of VCT services.

Table 4.1b: Distribution by paying for VCT services

<table>
<thead>
<tr>
<th>Is paying for VCT a hindrance to its use?</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>61</td>
<td>24.8</td>
</tr>
<tr>
<td>No</td>
<td>172</td>
<td>69.9</td>
</tr>
<tr>
<td>No response</td>
<td>13</td>
<td>5.3</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100</td>
</tr>
</tbody>
</table>

4.2 HIV-VCT services utilization

Out of 246 teachers only 75 (30.5%) reported to have ever utilized VCT services, of which 46.7% were males and 53.3%, were females (table 4.2). There was no significant difference between gender and HIV-VCT utilization (Odds ratio = 0.831, 95% CI limit 0.478 -1.444).
Table 2.2: Distribution by use of VCT services

<table>
<thead>
<tr>
<th>Ever Used VCT?</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>75</td>
<td>30.5</td>
</tr>
<tr>
<td>No</td>
<td>158</td>
<td>64.2</td>
</tr>
<tr>
<td>No response</td>
<td>13</td>
<td>5.3</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100</td>
</tr>
</tbody>
</table>

Over 50% of secondary school teachers reported (perceived or actual testing) to know their HIV status but not necessarily by majority through HIV-VCT centres. Out of those who reported to know their HIV status, about 131 (53.25%) confessed their HIV status as Negative, 3 (1.2%) as Positive and 38 (15.45%) declined to disclose their HIV status while 74 (30.1%) did not know their HIV status. Those who had not utilized HIV-VCT service were asked to state how they knew their HIV status. About 30 (45.5%) said while seeking medical care, 13 (19.7%) said while donating blood and 23 (34.8%) gave various situations including “God told me my status”, “tested at a doctor friend’s house”, pre-marital test, seeking insurance cover, “not had sex”, “I have no reason to imagine I would be positive”, “by faith and personal conduct” and during antenatal care. Although only 30.5% had utilized VCT services, 94.6% of the respondents knew a VCT centre which they could easily access.
4.3 Motivators to HIV-VCT utilization by teachers who had sought HIV-VCT services.

The teachers who had utilized HIV-VCT services identified the following motivating factors to utilize HIV-VCT services.

4.3.1 Knowledge of their HIV status

Out of the 75 teachers who had sought VCT services, 36.6% were motivated by virtue of wanting to establish their HIV status. The urge ‘to know HIV status’ was the most frequently cited factor that motivated the teachers. The number of teachers who were influenced by urge ‘to know HIV status’ were not significantly different from those who were not influenced by the urge ($\chi^2 = 0.013$, df = 1, P = 0.908). Sex of the teachers had a significant relationship with urge ‘to know HIV status’ ($\chi^2 = 5.441$, df = 1, P = 0.020). Male teachers were almost three times likely to be influenced by the urge ‘to know status’ than female teachers (Odds ratio = 3.056, 95% CI limit 1.180-7.909).

Majority of the teachers who lived in peri-urban were not influenced by the urge ‘to know HIV status’. On the other hand majority of those who lived in rural set up seemed to be influenced. ($\chi^2 = 6.357$, df = 2, P = 0.042). Working experience had no significant association with urge to know HIV status ($\chi^2 = 4.291$, df = 2, P = 0.232).
4.3.2 HIV/AIDS awareness campaigns
About 16.8% of the 75 who had sought HIV-VCT services were motivated to go for HIV-VCT services owing to HIV/AIDS campaigns. The number of the teachers who were influenced by the campaigns was found to be significantly less than those who were not ($\chi^2 = 22.413$, df = 1, $P = 0.000$). There was no significant association between male teachers and female teachers ($\chi^2 = 1.775$, df = 1, $P = 0.183$).

4.3.3 Partner support
Partner support was also reported by about 6.9% of those who had utilized HIV-VCT services ($n = 75$), to have been a factor that influenced teachers to seek HIV-VCT services. The number of teachers who reported this to be a factor were significantly less than those who did not ($\chi^2 = 48.649$, df = 1, $P = 0.000$) No significant association was found between sex and partner support (Fisher exact test, P=1). That is male teachers were not significantly different from female teachers (Odds ratio = 0.900, 95% CI limit 0.187-4.341).

4.3.4 Partner risk behavior
About 6.9% of the 75 who sought HIV-VCT services cited Partner risk behaviour as a factor that motivated them to utilize HIV-VCT services. The teachers who did not cite this as a factor were significantly more than those who did (Fishers Exact Test).
4.3.5 Infant expectancy
Infant expectancy was also reported by about 6.9% of the 75 who had used HIV-VCT services to be a motivating factor. The teachers who did not cite this as a factor were significantly more than those who did (Fishers Exact Test).

4.3.6 Insurance
Some teachers (5.9% out of 75 teachers who had utilized HIV-VCT services) who intended to take an insurance cover first sought HIV-VCT services. The number of teachers who reported this to be a motivating factor were significantly less than those who did not ($\chi^2 = 52.920$, df = 1, $P = 0.000$). It was observed that there was no significant association between sex and insurance cover ($\chi^2 = 2.254$, df = 1, $P = 0.133$).

4.3.7 Availability of ART
Availability of ART was less frequently reported to motivate the teachers to HIV-VCT uptake. Only 4.9% of the 75 who sought HIV-VCT services were of this opinion. Those who identified this factor were significantly less than the rest ($\chi^2 = 56.330$, df = 1, $P = 0.000$). No significant association was noted between Availability of ART and gender (Fishers Exact Test).
4.3.8 Other motivating factors
Friend’s encouragement (3.9%), sick/unwell (2.9%), Job requirement (2.9%), immigration reasons (2.9%) and premarital test (1.9%) were less frequently reported as factors that motivated them to HIV-VCT uptake.

The table 4.3 below gives the summary of reasons that motivated teachers to have attended VCT services

**Table 4.3: Distribution by reasons motivating teachers to have attended VCT services**

<table>
<thead>
<tr>
<th>REASONS THAT MOTIVATED TEACHERS TO ATTEND VCT SERVICES (n = 75)</th>
<th>FREQUENCY</th>
<th>RELATIVE FREQUENCY (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 To know status</td>
<td>37</td>
<td>36.63</td>
</tr>
<tr>
<td>2 HIV awareness campaigns</td>
<td>17</td>
<td>16.83</td>
</tr>
<tr>
<td>3 Partner support</td>
<td>7</td>
<td>6.93</td>
</tr>
<tr>
<td>4 Partner risk behaviour</td>
<td>7</td>
<td>6.93</td>
</tr>
<tr>
<td>5 Infant expectancy</td>
<td>7</td>
<td>6.93</td>
</tr>
<tr>
<td>6 Insurance</td>
<td>6</td>
<td>5.94</td>
</tr>
<tr>
<td>7 Availability of ART</td>
<td>5</td>
<td>4.95</td>
</tr>
<tr>
<td>8 Friends’ encouragement</td>
<td>4</td>
<td>3.96</td>
</tr>
<tr>
<td>9 Job requirement</td>
<td>3</td>
<td>2.97</td>
</tr>
<tr>
<td>10 Immigration reasons</td>
<td>3</td>
<td>2.97</td>
</tr>
<tr>
<td>11 Sick/unwell</td>
<td>3</td>
<td>2.97</td>
</tr>
<tr>
<td>12 Pre-marital test</td>
<td>2</td>
<td>1.98</td>
</tr>
<tr>
<td>Total</td>
<td>101*</td>
<td>100</td>
</tr>
</tbody>
</table>

* A respondent could give more than one reason (multiple responses).

4.4 Barriers to HIV-VCT utilization by teachers who had not sought HIV-VCT services
Out of 246 participants majority 158 (64.2%) had not sought HIV-VCT services.

Most of the reasons that hindered teachers from utilizing HIV-VCT services were
post test implicated. The following various hindrances were identified by the teachers who had not sought HIV-VCT services.

4.4.1 Stress if tested positive
Majority of the respondents (24.9%) who had not sought HIV-VCT services reported that stress if tested positive would deter them from using HIV-VCT services. However there was no significant difference between teachers who agreed with this factor and those who did not ($\chi^2 = 1.361$, df = 1, P = 0.243). Gender had also no significant association with stress if tested positive ($\chi^2 = 0.086$, df = 1, P = 0.770)

4.4.2 Stigma if tested positive
About 16.5% of the teachers who had not sought HIV-VCT services mentioned that they feared stigmatization if tested positive. Apparently there was no significant association between gender and stigma if tested positive ($\chi^2 = 0.22$, df = 1, P = 0.883)

4.4.3 Breach of confidentiality
About 12.6% of those who had not sought HIV-VCT services feared for breach of confidentiality. Moreover there was no significant association between gender and breach of confidentiality ($\chi^2 = 0.133$, df = 1, P = 0.716).
4.4.4 Not sure of service quality
Some teachers (10.7%) were not sure of service quality; hence this might have hindered them from accessing HIV-VCT services. Statistical significance was observed between gender and not sure of service quality ($\chi^2 = 5.795$, df = 1, P = 0.016). Male teachers were more likely not being sure of service quality than female counterparts (OR = 3.066, 95% CI limit, 1.197-7.855).

4.4.5 Discrimination if tested positive
Discrimination if tested positive was also reported by about 9.6% of the teachers who had not sought HIV-VCT services as a hindrance to HIV-VCT uptake. No significant association was noted between gender and discrimination if tested positive ($\chi^2 = 2.930$, df = 1, P = 0.087).

4.4.6 Lack of HIV/AIDS cure
The fact that HIV/AIDS still has no cure was reported to hinder the teacher from using HIV-VCT services. About 9.2% of the teachers who had not sought HIV-VCT services were of this opinion. No significant association was, however noted between gender and lack of HIV/AIDS cure ($\chi^2 = 0.066$, df = 1, P = 0.797). The male and female teachers were equally likely affected by lack of HIV/AIDS cure (OR = 1.123, 95% CI limit, 0.465-2.709).
4.4.7 Fear of partner’s reaction to test result
Fear of partner’s reaction to test result was reported by about 6.1% of the teachers who had not sought HIV-VCT services. No significant association was observed between gender and fear of partner’s reaction to test result ($\chi^2 = 2.170$, df = 1, $P = 0.141$).

4.4.8 Lack of follow up support
Some teachers (5.7%) identified lack of follow up support as a limiting factor. No significant association between gender and lack of follow up support was observed ($\chi^2 = 0.016$, df = 1, $P = 0.900$). The male and female teachers were equally likely affected by lack of follow up support (OR = 1.071, 95% CI limit, 0.366-3.135).

4.4.9 Other hindering factors
Cost of VCT services (1.9%), VCT services not accessible (1.5%) and long waiting queues (1.1%) were also identified as hindrances.

Table 4.4 shows the issues that might have hindered the teachers who had not sought VCT from doing so.
Table 4.4: Distribution by issues hindering the teachers who had not sought VCT from attending VCT services

<table>
<thead>
<tr>
<th>ISSUES THAT HAVE HINDERED THE TEACHERS FROM ATTENDING VCT (n = 158)</th>
<th>RESPONDENTS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress if tested positive</td>
<td>65</td>
<td>24.9</td>
</tr>
<tr>
<td>Stigma if tested positive</td>
<td>43</td>
<td>16.5</td>
</tr>
<tr>
<td>Breach of confidentiality</td>
<td>33</td>
<td>12.6</td>
</tr>
<tr>
<td>Not sure of service quality</td>
<td>28</td>
<td>10.7</td>
</tr>
<tr>
<td>Discrimination if tested positive</td>
<td>25</td>
<td>9.6</td>
</tr>
<tr>
<td>Lack of HIV/AIDS cure</td>
<td>24</td>
<td>9.2</td>
</tr>
<tr>
<td>Fear of partner’s reaction to test result</td>
<td>16</td>
<td>6.1</td>
</tr>
<tr>
<td>Lack of follow up support</td>
<td>15</td>
<td>5.7</td>
</tr>
<tr>
<td>Cost of VCT services</td>
<td>5</td>
<td>1.9</td>
</tr>
<tr>
<td>VCT services not accessible</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td>Long waiting queues</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td>261*</td>
<td>100</td>
</tr>
</tbody>
</table>

* Multiple responses.

4.4.10 Decision to use HIV-VCT services if offered solutions to their fears

The teachers who had not sought HIV-VCT services were asked if they could accept VCT services if their fears were met, 51.9% said Yes, 18.6% said No while 29.4% were non committal (see figure 4.20). The difference among the responses was found to be significant at 5% level ($\chi^2 = 22.372$, df = 2, P = 0.001). It implies that majority of the teachers who had not sought HIV-VCT services could accept HIV-VCT uptake if necessary steps were taken.
4.5 Relationship between various factors and HIV-VCT service uptake

Various factors were cross tabulated with HIV-VCT uptake and their relationships established. At 5% level, some factors were found to be related with HIV-VCT uptake.

There was a strong association between the respondents age and VCT uptake ($\chi^2 = 15.325$, df = 5, $P = 0.009$). The younger teachers (18-30 years) were more likely to use VCT than the older ones (Likelihood ratio, $P = 0.004$).

Teaching experience and HIV-VCT uptake were found to be associated ($\chi^2 = 13.604$, df = 4, $P = 0.009$). Those who were more experienced were less likely to use HIV-VCT services (Likelihood ratio, $P = 0.003$).

The nature of the school, private or public school, plays a role in the uptake of HIV-VCT services ($\chi^2 = 4.850$, df = 1, $P = 0.028$). Teachers in private secondary
schools were twice likely to seek HIV-VCT services than those in public schools (OR = 2.356, 95% CI limit, 1.082-5.128).

The prevalence of HIV/AIDS in an area was found to have an association with HIV-VCT uptake ($\chi^2 = 4.726$, df = 1, P = 0.030). Those who were scared by the HIV prevalence in their area were three times less likely to utilize HIV-VCT services (OR = 0.312, 95% CI limit, 0.104-0.936).

HIV-VCT uptake had an association with perceived benefit of VCT services ($\chi^2 = 4.520$, df = 1, P = 0.034). The teachers who had not sought HIV-VCT service were less likely to perceive HIV-VCT services beneficial (Likelihood ratio, P = 0.027).

Other factors were either not associated with HIV-VCT uptake or their Chi-square statistics were not valid. The table 4.5 gives a summary of the relationship between selected factors and HIV-VCT uptake at 5% level of confidence.
Table 4.5: Summary of the relationship between various factors and HIV-VCT uptake at 5% confidence level.

<table>
<thead>
<tr>
<th>Factor</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>P-Value (&lt;0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Age</td>
<td>15.325</td>
<td>5</td>
<td>0.009**</td>
</tr>
<tr>
<td>2 Working experience</td>
<td>13.604</td>
<td>4</td>
<td>0.009**</td>
</tr>
<tr>
<td>3 Status of schools</td>
<td>4.85</td>
<td>1</td>
<td>0.028*</td>
</tr>
<tr>
<td>4 HIV sero-prevalence</td>
<td>0.028</td>
<td>1</td>
<td>0.030*</td>
</tr>
<tr>
<td>5 Perceived benefit of VCT</td>
<td>4.520</td>
<td>1</td>
<td>0.034*</td>
</tr>
<tr>
<td>6 Sex</td>
<td>0.433</td>
<td>1</td>
<td>0.511</td>
</tr>
<tr>
<td>7 Marital status</td>
<td>1.174</td>
<td>2</td>
<td>0.556</td>
</tr>
<tr>
<td>8 Residential location</td>
<td>1.990</td>
<td>2</td>
<td>0.370</td>
</tr>
<tr>
<td>9 Type of schools</td>
<td>0.657</td>
<td>3</td>
<td>0.883</td>
</tr>
<tr>
<td>10 Category of schools</td>
<td>4.898</td>
<td>2</td>
<td>0.086</td>
</tr>
<tr>
<td>11 School location</td>
<td>8.540</td>
<td>2</td>
<td>0.370</td>
</tr>
<tr>
<td>12 Sexual partners</td>
<td>0.706</td>
<td>1</td>
<td>0.401</td>
</tr>
<tr>
<td>13 Condom</td>
<td>3.599</td>
<td>2</td>
<td>0.165</td>
</tr>
<tr>
<td>14 Alcoholic use</td>
<td>0.722</td>
<td>1</td>
<td>0.395</td>
</tr>
<tr>
<td>15 Addictive drug use</td>
<td>0.203</td>
<td>1</td>
<td>0.652</td>
</tr>
<tr>
<td>16 Cost of VCT services</td>
<td>1.779</td>
<td>1</td>
<td>0.182</td>
</tr>
<tr>
<td>17 Societal factors</td>
<td>3.570</td>
<td>1</td>
<td>0.059</td>
</tr>
<tr>
<td>18 Attitude towards HIV/AIDS</td>
<td>0.298</td>
<td>1</td>
<td>0.585</td>
</tr>
</tbody>
</table>

** P<0.01  * P<0.05
5.1 DISCUSSION

5.1.1 HIV-VCT utilization among secondary school teachers.
Although several studies have shown that HIV-VCT awareness is generally high, only 30.9% of the teachers had ever utilized VCT services as compared with the general public which is estimated at less than 20% (Michael, 2001; Day et al., 2003; Ekanem and Gbadegesin, 2004; Shitaye et al. 2004; KEMRI-JICA, 2003; Kalichman and Simbayi, 2004). Although a higher HIV-VCT utilization level is targeted in Kenya, the results of this elaborate group of population, being more than the general population, is encouraging and it shows that the teachers are responding well to the call for HIV-VCT services. In fact, a participant in one of the FGDs retorted “HIV-VCT services are good let the teachers use them.”

Learning one’s sero-status with prevention counselling can be a powerful prevention and care strategy. Knowledge of personal risk behaviours and sero-status is ‘power’ (UNAIDS, 2000a, 2001; Kamenga et al., 1991; CDC 2005; Van de Perre, 1999). Although over 50% of the teachers reported to know their HIV status, their mode of knowing HIV status was doubtful or perceived especially those who gave their results without actual testing. This could be an indicator of
state of denial or fear of the test. VCT services not only offer HIV testing alone, but also prevention counselling which if missed lessens the ‘power’

A survey among primary and secondary school teachers in Kenya showed 25% of the teachers had tested for HIV (Kiragu and Kimani, 2005). Either the teachers have improved on their VCT utilization or the secondary school teachers have higher HIV-VCT utilization than their counterparts in primary sector. A cross-section study among primary school teachers in Mwanza region, Tanzania found about 20% of the participants had voluntarily tested for HIV (Kakoko et al., 2006). Another study among general public in Uganda realized 17% HIV-VCT utilization (Nuwaha et al., 2003)

Kiragu and Kimani (2005) established that 90.1% of teachers in Kenya knew where to be tested. The findings compares well with this cross-sectional study which reported 94.6% of teachers knew VCT centres that they could access. This shows that the utilization of the service might be the problem. Teachers have the information but not what it takes to utilize VCT services.

5.1.2 Barriers and motivators to HIV-VCT uptake among secondary school teachers.
Stigma surrounding HIV testing, fear of a positive result, and concerns about confidentiality were identified to be among barriers to seeking VCT services. This agrees with the findings of Richter and England (2004) in multi-round
population-based surveys in Africa and Fylkesnes et al., (1999). Stigma was also identified as a barrier to HIV-VCT use in Tanzanian primary school teachers (Kakoko, 2006). A study among Intravenous drug users also found similar results with most commonly cited reasons being associated with a potential positive result and were: 1) fear of increased social stigma; 2) knowing would only lead to "more worry"; and 3) "why know?" if treatment is not available. Other deterrents were costs associated with testing, distance, perceived lack of confidentiality, and stigmatization (Voytek et al., 2004). Stigma may prevent people accessing care, gaining support, and preventing onward transmission.

Results from Zambia and Zimbabwe, however, showed that stigma around VCT had lessened over time with the introduction of mass media based behavior change communication (BCC) campaigns focusing on perceived benefits, and that an increasing percentage see the benefits of VCT and believe that VCT centers preserve confidentiality (Richter and England, 2004). This cross-sectional study established that HIV/AIDS awareness campaigns was the most cited reason for the teachers to have attended HIV-VCT services. VCT client intake data show that social marketing campaigns using mass media are a key source of information for those seeking VCT services. In particular, these campaigns have attracted young people at-risk and couples who can most benefit from HIV prevention counseling (Richter and England, 2004). This implies that HIV-VCT
campaign is an important component in the fight against HIV/AIDS as it motivates people to utilize HIV-VCT services.

Inability to communicate with a partner or fear of partner reaction was also identified as a barrier to HIV-VCT utilization. This finding is in agreement with that of Masingi et al., (2004). This issue is well dealt with at all VCT centres where clients are counselled on how to handle disclosure and related issues. Lack of perceived benefit when healthy, was reported as a barrier to utilization by Masingi et al., (2004). In this study, being sick or ill was identified as a motivating factor to HIV-VCT use.

The other factors influencing VCT for HIV were consequences of a test result, influences from a sexual partner, cost of VCT, physical accessibility of VCT, and perceived quality of care of VCT services. Nuwaha et al., (2003) also found similar results in their study in Uganda among the general public.

The teachers identified breach of confidentiality as another barrier to HIV-VCT use while the counsellors suggested that there should be a mechanism to open up confidentiality to certain degree to enable curb spread of HIV, especially among sexual partners.
Despite the barriers to HIV-VCT utilization, a good number of the teachers (51.9%) are willing to overcome the barriers if necessary steps are taken.

5.1.3 Relationship between various factors and HIV-VCT service utilization

5.1.3.1 Age and sex
This study established that there was a strong relationship between age and HIV-VCT use ($\chi^2 = 15.325$, df = 5, $P = 0.009$). The younger teachers (<35 years) were more likely to seek VCT services than the older ones. A study in Mwanza, Tanzania among primary school teachers, also showed that teachers who were aged between 21 to 30 years, reported easy access to VCT services (Kakoko, 2006). This could be attributed to the fact that younger generation are sexually active and explorative than the older ones; hence the need to reassure themselves that all is well despite their situation. Younger and less experienced teachers have even higher HIV infection rates than their predecessors (Walters, 2002). The older teachers could be feeling more stable and settled in life hence they do not see the need for VCT services. This finding compares well with a study carried out in Nairobi among VCT clients by Otele (2005) and Kakoko et al., (2006). In fact one participant in a FGD retorted “we young people are quite explorative, we kiss several frogs before we get the one, so we go to the VCT to test with the new partner to be sure.”
There was however no significant difference between male teachers and female teachers in HIV-VCT utilization ($\chi^2 = 0.017$, df = 1, $P = 0.897$). This differs with Otele, (2005), findings that females utilized HIV-VCT services more than males.

5.1.3.2 Marital status
Marital status had no association with VCT utilization ($\chi^2 = 1.174$, df = 2, $P < 0.556$), but it was realized that more female teachers (13.3%) were divorced/separated or widowed than male teachers (3.4%). Marital status cannot influence VCT utilization. This finding is in line with that of Bwibo et al., (2003).

5.1.3.3 Residential location of the teachers
In a population-based HIV survey in selected urban and rural areas in Zambia to examine factors affecting the readiness for HIV-related voluntary confidential counselling and testing (VCCT), actual use was four to five times higher in rural compared with urban areas (Fylkesnes et al., 1999). Contrary, this cross-sectional study established that residential location of the teachers did not have any significant association with HIV-VCT utilization.

5.1.3.4 Professional qualifications and Academic disciplines
Professional qualifications and Academic disciplines could not be associated or disassociated from HIV-VCT utilization owing to lack of statistical validation. It
would have been expected that teachers in science oriented subjects would readily accept VCT services than those in other subjects. Male teachers dominated in science and mathematics subjects while female teachers were more in languages and humanities. Since sex had no significant association with VCT utilization, yet there were more males in science subjects and more females in humanities and language subjects, then it could be deduced that academic disciplines had no significant association with VCT utilization.

5.1.3.5 Attitude towards HIV/AIDS
This study established that most teachers (over 80%) supported the inclusion of HIV/AIDS education in school curriculum. Attitude towards HIV/AIDS had no significant association with HIV-VCT utilization. This finding compares well with that of Dawson, (2001). One teacher said "Teachers' Service Commission should organize to have at least two teachers from each school trained in HIV/AIDS so as to handle their fellow peers or students well."

This finding is important since to prevent the spread of any disease, teachers must be knowledgeable and skilled in using correct infection control guidelines in and around the classroom. In some instances, the teacher may be entrusted with information about a student's, parent's, or staff member's HIV status and must understand ethical and legal requirements for respecting confidentiality. Teachers may be expected to provide HIV/AIDS education and to answer students'
questions about HIV disease in a manner that is developmentally and culturally appropriate.

5.1.3.6 Sero-prevalence of HIV in the area
The prevalence of HIV/AIDS in an area was found to have a significant association with HIV-VCT utilization ($\chi^2 = 4.726$, df = 1, $P = 0.030$). Those who were scared by the HIV prevalence in their area were three times less likely to utilize HIV-VCT services (OR = 0.312, 95% CI limit, 0.104-0.936). "Here in Thika, they say many people are infected I'd rather not test, I would be so stressed," a participant said. In high prevalence settings, many individuals tend to develop feelings of hopelessness and helplessness and a sense that it is too late for behaviour change. In these settings, the power of positive behaviour change messages can be reinforced by effective HIV-VCT services. Sero-prevalence in a community is thought to be important in HIV-VCT utilization (UNAIDS 2004).

5.1.3.7 Working experience
The teachers with vast experience were not likely to use HIV-VCT services. This could be closely related to the age of the teachers, although an older teacher could have less years of experience depending on when they started working. There has been more emphasis on the younger people to utilize HIV-VCT services than older ones, and this may be reason for their higher HIV-VCT utilization.
Alternatively, the more experienced teachers could be in denial in as far as HIV-VCT services are concerned.

5.1.3.8 Sexual partners and Use of condoms
The number of sexual partners and use of condoms did not have any significant relationship with HIV-VCT utilization, although a large number of teachers (88.6%) reported to have had only one sexual partner in the last one year.

5.1.3.9 Nature of school (Private/public)
It was observed that teachers in private secondary schools were twice likely to seek HIV-VCT services than those in public schools (OR = 2.356, 95% CI limit, 1.082-5.128). The difference between public and private school teachers seeking VCT services may be due to factors like employment policy in the private sector, which favours HIV testing whilst public institutions do not. Some private school teachers said that before one is employed a medical check up is done so they had no option but know status in advance. In an interview with an informer she said that it would be expensive to maintain a sick teacher so they are always on the lookout.
5.1.3.10 Perceived benefit of HIV-VCT services
HIV-VCT utilization had a significant association with perceived benefit of VCT services ($\chi^2 = 4.520, \text{df} = 1, P = 0.034$). The teachers who had not sought HIV-VCT service were less likely to perceive HIV-VCT services as beneficial (Likelihood ratio, $P = 0.027$). This could be an indicator that some teachers are still ignorant or not aware enough about the benefits of HIV-VCT services. It has been shown that a common barrier for VCT is lack of perceived benefit (Baggaley, 1994). Kakoko (2006) found out that teachers in Mwanza, Tanzania who had not been tested for HIV were significantly more likely to believe that it was not necessary to be tested for HIV in absence of a vaccine or cure for HIV/AIDS.

5.2 CONCLUSION
The following conclusions were made from the findings of the study.

✓ Although HIV-VCT utilization among secondary school teachers was higher than that of the general public, at 30.5% it was still low. Majority of the teachers (>50%) knew their HIV status but few (<30%) had had the required counselling.

✓ The younger and less experienced teachers were more likely to utilize HIV-VCT services than the older and more experienced ones.

✓ Private school teachers were more likely to utilize HIV-VCT services than
those of the public school.

✓ Teachers who were alarmed by the HIV prevalence in their area were three times less likely to utilize HIV-VCT services.

✓ The teachers who had not sought HIV-VCT service were less likely to perceive HIV-VCT services as beneficial.

✓ Various factors were identified as barriers to HIV-VCT utilization; most of them were post test implicated and;

✓ A number of factors that made some teachers to seek HIV-VCT services were identified; HIV/AIDS awareness campaigns and urge ‘to know status’ being the most cited factors.

5.3 RECOMMENDATIONS

1. A vigorous and innovative information, education and communication (IEC) drive, with accurate and consistent messages is required through the government and concerned parties like NGOs to continue mitigating the teacher-related barriers to utilization of HIV-VCT.

2. There is need for government through Teacher Service Commission and Ministry of Health to improve post test care and support; demystify testing
and counselling process, as well as, emphasize positive consequences of VCT to increase the number of teachers seeking the service.

3. The Ministry of Education along with its main partners require a major commitment of resources and appropriate organisational and management arrangements that will ensure that tackling HIV/AIDS, through VCT and other strategies is mainstreamed and entrenched throughout the teaching fraternity.

4. The HIV-VCT service providers should also target the older teachers

5. HIV-VCT services are good let the teachers use them

Recommendations for further research

1. Establish the teachers' responses to training their peers as VCT counsellors

2. Explore the Pros and cons of confidentiality in VCT set up; does it deny would be patients of HIV infection a chance to protect themselves? What about making possible HIV-VCT users shy away?

3. Establish actual HIV prevalence among teachers in Kenya

4. Research on VCT information and human resource management

5. VCT re-test clients and reasons for repeat testing

6. VCT acceptability, effectiveness and efficiency
REFERENCES


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APPENDIX 1: QUESTIONNAIRE

Introduction

I am a postgraduate student at Kenyatta University carrying out a study on determinants of HIV-VCT service uptake among secondary school teachers, for purposes of a degree. It is a survey among the teachers and you are kindly requested to be very honest with your answers bearing in mind that you will not write your name in this questionnaire. The responses will not be discussed with any member of your staff, family, friends or your students and will not be linked to you in any way. Confidentiality will be maintained. I would very much like you to participate in this study. However, you are free to decide if you want to or not.

Date of interview ................................ Signature.........................

Notes:

a) Please tick appropriately.

b) After you are through, put the questionnaire in the provided envelope, seal and label ‘ENOCK’.

A) Socio-Demographic Characteristics


A2. Which age group do you belong?


A3. What is your professional qualification?


A4. What is your academic discipline?

Humanities [4] Languages [5] Other (Specify) [6]..............

A5. What is your marital status?

Widowed/Divorced/Separated/Estranged [3]

A7. Where is your residence located?
B) Socio-Economic Information

B1. Do you work in a Private school [1] or Public school [2]?

B2. What type is your school?

B3. How is your school categorized?

B4. Where is your school located?

B5. What is your income level per month? Salary, business, farming etc. (Kshs)
   <10,000 [1]   10,001 to 20,000 [2]   20,001 to 30,000 [3]
   30,001 to 40,000 [4]   40,001 to 50,000 [5]   50,001 to 60,000 [6]
   >60,001 [7]

B6. What is your religion?

B7. How many years have you been teaching?

C) Behavioral Characteristics and Practices

C1. Have you had more than one sexual partner in the last 12 months?
   Yes [1]   No [2]

C2. If yes in C1 above, how many? [......]

C3. Do you encourage use of condoms?

C4. Do you take alcoholic beverages e.g. beer, traditional brews?
   Yes [1]   No [2]

C5. Do you use any addictive drug(s)?
   Yes [1]   No [2]

C6. If yes in C5 above, which ones? (Indicate).................................
D) Location and Physical Access of VCT Centers

D1. Would location of VCT sites affect your decision to take the VCT services?
   Yes [1] No [2]

D2. How many VCT centers do you know that you could access?

D3. Would you attend a VCT site near your residence?
   Yes [1] No [2]

D4. Which VCT site would you prefer if made available?
   Site on its own (stand alone) [4] Place of work [5] Other (Specify) [6]

D5. Where will you prefer VCT room located in your choice D4 above?
   Isolated point [1] Just with other services or offices [2] Other (Specify)[3]……

E) VCT Service Delivery

E1. In your opinion, how would you rate VCT services?

E2. What would be your opinion on VCT service opening hours?
   Include lunchtime [1] Include after 5.00pm [2]
   Weekends, 8am-5pm [3] Other (Specify)……………… [4]

E3(i). What would be your preferred age of VCT Counselor?

E3(ii). Give reason for your answer in E3(i)……………………………………

E4. In your opinion, should a VCT counselor have some background training e.g. nursing?
   Yes [1] No [2]

E5. What in your opinion should be the sex of VCT counselor?

E6(i). Would you believe that your confidentiality would be maintained at any VCT center?

E6(ii). Give reason for your answer in E6(i) above ...........................................

.................................................................

F) Sero-Prevalence of HIV in the Area

F1. How would you rate HIV pandemic in your neighborhood/area? 


F2. Would the prevalence of HIV in your area scare you from taking VCT services?

Yes [1] No [2]

G) Use Of VCT Services

G1. Have you ever used VCT services?

Yes [1] (Proceed to G2) No [2] (Proceed to G3)

G2. If yes in G1 above,

a) How many times have you visited a VCT center?


b) Which part of the service did you like?

Post-testing [4] Other (Specify) [5]...

d) Were you comfortable with waiting time before seeing a counselor?

Yes [1] No [2]

e) Were you tested?


f) If you were tested, what was your HIV status?


h) What would you say about the counselor who served you in relation to:


i) Which factors made you to seek VCT services?

Partner support [9] Partner risk behavior [10]
Other (Specify) [11]...........

G3. If no, in G1 above,

a) Which factors do you feel may hinder you from seeking the VCT services?

Lack of follow-up support [7] Cost of VCT service [8]
Other (Specify)............. [13]

b) Would you use the VCT service if your fears were met?


c) Do you know your HIV status despite not sought VCT service?

Don’t know [5]

d) If you know your status, where were you tested?

Other (Specify) [3]............

e) If you know your status, were you counseled before the test?

Yes [1] No [2]
H) Cost of VCT Services

H1. Would paying for VCT services hinder you from taking VCT?
   Yes [1] No [2]

H2. How much (Kshs) would it cost you to a VCT center of your choice?

H3(i). Do you perceive any other cost to seek VCT services?
   Yes [1] No [2]

H3(ii). If yes, which one(s)..........................

J) Perceived benefit of VCT services

J1. VCT services are important.


J3. Everybody deserves to go for VCT.

K) Societal Factors

K1. We should attend VCT services with our partners?

K2. I would not ask permission from my partner before seeking VCT service?

K3. There is no bother if one is seen from a VCT center by relatives or colleagues?

K4. VCT does not violate my cultural/social values.

L) Attitude towards HIV/AIDS

L1. HIV/AIDS education should be included in the school curriculum?
L2. It should be the teachers' responsibility to teach HIV/AIDS education in schools?


L3. Future teachers should be trained about HIV/AIDS in colleges?


L4. Teachers should talk freely with their colleagues about HIV/AIDS?


L6. Teachers should be encouraged to undertake VCT services.


L7. One should not drop a friend because of learning his/her HIV positive status.


L8. There is no problem buying food from HIV positive shopkeeper or food seller?


Thank you so much for your cooperation
APPENDIX 2: FGD guideline

Teachers
a) What is your feelings/attitude towards VCT services?
b) What will make you like or hate VCT services?
c) Is there a belief, culture or practice that may negatively or positively influence you in taking VCT services?
d) Whom do you feel is appropriate to offer you VCT services?
e) Will location of VCT services influence you in taking or not taking the services?
f) Are you accessible to a VCT center of your choice?
g) Do you think knowing your HIV status would change your behavior?
h) In your opinion, what is the importance of VCT as a method of HIV prevention, care and support?
i) What do you think should be done to make VCT more acceptable and accessible to teachers?

Counselors/Healthcare workers
a) What is your feelings/attitude towards VCT services?
b) Is there a belief, culture or practice that may negatively or positively influence teachers in taking VCT services?
c) What are the challenges encountered while counseling the caliber of teachers?
d) What do you think should be done to make VCT more acceptable and accessible to teachers?
e) What suggestions would you give to improve on VCT services as a method of HIV/AIDS control and prevention among teachers?
APPENDIX 3: Interview schedule

Education sector leaders

a) What is your feelings/attitude towards VCT services?
b) What are the challenges encountered in the management, as far as teachers and HIV/AIDS is concerned?
c) Has HIV VCT services been of any help
d) What do you think should be done to make VCT more acceptable and accessible to teachers?
e) What suggestions would you give to improve on VCT services as a method of HIV/AIDS control and prevention among teachers?
APPENDIX 4: Research permit

MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY

Enock Oburi Marita
Kenyatta University
P. O. Box 43844
NAIROBI

Dear Sir

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on 'Determinants of HIV-VCT uptake among Secondary School teachers in Thika District.'

I am pleased to let you know that you have been authorized to carry out research in Thika District for a period ending 30th September 2006.

You are advised to report to the District Commissioner, the District Education Officer, and the Medical Officer of Health, Thika District before embarking on your research project.

Upon completion of your research, you are advised to submit two copies of your research report to this office.

Yours faithfully,

B. O. ADEWA
FOR: PERMANENT SECRETARY

Copy to:
The District Commissioner – Thika District
The District Education Officer – Thika District
The Medical Officer of Health – Thika District
APPENDIX 5: MAP OF STUDY AREA

Map showing study area