

**POLICY REVIEW ON SUSTAINABLE USE AND MANAGEMENT OF WETLANDS IN  
KENYA: A CASE STUDY OF THE KIMANA WETLAND, KAJIADO COUNTY,  
KENYA**

**BY**

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Arts in Environmental Policy of the University of Nairobi**

**SEPTEMBER 2016**

**DECLARATION**

This thesis is my own original work and has not been submitted for a degree in any University.

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## **ABSTRACT**

Wetland ecosystems are areas seasonally or permanently covered in shallow water, and land where the water table is close to the surface. They provide functions such as flood control, provision of food and act as carbon sinks. The general perception has been that these areas are wastelands that should be avoided or eliminated. Kimana wetland located in Oloitoktok District of Kajiado County faces threats from activities such as agriculture, drainage due to massive water abstractions, deforestation, and pollution from oil spills from the fuel pumps amongst other threats. This is attributed to variance in the legal, institutional and policy frameworks applicable there amongst other reasons.

This study sought to understand how these variances affect Kimana. Further it looked at the use, social-cultural importance and the various social changes within the area. Primary data was collected using key informant interviews, household questionnaires, and field observations. Secondary data was collected from different sources including journals, policy documents, and research articles. The primary data was coded and analysed. Themes were also extracted. Thereafter the results displayed using frequency tables, charts, and graphs.

The results were that the lack of clear policies, legal and institutional frameworks at play within the area contributed to the destruction, drainage and pollution of the wetland. Further that the fragmented sectoral policy, legal and institutional frameworks and the over dependence of the community and stakeholders on the wetland leads to unsustainable use and management. The study concluded that there was need to sensitize and train community members on sustainable management practices; encourage community participation in the sustainable management of the wetland; seek the establishment of a national institutional framework. Establishment of National Wetlands Steering Committee for coordinating sustainable use and management of the wetland at national, county and community levels; and the advancement of stakeholder governance to enable implementation of these frameworks both at of the National and County levels. The study espouses the need for a National Wetlands Policy, and for inter-linkages between the wetlands sector stakeholders.

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## **DEDICATION**

I wish to dedicate this work to my family and friends who stood by me to the end. Despite all the odds you encouraged me to push on and see this thesis finalised and thereby graduate. I will always love you all and cherish the input you have in my life.

*Dios te Bendigas y Muchos Gracias*

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## **LIST OF ABBREVIATIONS**

|       |   |
|-------|---|
| AWF   | African Wildlife Foundation   |
| BLG   | Biological Liaison Group  |
| CAAC  | Catchment Area Advisory Committee   |
| CBD   | Convention of Biological Diversity  |
| CBO   | Community Based Organizations   |
| CBWMP | Community Based Wetlands Management Plans                                       |
| CEO   | County Code Enforcement Officer   |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CMS   | Convention on the Conservation of Migratory Species of Wild Animals             |
| COP   | Convention of Parties   |
| DEAT  | Department of Environmental Affairs and Tourism                                 |
| DEC   | District Environment Committee  |
| DEO   | District Environment Officer  |
| DOA   | Department of Agriculture   |
| DWAF  | Department of Water Affairs and Forestry  |
| EMCA  | Environment Management and Coordination Act                                     |
| FBO   | Faith Based Organizations   |
| IPPC  | International Plant Protection Convention                                       |
| IUCN  | International Union for Conservation of Nature                                  |
| IWRB  | International Waterfowl and Wetlands Research Bureau                            |
| IWRM  | Integrated Water Resource Management  |
| KCWS  | Kimana Community Wildlife Sanctuary   |
| KGR   | Kimana Group Ranch  |
| KIWMP | Kimana Integrated Wetland Management Plan                                       |
| KLA   | Kenya Land Alliance   |
| KLR   | Kenya Law Reports   |
| KWA   | Kimana Wetlands Association   |
| KWE   | Kimana Wetland Ecosystem  |
| KWF   | Kenya Wetlands Forum  |
| KWMIC | Kimana Wetlands Management Implementation Committee                             |

|        |  |
|--------|--|
| KWS    | Kenya Wildlife Service                               |
| LVBC   | Lake Victoria Basin Commission                       |
| LVFO   | Lake Victoria Fisheries Organization                 |
| MEA    | Multilateral Environmental Agreements                |
| MEDWET | Mediterranean Wetlands Initiative                    |
| MEMR   | Ministry Of Environment, Water and Natural Resources |
| NBC    | Nile Basin Countries                                 |
| NBI    | Nile Basin Initiative                                |
| NCBO   | Noomayiant Community Based Organization              |
| NEAP   | National Environment Action Plan                     |
| NEC    | National Environmental Council                       |
| NEMA   | National Environment Management Authority            |
| NEP    | National Environment Policy                          |
| NET    | National Environment Tribunal                        |
| NLC    | National Land Commission                             |
| NRA    | National Resource Association                        |
| NRUA   | National Resources User Association                  |
| NWCPC  | National Water Conservation and Pipeline Corporation |
| NWSC   | National Wetlands Standing Committee                 |
| PEC    | Provincial Environment Committee                     |
| PPP    | Private Public Partnerships                          |
| RAMCEA | Ramsar Centre for Eastern Africa                     |
| RC     | Ramsar Convention                                    |
| RSC    | Ramsar Commission Secretariat                        |
| SANBI  | South African National Biodiversity Institute        |
| SDG    | Sustainable Development Goals                        |
| SMTP   | Second Medium Term Plan                              |
| SWM    | Sustainable Wetland Management                       |
| TEK    | Traditional Ecological Knowledge                     |
| UNCCD  | United Nations Convention to Combat Desertification  |
| UNCLOS | United Nations Convention on the Law of the Sea      |

|        |   |
|--------|---|
| UNEP   | United Nations Environment Programme                  |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WAB    | Water Appeals Board                                   |
| WCED   | World Commission on Environment and Development       |
| WFWET  | Working for Wetlands                                  |
| WHC    | World Heritage Convention                             |
| WRMA   | Water Resources Management Authority                  |
| WRUA   | Water Resource User Associations                      |
| WSB    | Water Services Board                                  |
| WSP    | Water Services Provider                               |
| WSRB   | Water Services Regulatory Board                       |
| WSTF   | Water Services Trust Fund                             |
| WWF    | World Wide Fund for Nature                            |

## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the Study

Wetlands are diverse ecosystems that are wet and they consist of both water and land. They also play the role of protecting life and property from climate extremes (Twilley, 2007). Wetlands enhance environmental quality by being territories for fish and wildlife species, by supporting vegetation such as papyrus and other plant species some of which may be harvested as food. They also control floods, enhance shoreline stabilization and assist in climate change mitigation (Harris, 2008).

Historically, these areas were perceived as being among the last truly wild and untouched places in the world (Maltby, 1986). This was due to their ecological characteristics and the lack of interest to venture into these areas. They were considered as mere 'mosquito breeding nuisances' (Gardener, 1996) which led to their devaluation, draining and destruction into farm lands and development areas to cater for increased population and other viable economic activities. As economies grew and societies changed there was a rise in interference in these areas.

This led to an initial call for an international convention that would lead to the formulation of a global framework for the sustainable management of wetlands. This call led to the 1962 wetlands conference known as Project MAR from MARshes, MARécages, or MARismas (Matthews, 1993). From the said conference the Convention on Wetlands of International Importance especially as Habitats for Waterfowls; commonly known as the Ramsar Convention was formulated and the same was opened for signature at Ramsar, Iran, on the 2<sup>nd</sup> of February 1971 (Carp, 1972).

Article 1.1 of the Ramsar Convention (RC, 1971), defines a wetland 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”.

In 2005, the Millennium Ecosystem Assessment (MEA) report enhanced understanding of what are the drivers of changes to wetlands and how these ecosystems would react in the face of future scenarios. At the time the report noted that the global extent of wetlands was estimated to be in excess of 1,280 million hectares (MEA, 2005). International organizations like Wetlands International estimate that the total coverage of designated wetlands is at approximately 1.9 million km<sup>2</sup> (187,044,576 hectares); this is as at 28<sup>th</sup> February 2011 (Wetlands International, 2013). Further reports note that global inland wetlands cover at least 9.5 million km<sup>2</sup> (i.e. about 6.5% of the Earth’s land surface) with inland and coastal wetlands together covering a minimum of 12.8 million km<sup>2</sup> (Finlayson *et al.*, 1999; UNEP, 2012). Presently, there are 169 contracting parties to the Ramsar Convention and each of these parties has listed at least one or more wetlands in their countries as wetlands of international relevance. This had meant that so far we have 2,240 listed wetlands sites all covering 215,240,112 hectares.

Wetlands to date still face threats due to degradation by severe pressures from climate change, nutrient loading from fertilizer use and urban waste that lead to eutrophication thereby creating dead zones. Further human induced activities such as draining, pollution, agriculture and economic developments including the construction of residential houses reduces the ability of these ecosystems providing the goods and services for human and environmental needs (Clare & Cyrille, 1999). Due to lack of sufficient global metric information there is a challenge to ascertaining how these threats affect wetlands. However, there are examples of loss and degradation around the world such as the reduction in size of the Mesopotamian marshes from an area of 15,000–20,000km<sup>2</sup> in the 1950s to less than 400 km<sup>2</sup> due to excessive water withdrawals, dams, and industrial development (MEA, 2005).

There is need to consider the sustainable management of wetlands. This looks at sound management of wetlands considering their ecological and environmental characteristics, assessing stakeholders’ uses all the while ensuring sustainable development of these sensitive areas. The Convention at Article 3.1 defines wise use of wetlands as the maintenance of wetlands ecological

character, achieved through the implementation of ecosystem approaches, within the context of sustainable development (RCS, 2010). Therefore wise use of wetlands and their sustainable management assesses the values that are attached to these areas by the society and also having a sound understanding of their ecosystems functioning as well as protecting and preserving them. A sustainably managed wetland will support its ecosystem functions like controlling floods, provision of food, at the same time providing water for stakeholders like farmers to grow crops and for wildlife and ensure that these and other services are not available for the present generations but also be preserved and protected to ensure that they meet the needs of the present generations.

Kenya ratified the Ramsar Convention on the 5<sup>th</sup> of October 1990 (GOK, 2008) then listing five (5) major recognised International Ramsar sites (see Appendix 1-NEMA data form) (NEMA, 2012). Later on the 7<sup>th</sup> of September 2012, the 6<sup>th</sup> Ramsar site was listed as the Tana River Delta. Kenyan wetlands occupy about 3-4% of the land surface which is about 14,000 kilometres square of land surface and this fluctuates up to 6% during the rainy seasons (KLA, 2006). These wetlands are listed as: natural wetlands being the estuarine, marine, riverine, palustrine, lacustrine and man-made wetlands such as dams, salt pans, canals and reservoirs (KWF, 2012).

Kenyan wetlands face threats from encroachment by stakeholders for expansion of agricultural activities, industrial development, urban town development and areas to cater for increase in population, overgrazing, overexploitation of wetland goods, increase of invasive and alien species, pollution and eutrophication (KWF, 2012). An example of a threat that was looking at development in form of construction of the Standard Gauge Railway was the sand dredging that had started in Kwale County before the County went to Court and sought to have the process halted due to environmental degradation (Business Daily, 2015, April 8). This is just one example however; there is no information on wetlands loss in Kenya, no wetlands inventory to provide information on wetland numbers in the country, their locations, sizes, use or abuse, their ecological characteristics and their importance.

One wetland that is facing these threats is the Kimana Wetland in Oloitoktok District of Kajiado County. It faces threats from the increase of human interference through activities such as large

scale agriculture of tomatoes and onions which has drastically reduced the size of the wetland as more and more of the area is converted into agricultural land. There are major water abstractions for large scale irrigation of these farms, water pollution from fuels pumps amongst other threats (KIWMP, 2008). Several other stakeholders within Kimana use and manage the area as guided by their own set of rules and practices. This has led to unsustainable practices on the wetland leading to its loss and degradation. The larger community is engrossed in agricultural activities which are gradually destroying this wetland and further encroachment by the community into the wetland area and wildlife corridors in search of agricultural and urban town development land has led to conflicts between the human and human for the scarce resources as well as cases of livestock and humans being attacked by wildlife and vice versa.

Countries such as Uganda that faced similar challenges with their wetlands developed a wetlands policy as a guiding document on wetlands matters. At present Kenya is yet to finalize its national wetlands policy and the latest draft is for November 2013. A policy will provide a guiding framework for mitigating and tackling the diverse challenges that affect wetlands conservation, wise use and management. This document proposes to have the wetlands be mapped, inventoried and publicized to ascertain in which jurisdictions they come under and for the boundaries to be drawn. Other various policies such as the land, water, agriculture and fisheries policies interact with wetlands as these diverse ecosystems exist in all these areas. Even as we look at the wetlands policy consideration should be given to these other sectoral policies so that there are inter linkages between them and the wetlands policy to avoid conflicts and contradicting management. Aside from these sectoral policies there other laws and legal instruments that also touches on wetlands management.

To name a few we have the Constitution and Vision 2030. The Constitution at Article 2 (5) and (6) provides that international law shall form part of the laws of Kenya and that any treaty or convention that Kenya has ratified shall be part of the laws of Kenya. Kenya having ratified the Ramsar Convention has to ensure that there is wise use of wetlands within her boundaries. At Article 10 (2) (d) of the Constitution, the concept of sustainable development is one of the national values and principles of governance. Article 42 gives the right to have a clean and healthy environment and this right at Article 70 is enforceable through a petition to the High



Court. Article 69 notes that there has to be sustainable development of all the resources in the County and this has to be done equitably. Vision 2030; Kenya's blue print emphasizes economic growth in a sustainable manner. Sustainably managed wetlands play a crucial role in the achievement of this vision as they will be replenished to perform their functions as well as provide for the stakeholders.

Kenya enacted an environmental legal framework, the Environmental Management and Coordination Act (EMCA), Act No. 8 of 1999 amended on 3<sup>rd</sup> June 2015 and is now known as the Environmental Management and Coordination (Amendment) Act, 2015. The Act defines wetlands under Section 2 thereof. This Act empowers the Cabinet Secretary (formerly the Minister) to pass wetlands regulations under Sections 42 and 43. Under Section 43 (2) of the amended Act the same noted that the Cabinet Secretary together with the lead agencies they can formulate guidelines for co-management of wetland areas and also take in the views of the communities that surround the wetland. The then Minister enacted Legal Notice No. 19; The Environmental Management and Co-ordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations, 2009. These regulations provide guidance on the use of wetlands and the activities that can be carried out in these areas. For one to carry out any activities on wetland areas, you have to obtain a licence. At the moment what plagues Kenya is still the issues of sectoral management of wetlands.

## **1.2 Statement of the Research Problem**

Social and societal changes coupled with variance in policies, legal, institutional frameworks tend to influence a community's use and management of the wetland. Sectoral management and use of wetlands allows for free access to every stakeholder and over time this leads to their over-exploitation and degradation. In Kenya the environmental policy and framework is characterised by fragmentation (ROK, 2007) and an example of such a resource is wetlands. Wetlands are controlled by over 77 sectoral regulatory frameworks, which have created overlaps in mandates with dire consequences on these resources and further their use and management is governed by various objectives like economic benefit, livelihood security and sustainability amongst other reasons.

One such affected area is the Kimana Wetland located in Oloitokitok District of Kajiado County. This wetland uniquely forms part of the greater Amboseli National Park falling also within the emerging Kimana town. There are various stakeholders in the area comprising of Kenya Wildlife Service, Community Based Organizations, communities, Ministries of water, environment, agriculture to name a few. All these stakeholders have their own interest in the area and they are guided by their sectoral policies, legal and institutional frameworks. Therefore the study assesses how these policies, legal and institutional frameworks affect and impact the sustainability of wetlands using Kimana Wetland as a study area.

### **1.3 Research Questions**

The overarching question is: what are the issues relating to the sustainable management of wetlands in view of sectoral policy, legal and institutional frameworks?

To aid in answering this question the study examined the following sub-questions:

1. Which policies, legal and institutional frameworks govern Kimana Wetland?
2. What are the socio-cultural, economic and environmental uses of Kimana Wetland?
3. What management regimes are applied at Kimana and their implications?

### **1.4 Objectives of the Study**

The objectives of the study were to:

1. Evaluate the policy, legal and institutional frameworks governing Kimana Wetland.
2. Examine the socio-cultural, economic and environmental uses of Kimana Wetland.
3. Evaluate the management regimes at Kimana Wetland and the implications thereof.

### **1.5 Justification and Significance of the Study**

Wetlands are sensitive and fragile areas which when abused are in danger of destruction and loss. When these areas are under threat due to lapses in various policies, legal and institutional frameworks then sustainability cannot be attained. If all these regulatory frameworks are geared towards the protection, conservation, use and management then why is there such continued destruction of these areas? To assist in trying to answer this question Kimana wetland was selected as a case study area as the same is located within the larger Amboseli area and is a crucial dispersal zone for wildlife to the Tsavo and Amboseli National Reserves. Challenges

facing this area range from human interference through activities such as agriculture, commercial development, and extensive water abstractions for domestic and agricultural uses and loss of tree cover through deforestation which alters the conditions at the wetland.

Due to the various sectoral policy, legal and institutional frameworks at play in the area there have been increased cases of human-human conflicts for resources, human-wildlife conflicts and stakeholder misunderstanding with both the local and governmental institutions in the area such as Kenya Wildlife Service (KWS), Water Resources Management Authority (WRMA), National Environment Management Authority (NEMA), Kimana Wetlands Association (KWA) and Noomanyiat Community Based Organization (NCBO).

Kimana wetland is a perfect example for assessing how the policies, legal and institutional frameworks affect sustainable use and management of wetlands. The study will also look at best practices from other regions and countries that have faced the same challenges and how they managed to overcome the same and also seek to involve the various stakeholders to best understand what causes unsustainable management of the area and offer recommendations geared towards achieving sustainability of the wetland.

## **1.6 Scope and Limitations of the Study**

The study focused on Kimana Wetland evaluating the policy, legal and institutional frameworks in place, the uses and management regimes, how these affected the wetland and the challenges therein. Further exploring the uses of the wetland by the community and other stakeholders, the management regimes that are within the wetland and the challenges that the wetland faces from all the above. The study was limited to a point by the lack of cooperation by some of the stakeholders such as the members of the group ranches who are at the core of cultivation of the wetland, availability of general information on the wetland, accessibility to information on the wetland policy mandate and general wetlands management and others such as financial and time constraints to enable the researcher access the vast wetland communities and stakeholders.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

In this chapter, past studies on the topic will be looked at ascertain the gaps therein and what the study aims to fill. The theoretical framework of the study will be discussed as well as derive the conceptual framework of the study.

### **2.2 Past Studies**

Sustainable wetland management is pegged on having a balance between conservation of the wetland area, usage and management of the same. Sustainability is derived from the theory of sustainable development which looks at the needs of the present to have access, use and manage the resources available considering that the present generations also have to the same resources. Over the years wetlands have been degraded from pressures of agriculture, urban developments, industrialization, population increase, pollution amongst other reasons. The continued unsustainable use can be attributed to various reasons such as the lack of information on the dangers of over utilising these areas, ignorance of the policies and laws in place to safeguards these areas, overlapping policies, laws and institutional frameworks leading to overlapping mandates by various organizations, selfish utilization by stakeholders to the detriment of other users and also the resource from performing its natural functions. Is it that communities around these areas are not aware of the importance of these areas? Are stakeholders aware that there are overlaps in the laws, policies and institutional frameworks and that these overlaps are contributing majorly to the unsustainable use of the resources.

Studies from Cambodia have noted that there is no specific legislation that deals with wetlands and they are governed through sectoral laws and regulations such as fisheries, forests, environment and water. Each of these sectoral agencies has their own laws, policies, institutional frameworks specific to their sectoral mandates. Cross cutting resources such as wetlands are affected by these sectoral mandates (IUCN, unpublished report). This is notable in Kenya as well. Coordinated management of the resources and the stakeholders is crucial to the sustainable use and conservation of the wetlands. This coordination is guided at the global level by the Ramsar Convention which calls for parties to have wetland policies and wise use of these areas, to regional coordination, national coordination and lastly should be disseminated to the grassroots

coordination with the stakeholders and other users as the units that interact day to day with the wetland for various activities.

Further studies noted that since wetlands cut across various jurisdictional areas as well as governmental agencies, there was need for better communication, coordination between these agencies as well as an effective policy that was enforced by these agencies (Rubec, 1999). A National Wetlands Policy was seen as an effective tool to help coordinate these agencies and through the mechanisms enacted by the policy incentives to the government agencies and others could be given to promote both conservation and wise use of the resources (Rubec, 1999).

Globally, regional and nationally, the issues surrounding the sustainable management of wetlands have drawn attention. Globally instruments such as the Ramsar Convention have been seen to try and deal with the issues. The Convention at Article 3.1 notes that all the contracting parties are to promote the conservation of the wetlands in the List and there should be wise use of wetlands by these contracting parties (RC, 1971). Article 5 promotes the need to have transboundary coordination between the regions and contracting parties on transboundary wetlands (RC, 1971). These policies should consider the views of the stakeholders who involved in the wetland within their jurisdiction. Regionally within the East African Community which Kenya is a member of organizations and regional mechanisms have been suggested to this end but the same has been faced with challenges at implementation. In Kenya we are still dealing with wetlands from a sectoral perspective as we are yet to enact a wetlands policy and there is no specific entity that is dealing with the management of wetlands.

## **2.3 Policies, legal and institutional frameworks in wetlands use and management**

### **2.3.1 Global perspective**

Wetland loss is defined as define wetland loss as "the loss of wetland area, due to the conversion of wetland to non-wetland areas, as a result of human activity", whereas wetland degradation is "the impairment of wetland functions as a result of human activity" (Claire & Cyrille, 1999). Increase in the wetlands loss and degradation led to the initial call the Ramsar Convention. Despite having this established global policy framework, wetland ecosystems which are estimated

to cover more than 1,280 million hectares have rapidly been degraded and are being lost rapidly (MEA, 2005).

The primary indirect drivers attributing to this change have been highlighted as increase in population and need for economic empowerment. The direct drivers have noted as conversion of land for agricultural purposes and developmental purposes such as constructions of roads, housing, water extractions for agriculture and domestic uses, pollution of these resources by fertilisers and other chemicals used on the farms. Invasive species on other areas for example in Kenya in Lakes Victoria, Nakuru and Naivasha where the Hyacinth plant has caused decline in fish stocks and use of lakes for recreational value (MEA, 2005). There is also no political will, inadequate scientific information, and financial constraints, lack of technical skills and laws and rules of enforcement.

The Ramsar Convention as the global instrument provides guidelines for sustainable use, management and governance of wetlands. It is the intergovernmental treaty on wetlands that seeks to provide the framework for international action and cooperation for the conservation and wise use of these areas and their resources. Its mission is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world". The centre philosophy of the Convention's is its wise use concept that looks at the sustainable use and conservation of the wetlands and their resources for the benefit of mankind. The Ramsar Secretariat has also developed guidelines for the implementation of the wise use concept which were first adopted as an annex to Recommendation 4.10 of the 4th Meeting of the Conference of the Contracting Parties Montreux, Switzerland, 1990 (Ramsar, 2012).

The Convention calls for international cooperation between contracting parties and also champion's individual countries to have national policies on wetlands. Further the Ramsar Strategic Plan 2009-2015 recognised the difficulties of parties having a plan that fits all at a global level. The Plan advises at Article 9 that each Party establishes its own priorities within the Plan's agreed priorities, develop its own work plan for implementing them, and considers its own use of its resources (RCS, 2008).

The Convention through the Secretariat advises its contracting parties to establish national wetlands committees to assist in implementation of the convention therefore promoting the formulation of an institutional framework for the implementation of the convention by contracting parties. These national wetland committees can assist in disseminating the convention at the national level and thereafter there can be further dissemination at the grass root levels where the stakeholders who are the day to day users of the wetlands are. These interactions thereafter generate data and are used as feedback mechanisms to the national wetland committees who can then advise the policy makers on what needs to be improved or not.

Globally, the convention is alive to the fact that to achieve sustainable management of wetlands synergies and cooperation with other conventions, policies and laws dealing with or having an element of management of wetlands is required. Such synergies may be embodied in instruments such as Multilateral Environmental Agreements (MEAs). These synergies try to harmonize these international instruments to strive to ensure sustainable use and management of wetlands and other ecosystems. This gives credence to cooperation between various policies, institutional and legal frameworks to ensure efficient and sustainable wetlands use and management. The effect thus trickles from a global perspective to a regional and national perspective.

Some these international policies that the Convention syncs with are: the Convention on Biological Diversity (CBD) where one of its principal objectives is the conservation of biological diversity. In this respect, it prioritizes the protection of ecosystems (such as wetlands) which are species-rich and are an important haven for endemic and threatened species (MEMR, 2012). The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) focuses on conservation of terrestrial, aquatic and avian migratory species, their habitats and migration routes. Wetlands are thus protected as important habitat category because the migratory water birds use them as layover sites for feeding, resting and sheltering from harsh weather (MEMR, 2012).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade in endangered species of wild animals and plants to ensure that this does not threaten their survival. Many of the endangered and threatened species are found within

the wetlands. The United Nations Convention on the Law of the Sea (UNCLOS) also known as the Law of the Sea Convention or the Law of the Sea treaty is an international agreement that resulted from the third United Nations Conference on the Law of the Sea (UNCLOS III). The aim of the convention is to ensure that there is order in the oceans and seas, having international communication for ease of use of these areas leading to their peaceful, equitable and efficient use, conservation, protection and preservation.

Ramsar Convention, CBD, CITES, International Treaty on Plant Genetic Resources for Food and Agriculture (2004), Convention on the Conservation of Migratory Species of Wild Animals (CMS) (1979), World Heritage Convention (WHC) (1972) and the International Plant Protection Convention (IPPC) (1952) have enhanced cooperation amongst themselves by establishing a Biodiversity Liaison Group (BLG) comprising of the executive heads of these biodiversity-related conventions. This group was established in the year 2002 and at their meetings they advance options for cooperation to reduce duplication of efforts in the protection of biodiversity (CBD.int, 2015). Mechanisms are put in place to try and enhance cohesiveness in the formulation of policies, legal and institutional frameworks, to have opportunities for activities, coordination of these activities and information exchange to promote the protection of wetlands and other ecosystems all along still alive to each other's mandates under their respective conventions.

### **2.3.2 Regional perspective**

Like the Biodiversity Liaison Group (BLG), there are certain initiatives that have been formed to try and ensure eco-system management within the East African Region. The Ramsar Centre for Eastern Africa (RAMCEA) is a regional initiative located in Uganda consisting of Kenya, Uganda, Burundi, Rwanda, Djibouti and Tanzania as member countries. RAMCEA's aim is to support the East African Community Countries, other stakeholders and institutions to improve and implement the Ramsar Convention in their countries in line with the wise use principle of the convention (Ramsar site, 2012). RAMCEA further supports the mission of the Convention by building capacity of the administrative authorities and other stakeholders to put in place appropriate instruments to promote the wise use of wetlands (RAMCEA, 2013).



RAMCEA recognises that there are challenges in wetlands management within the East African Region. Some of these challenges are: the wetland laws are spread out in too many sectoral laws; little or no funding for the wetlands or environment; lack of education and dissemination of information to the communities that live within the wetland areas on their relevance and means of having sustainable management of these areas, conservation vis a vis economic empowerment; no plans, access to the wetland, ownership are just amongst the few challenges that have been highlighted (RAMCEA, 2013).

RAMCEA recognises the need for regional initiatives but calls for mobilization of technical support to the regional interventions in wise use of wetlands by all interested stakeholders. Through such a forum, countries are able to report back to a veto body to make a unified decision rather than individual decisions. For example RAMCEA should be more empowered especially now in the wake of the East African Community. This body with an efficient secretariat could then strive to formulate policies, legal and institutional frameworks giving consideration to all affected stakeholders, to ensure wise use, practices and effective management regimes. This initiative should be undergirded by the principles of integrated eco-systems management and wise use for managing shared ecosystems.

Regionally, the initiative is yet to be felt and much is needed to ensure that it attains the overall goal of having “well coordinated, strengthened and networked institutions for wise use and conservation of wetlands in the region”. Countries involved in RAMCEA need to show their support of the initiative through provision of technical and financial supports to enable the same achieve its mandate (RAMCEA, 2013).

The East African Community Treaty calls on contracting states to have cooperation in matters of environment and natural resource management in their countries as well as those that are transboundary. The same calls for preservation, protection, quality enhancement and sustainable use of these areas. Moreover, the Treaty requires the Partner States to undertake to conclude such Protocols as may be necessary in each area of cooperation which shall spell out the objectives, scope of, and institutional mechanisms for co-operation and integration. Pursuant to this

requirement the Partner States in 2006 concluded the Protocol on Environment and Natural Resources Management (EAC Protocol, 2006).

This Protocol seeks to, inter alia, promote sustainable development and utilization of the Partner States' environment and natural resources through prevention of activities that are detrimental thereto, and to promote development and harmonization of policies, laws and strategies for environment and natural resources management to support sustainable development. The Protocol notes that any divergences in the national policies, laws and strategies should be harmonized (EAC Protocol, 2006).

The Protocol faces the challenge of having a joint framework on the matters touching on environment and natural resources and Republic of Tanzania is yet to sign the same as it raised some concerns with the said Protocol and they have been incorporated in the revised version of the Protocol. Article 14 of the Protocol provides that the parties therein have to harmonize and adopt and domesticate common policies, laws and frameworks to ensure that there is sustainable management and use of the wetlands resources within their borders and also ensure the same for the transboundary resources. Once all East African Community nations have signed the Protocol then parties will be able to develop the policies and laws. Partner States are also encouraged to give voluntary contributions to enable the Protocol take effect (EAC Protocol, 2006).

An example of a regional wetland within East African is the Lake Victoria basin which is considered an important asset of the five East African countries being Kenya, Uganda, Tanzania, Rwanda and Burundi. Therefore taking cognizance of this, a number of regional initiatives have been formed to ensure its sustainable use and management. These umbrella programmes are the Lake Victoria Basin Commission (LVBC) which is tripartite commission between Kenya, Uganda and Tanzania. It looks at the overall management and rational utilization of the shared resources of the Lake. Secondly, the Lake Victoria Fisheries Organization (LVFO) which coordinates the management of the Lake's fisheries resources and thirdly the Nile Basin Initiative (NBI) which is an intergovernmental organization formed by the Nile Basin Countries (NBCs) to ensure the equitable and sustainable utilization of the diverse resources of the Nile Basin in order to achieve water security and avert conflict. The initiative's member states are Burundi,

Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda while Eritrea is an observer (MEMR, 2012).

There are challenges facing the region to ensure integrated use and management of wetlands as well as formulation of policy for wetlands management. Amongst some of the challenges noted is the lack of financial commitment by the East Africa Community Partner States. How can partner states be encouraged to contribute towards this cause? Can a cost benefit analysis be carried out within the community for the partner states to appreciate the need for policy, legal and institutional frameworks to enable sustainable use and management of these ecosystems?

### **2.3.3 National perspective**

Nationally each country has a mandate to ensure the wise use and conservation of their wetlands leading to sustainable management of wetlands. It is noteworthy to have a unique wetland policy which provides for a clear opportunity to recognize wetlands as ecosystems that require different approaches to their management and conservation, and not have them masked under other sectoral management objectives. A good policy takes into perspective the needs of all the stakeholders involved in the wetland as well as the capability of the wetland to still maintain and carry on its ecological capabilities. It should also serve to identify and address possible conflicts between local priorities, national considerations and international obligations (Ntambirweki, 1998).

Most of the wetland policies in many cases are components of other sectoral laws and policies. Thus the importance of these ecosystems can be lost or confused in the broader and greater Government policies and laws. The Ramsar Convention recognises the fact that each nation faces its own challenges and threats, each community and stakeholder attach importance to wetlands based on what its uses and benefits are to them and also each has its own management regime.

These concerns boost the need to have a holistic regime encompassing the views of all the stakeholders to ensure proper wetland management. Legislative review and overhaul can help in identifying positives and negatives of sectoral policies and laws and thus through the process there can be modification of the legislations and laws and identification of the institutions that can now take charge of these areas to ensure that the same are managed and used efficiently to attain

sustainability (Dodman *et al.*, 2009). Wood notes that even with the move to have the legislative review policies should not be politicised and based on insufficient or inadequate and un-researched information. It should be based on information that is dynamic, capturing the views of all the stakeholders and having encouraged active public participation. Further he notes that though by-laws at local levels may have impacts on wetlands management the same may not be the case for general economic policies or policies on land use, urban development and food production that may have negative effects on the wetlands by exerting pressures on the wetlands for other uses such as grazing fields, cash crops production and expansion of urban centres (Wood, 2000).

In Uganda, the Government of the day recognised that these areas were spread out in the sectoral laws and policies such as water, environment, agriculture etc. With this realization the government went for a more intersectoral approach through an inter-ministerial committee. The committee was representative of some of the people who play a role in wetlands management. However, it was noted that for the policy to work and be effective there was need for community public participation, involvement of a larger sectoral base as well as government agencies who have activities that in one way or the other can touch on wetlands. For example Ministry of Roads that can seek to construct bridges or reroute part of wetlands to pave for roads. Further that a comprehensive policy may not evolve in a single document but in a series of co-ordinated policy statements and the need to have harmonised institutional frameworks that intersect due to the nature of wetlands (Ntambirweki, 1998).

It is noted that for long-term effectiveness and coherence, legislation needs to be located within a consistent policy framework. It should translate national policy on the promotion or control of defined activities, create an administrative framework, powers and procedures for managing such activities, authorise the collection and evaluation of relevant information and provide for decision making based on specific criteria (Clare & Cyrille, 1999). Further they note that legislation forms a bridge between international and local contexts by translating treaty commitments into measures appropriate to national systems and, usually through secondary legislation, into detailed provisions applicable at local level (Clare & Cyrille, 1999).

Policies should not be weighed down by obstacles which are political, technical or individualistic. They should be cohesive documents that seek to encompass all who benefit, use, manage or gain from the resource. It is useful to look at every field of action through the lens of what is required for wetland objectives specifically, as codified under Ramsar, and to ensure a complete suite of actions is provided for. Specific wetland policies are also useful to provide a visible 'audit trail' for delivery of wetland objectives, and to create identification with, ownership of and engagement with the issues by those responsible (Pritchard, 1997).

Another thought that has been considered is whether having a National Wetland Policy should be separate from other environmental policy. In Ethiopia one scholar notes that although a national wetland policy there draws on wetlands related problems and concerns, he notes that these areas are also well captured in the existing national laws and policies already (Mesfin, 2003). Further to this he argues that it is not necessary to have a standalone wetlands policy but that instead synergies could exist between what is there and have the same implemented at the local levels. What he notes is that within the areas that these wetlands occur they can formulate further localised laws based on the main law to maintain and conserve their wetlands and address the issues that face these local wetlands (Mesfin, 2003).

In Kenya, the wetland scenario is vast ranging from coastal & marine wetlands to inland fresh water lakes, swamps, glacier lakes and others. Localised wetlands which are small in size are easily abused as the same are not inventoried nor given the importance like the bigger wetlands. At most times these types of wetlands are seasonal and appear during rainy seasons but can still cover very large areas and be rich in biodiversity (Ng'weno, 1992). Due to the small size and the seasonal nature of these areas which mostly occurred and do occur on private or community owned land, made and still makes conservation interventions by government agencies difficult to implement (Macharia *et al.*, 2010). A proposed management strategy of these areas was to have little human interference by restricting access to the areas. However, this is faced by the challenge that most of these areas do in most occasions occur in private lands or community lands (Macharia *et al.*, 2010).

Inadequate government supervisory roles grants free open access to these areas to every member of the community and over time this leads to over-exploitation and degradation of the resources. For example a study that was conducted around Manguo swamp noted that 70% of the degradation was attributed to private land owners, 10% to the municipal council and 5% to the entire community. Moreover challenges to conservation of the swamps was due factors such as private land ownership (53%), corruption and illegal land excision within the municipal council (16%), theft of tree seedlings (13%) and lack of funds to initiate conservation activities (3%) (Macharia *et al.*, 2010). Other scholars have noted that sustainable management of wetland was constrained by a lack of clarity regarding the roles and responsibilities of the government institutions involved and the lack of defined modes of interaction, co-operation and decision-making (Kosal, 2004).

Further, these versatile areas have been degraded through unsustainable activities, conversions and overexploitation of their resources. This has been heightened by sectoral approach to conservation and development leading to inter-sectoral inconsistencies and conflicts. Other challenges impeding prudent management of wetlands have been identified as: political-tribal mediated insecurity; ineffective governance; different use of resources by different ethnic groups; division of labour along gender and age lines; poverty and inability to diversify resources; traditions, lack of education by the communities that live next to the wetlands and neglect of traditional ecological knowledge (TEK); and ecosystems (Terer *et al.*, 2004). All this pull and tag as it were has lead to unsustainable use and management of wetlands. So who does the buck stop with as it were?

Historically, as noted earlier, since the 1980s most of these wet areas were drained or filled up for urban developments and agricultural purposes (Baker *et al.*, 2007). Intensification of these activities leads to suffering by the communities as there is loss of water, loss of food, loss of income earning activities such as fishing, papyrus harvesting, and loss of medicinal plants and in the larger perspective the destruction of the environment. Further due to these problems there can be mass migration of communities from the diminished resource to other areas which may lead to insecurity and wars for the resources wherever they are located (Mwita *et al.*, 2012).

Kenya's first recognized the importance of wetlands in the Country in the 1963 Manifesto on the Conservation of Natural Resources. Later in 1969, at the first Wildlife Conference for Eastern Africa, the need to conserve and protect natural resources, including wetlands, was noted. When the Ramsar Convention came into effect, Kenya sent her delegates to important Conference of the Parties (COP) meeting in Regina Canada in 1987. At the said conference the country committed to conserve the water catchment areas as well as the wetlands (Odote, 2010). Subsequently, Kenya ratified the Ramsar Convention on the 5<sup>th</sup> of October 1990 and the 1<sup>st</sup> designated Ramsar Wetland of importance was the Lake Nakuru. Kenya Wildlife Service was designated as the 1990 and designated Kenya Wildlife Services (KWS) as the focal point for the Convention designating Lake Nakuru as the first Ramsar site. However, despite these efforts, wetlands resources continue to be degraded (Odote, 2010).

Thereafter an attempt to rectify situation came in the form of the 1993 National Wetlands Standing Committee (NWSC). The same was established as a sub-committee of the Inter-Ministerial Committee on the Environment. The terms of reference of the NWSC was to develop and coordinate a national wetlands policy and advise the Government on wetlands related issues (Becha, 2009). It was composed of 22 institutions, including government departments and agencies whose operations affect wetlands in one way or the other. There is no information as to what happened to the committee and or what were the recommendations, findings or outcomes of the same.

In Kenya we have several legislations that touch on wetlands and these have lead to some conflicts within the various ministries that these legislations represent. These acts and policies are discussed in the next chapter. These inter-sectoral conflicts have lead to mismanagement and destruction of wetlands. Sectoral legislations are guided by their sectoral mandates and their parent institutions which may not be geared towards the wise use and conservation of the wetlands. States with a federal system of government may have particular difficulties in harmonising resource use policies if there is confusion over the division of powers between national and provincial governments. They note that the wise use of wetlands can also be undermined by categories of projects deemed to be of public interest such as construction of roads or railways that are exempted from routine planning controls or environmental impact assessment

requirements. Thus in the hierarchy of political and popular priorities, wetland conservation usually comes well behind infrastructure development, river engineering schemes and economic development programmes.

Given the crucial importance of water to life on earth, it is necessary to consider how various ecosystems are linked through the hydrological cycle (Blumenfeld, 2009). An example is looking at the symbiotic relationship between the forests and wetlands. These resources share a symbiotic relationship where forests would die without such resources as springs, rivers and swamps. A good example is the coexistence of these resources in the Amazon Forest and in Kenya to just name one is the Arabuko Forest. Further the destruction of forests leads to drying up of water resources. Kenya has and still experiencing the effects of the destruction of the water towers in the Mau Forest areas. Trees were cleared to create agricultural tea zones to the detriment of the ecosystem. There is need to see these areas not as interdependent ecosystems but as systems that are linked and each has an important role in the hydrological cycle therefore with this background better policies and management practices will be implemented for the sustainable use and management of these areas. Policy linkages lead to activities that build constructively on interventions within respective domains. Multi-sectoral approach and considerable inter-sectoral ministerial coordination is required to identify these activities, plan for them and have implementation strategies with monitoring and evaluation plans to achieve the targets required.

The analysis of the above indicates that there are varying schools of thought. On the one hand some note that since wetlands are covered under other sectoral policies and law then there is no need for specific policy to cover wetlands. Others propose that wetlands as versatile and diverse ecosystems should be provided for under a specific law and policy to ensure that the same are sustainably managed, valued and protected for use. The nexus for these schools of thought is the fact that there is need for considerable inter-sectoral approach to achieve sustainable use and management of wetlands. These schools of thought support the fact that having a myriad of policies and law governing wetlands isn't sustainable. When looked at holistically and considering the ecological, environmental and economic linkages in the sustainable use and management of wetlands only then are we able to move forward. With enhanced and supported inter-sectoral inter linkages then as a country we shall not only be able to achieve the sustainable



management of wetlands but we shall also be on the path to accomplishing some of the Sustainable Development goals such as Goal 6 to ensure the availability and sustainable management of water and sanitation for all and Goal 14 where we shall have strategies in the conservation and sustainable use the oceans, seas and marine resources for sustainable development especially with the emerging trends of exploration of oil and gas from these ecosystems. So why is this not being achieved? What is needed to achieve this? Does it mean that society has to change where applicable their use and management of wetlands? What needs to be considered by the national and county governments to ensure sustainable use and management of wetlands? What is the current position on the ground? Has data been generated to show the value and attributes of these sensitive areas to be guide to policy makers and other stakeholders as they make decisions that touch and deal with wetlands? This study will look at try to offer solutions to bridging these gaps.

## **2.4 Analytical Framework**

### **2.4.1 Theoretical Framework for the Study**

Sustainable management of wetlands borrows from both the theory of sustainable development as well as the wise use principle of the Ramsar Convention. The theory of sustainable development is defined in the Brundtland Report as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). Wetlands are areas that need to meet the needs of this generation by providing water and other ecosystem services such as control flooding while at the same time ensuring that they shall exist in the future to give the opportunity to future generations to enjoy the same services. Societies with the current trends in environmental changes, technologies and culture changes, values and aspirations change, have to exist within a sustainable society which allows and sustains this change without compromising what the future expects and what is to be preserved for them (Hartmut, 1999).

In looking at sustainable development theory, scholars have noted that the same is based on several concepts that are an integral part of the theory. Some of these concepts include the concept of equity, ethical paradox, natural capital stock and eco-form just to name a few.

Wetlands are finite resources which if mismanaged can be degraded and their functions lost. Some of the concepts these concepts are useful in explaining sustainable management of wetlands looking at the uses and management of these areas by the various stakeholders.

Sustainable wetlands management can thus be defined as “human use of wetlands so that they may yield the greatest continuous benefits to present generations while maintaining its potential to meet the needs and aspirations of the future generations, in a way compatible with the maintenance of their physical, biological or chemical components, such as soil, water, plants, animals, and nutrients and interactions between them” (Abass, 2007). This definition is likened to the definition of sustainable utilization of wetlands under the Ramsar Convention.

Therefore guided by the above we must consider the uses and management of the areas by the current generations, looking also at the environmental aspect of conservation of the area to continue with its functions while meeting the needs of the current generation and look at the issues of development as well and all these taking into perspective that the area has to do the same for future generations to have the opportunity to experience the same. This can be based on the concepts of integrative management and equity.

#### **2.4.1.1 Concept of Integrative Management**

This concept looks at the aspects of social development, economic growth and environmental protection. Consideration should be given to all the above when one is looking at the uses and management of wetlands and also when one looks at the policies, laws and institutions that surround wetlands. It is noted that from a policy perspective, this concept looks at maintaining a minimum safe standard for living and non-living beings while at the same time seeing the need to maintain the ecosystem and life support systems (Jabareen, 2006). The concept looks at integrating the needs of all the stakeholders across the political and economic divides, considering partnerships between the private sector, government, local institutions as well as the communities within these areas, to have sustainable practices, uses and management schemes of wetlands and have the same enshrined within policies, laws and instructional frameworks that are collaborative instead of sectoral in nature. What it seeks to have is the link between the laws, policies and institutional frameworks by also integrating the views of the various players who are the users of

these wetlands and thus influencing their use and management of these areas in sustainable manner to meet the needs of the current generations as well as those of the present.

This concept ties in with the study as it proposes to look at the development, economic growth and the environmental aspects of the wetland, looking at the policies, legal and institutional frameworks that advise the uses and management of the wetlands. The concept calls for collaborative efforts between all the actors to ensure that there is sustainable wetlands management to enable the wetlands meet the needs of the present generations, while maintaining their ecological functions and also looking at doing the same for future generations.

#### **2.4.1.2 Concept of equity**

Closely related to the concept of integrative management is the concept of equity. The concept looks broadly at sharing the capacity of the resource for its conservation as well as the well being of the current and future generations. It is noted that this concept encompasses various other concepts such as environmental, social and economic justice, equal rights for development, democracy, public participation and empowerment (Jabareen, 2006). Other scholars believe that a truly sustainable society or system is one where the social needs, equity, welfare and economic opportunities are integrally related to environmental limits imposed in supporting ecosystems (Agyeman *et al.*, 2002).

In looking at the concept of equity one needs to consider the needs of the current generations and the needs of future generations to use the resource while still allowing the resource to carry on its functions and not be depleted or degraded. This is achieved by communities learning that though the resource is available to them at that particular time the same should also be reserved for the future and this can be monitored on how they efficiently use and manage the resource at the present time. Thus is it equitable to allow the conversion of a wetland into an agricultural patch to the detriment of other users such as wildlife, community uses for water, fishing and drinking and other ecological functions such as controlling flooding and acting as carbon sinks? The answer would be no. Not only will these other functions not be achievable but the wetland would be lost and whatever benefits that would have been enjoyed by future generations would be lost and there would be degradation of the environmental quality of the resource.

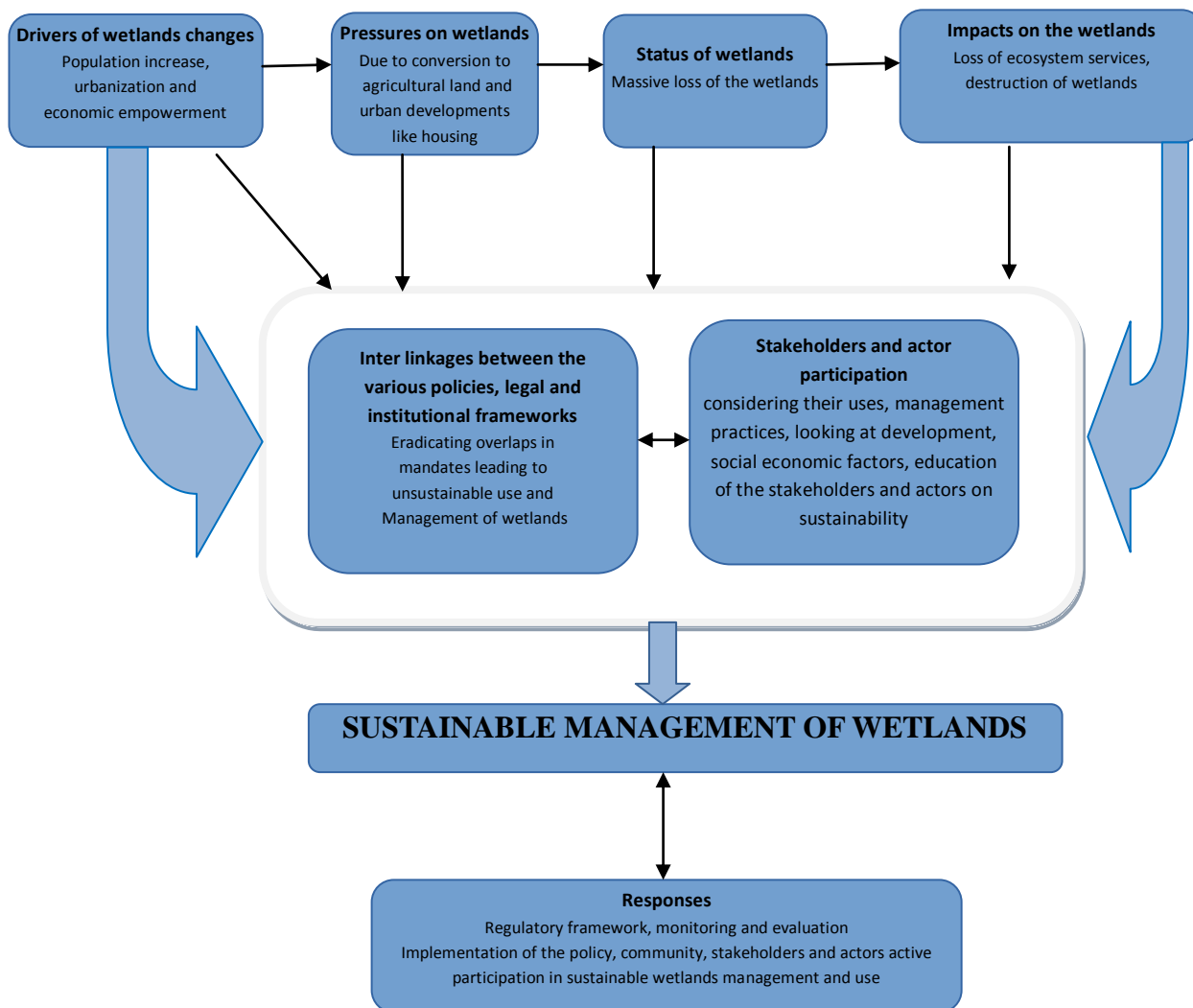
Closely linked to the theory of sustainable development is the Wise use principle under the Ramsar Convention. Recommendation 3.3 of the Ramsar Convention defines the sustainable utilization of wetlands as; "human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspiration of future generations" (RC, 1971). This is linked with the concept of wise use of wetlands. Wise use of wetlands is defined as the maintenance of the ecological character of these areas achieved through the implementation of ecosystems approaches, within the context of sustainable development (RCS, 2010). This supports the concept of sustainability of the wetlands in their usage and the activities that are carried therein. This is achievable when wetlands are valued economically and the values therein are also reflected in policy documents.

The theory of sustainable wetlands management analyzes the connection in the areas of policy, legal and institutional frameworks amongst all the actors, looking at the drivers, impacts and pressures on these areas, further looking at the community and stakeholders involvement in the management of these areas, lastly looking at what can be done in terms of monitoring and evaluation and see what if any incentives can be introduced to encourage sustainable wetlands management.

Kimana as a case study area offers a scenario where various stakeholders such as the Kimana Wetlands Association (KWA), NEMA, WARMA and the NCBO, wildlife protected under KWS and the Kimana Community Wildlife Sanctuary (KCWS) are involved and their interests need to be analysed. All these stakeholders draw different benefits from the wetland thus affecting how they use and manage the same.

In their use and management these different stakeholders are guided by sectoral mandates and institutional trends which often breed conflicts leading to degradation of the wetland. Concerns of conflicting uses and management, climate change, wildlife, human conflicts among other interests all need to be effectively addressed to attain a sustainably managed wetland guided by a proper policy, legal and institutional framework which can be effectively utilised by the community as well as the other stakeholders.

## 2.4.2 Conceptual Framework of the Study



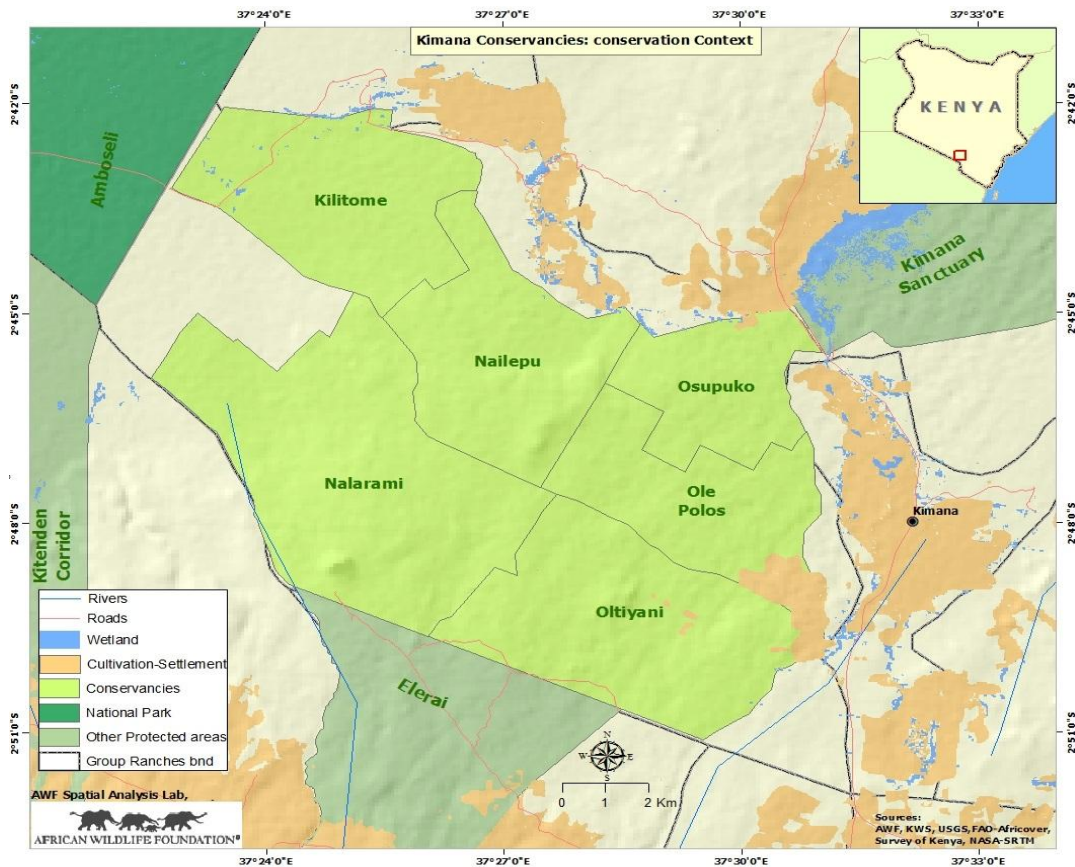
**Figure 1: Conceptual Framework on the linkages in the sustainable management of wetlands (Njagi, 2016).**

## CHAPTER THREE: STUDY DESIGN AND METHODOLOGY

### 3.1 Introduction

This chapter looks at the study area, the data collection and analysis of information from the Kimana Wetland. The first objective is achieved partially through desktop studies and also on information that was gathered from key informants from various institutions within the study area including the Kenya Wildlife Service, the District Environment Officer to name a few. The second and third objectives were field based where questionnaires were issued and key informant interviews conducted.

### 3.2 Study site



**Figure 2: Map of Kimana Area**

Source: African Wildlife Foundation

Kimana Wetland located in Oloitokitok District of Kajiado County in Kenya. The wetland basin spreads across three administrative divisions of the Oloitokitok District namely: Kimana, Central and Entonet. Oloitokitok district borders Tanzania to the West, Kajiado District to the North, Kibwezi District to the East and Taveta District to the South. The wetland basin is located at the junction of the Kimana and Isinet Rivers and is situated on the border of Kimana and Mbirikani Group Ranches that form wildlife dispersal area for Tsavo West and Amboseli National Parks. It lies between longitude  $37^{\circ}$  and  $37^{\circ} 30'$  East and latitude  $2^{\circ}30'$  and  $2^{\circ} 45'$  South. The area is generally arid to semi-arid with limited variations in its agro-ecological zones (Wetlands Org, 2012). This area can be accessed through the Emali-Loitokitok road, Amboseli National Park from the Namanga Border and the Tsavo-Amboseli Road.

The Kimana Wetland Ecosystem measures  $3,348 \text{ km}^2$  and it comprises of Kimana Division ( $358.8 \text{ km}^2$ ), Entonet division ( $1,349.3 \text{ km}^2$ ), Central division ( $1,280.3 \text{ km}^2$ ), Imbirikani Location ( $339.8 \text{ km}^2$ ), and Amboseli National Park (ANP) ( $392 \text{ km}^2$ ) (Nyamasyo and Kihima, 2014). Elevation of the area is 1199m above the sea level and the temperatures vary seasonally with the highs of  $35^{\circ}\text{C}$  early in the year in the months of February and March and lows of  $12^{\circ}\text{C}$  later on in the year from the month of July. Annual rainfall is concentrated into two seasons: the wet season, which ranges from November to January, and the dry season, which ranges from March to May. Total rainfall in the area averages 350 mm per year. The low rainfall is attributed to the ecosystem being on the rain shadow of Mt. Kilimanjaro. This makes swamps in the area critical resources for wildlife, people and livestock. The area is Maasai land, defined by group ranches, and the primary type of land use within the swamps is rain fed crop cultivation and dry season grazing area by the pastoral Maasai (Okello and Kioko, 2011). The November to January rains contribute most of the rain fed agriculture. Recurrent droughts and potential evaporation of 2200mm per annum typifies the ecosystem (KIWMP, 2008).

The Quaternary Volcanics (rocks and soils) are dominant in Kimana, Mashuru, Loitokitok, Rombo and Chyulu hills areas. The main rocks are Olvine basalts, phonolites, pyroclastics, volcanic ash, tuffs and trachytes. These rocks give rise to a variety of soils such as Ferralsols, Luvisols, Regosols, Lepasols, Lixisols, Cambisols and Vertisols, especially in the low lying areas (KIWMP, 2008).

Flora and fauna in the area is inclusive of both plants and animal as the area falls within the larger Amboseli ecosystem. The dominant vegetation types are open grasslands and Acacia dominated bush land to the south, neighbouring the forest belt of Mount Kilimanjaro. The dominant vegetation in the riverine habitat is *Acacia xanthophloea* but *Acacia tortillis* and *Acacia mellifera* are in drier areas (Irigia, 1995). Dominant perennial grass species such as *Cenchrus ciliaris* and *Chloris roxburghiana* are common in the area (Gichohi et al., 1996). Kimana ecosystem therefore has a divergent vegetation type and these include Acacia woodlands, alkaline\volcanic ash grasslands and permanent swamps (KIWMP, 2008).

For fauna, the array of animals has not changed significantly and the elephant population also grew. Some species like the lesser kudu and impala have diminished though and the ecosystem is also rich in bird species. Other fauna include amphibians such as frogs and toads, reptiles such as turtles, tortoise, cobra and black mamba, fish such as tilapia and catfish and invertebrates of different species of insects and scorpions (KIWMP, 2008).

The area is also comprised of a large mammal community which is dominated by migratory herbivores, which alternate seasonally between the arid bush lands and the swamp margins within the Amboseli and Tsavo West National parks. Migrants such as wildebeest, zebras and elephants, scatter during the wet seasons across the bush land pastures, concentrating in the basin woodlands and swamps each dry season, as water availability becomes limiting. Domestic livestock constitute a major portion of the migrant community, and the Maasai herd their cattle and small stock in parallel with the seasonal movement of wild herbivores (KIWMP, 2008).

A series of springs emerging in the basin from the watershed of Mount Kilimanjaro support the life of the wetland and its related environs (KIWMP, 2008). The Oloitokitok District is owned by various Group Ranches being the Eselenkei having 74,794 Hectares, Kimana/Tikondo having 25,120 Hectares, Kuku A having 18,712 Hectares, Kuku B having 96,000 Hectares, Mbirikani having 122,893 Hectares, Rombo having 38,000 Hectares and the Olgulului/Ololorash having 147,050 Hectares. The Kimana wetlands ecosystem is composed of three of the group ranches being the Mbirikani, Kimana and the Kuku ranches (KIWMP, 2008).



The Kimana Group Ranch that starts at the headwaters of the wetland system has also established a wildlife sanctuary. At the upper catchment within the Emperon area, four springs feed the River Emperon, which is joined by waters from the Tikondo spring to form the Tikondo River. The Isinet River joins with Kimana River in the middle part of the catchment just before it enters the wetland. There are series of swamps that drain water out of Kimana wetland towards the Chyulu Hills; these are the Il-Chalai and Esoit-Pus. From Kimana and Imbirikani Group Ranches, Kikarankot River flows into Kuku Group Ranch just past the Nol turesh pipeline (KIWMP 2008).

Maasai group ranches in Tsavo – Amboseli ecosystem support and provide wildlife corridors and dispersal areas that link the protected areas in the ecosystem (Amboseli, Tsavo West and Chyulu Hills) and community conservation areas (such as Kimana Community Wildlife Sanctuary (KCWS)), allowing them to support large populations of seasonally migratory mammals (Western, 1982). The group ranches on their own also support populations of wild large mammals in an open landscape (Wishitemi *et al.*, 2003) with 70% of wildlife living outside the protected areas. In support of wildlife conservation, KCWS was established in 1996. KCWS is approximately 40 km in area and is located in the north eastern corner of KGR.

Kimana wetland is located within the vast Amboseli Ecosystem and is faced with challenges of human-wildlife conflicts, human-human conflicts for the limited resources, conflict in policies and laws being applied within the wetland and how these impact on sustainable management of the wetland. Kimana is ideal as it is central to these issues. The area will indicate the policies, legal and institutional frameworks in the area, how these have affected the wetland area, what is the current status of the area, the uses, the uses and management regimes in the area to see evaluate their interplay in the sustainable management of the wetland area.

### **3.3 Methods**

#### **3.3.1 Data collection**

To address the objectives of the study, primary and secondary data methods were utilised. To collect the primary data the researcher achieved this through interviews of the local community and other relevant stakeholders and observations. To interview the stakeholders, questionnaires

and interview schedules were utilized (as per appendices 2 and 3) to solicit information on the knowledge of the policies, legal and institutional frameworks in Kimana as well as obtain information on the use and management of the wetland. Further the researcher also relied on direct observations of the stakeholders' uses of the wetland from the field visits of the area and photographs taken there. Secondary data were collected from laws, policies, journals and articles.

### **3.3.2 Study approach**

The first objective was to evaluate the policy, legal, and institutional frameworks governing Kimana Wetland. Secondary data including the relevant policies and laws together with online sources, books, journals and reports were analysed such as the Wetlands Regulations and the Draft Wetlands Policy (2013) amongst other key sectoral legislations. Furthermore case studies on wetlands management were analysed such as Uganda's Wetland sector strategic plan 2001-2010 (Ministry of Water, Lands and Environment), her National Policy for the Conservation and Management of Wetland Resources, 1995. The secondary data was gathered to help gain a deeper understanding of the topic.

Several stakeholders were identified within the area and they ranged from agricultural extension officers, wildlife rangers, KWS game rangers, households within the wetland area both upstream and downstream. The households were scattered upstream and downstream of the wetland. They consisted of about 500 households within the area. Thereafter simple random sampling was used to select the households to interview both from the upstream and downstream areas of the wetland. Further key interviews were carried out on sectoral stakeholders and actors using interview schedules. These people were from the sectors of water, wildlife, agriculture and environment representing the government and from local stakeholders like the Kimana Wetlands Association (KWA) and the Noomanyant Community Based Organization (NCBO). The same shed light into the issues of emerging technologies, challenges and threats affecting the wetland and what measures if any were in place to try and handle these issues.

The Second objective was to examine the socio-cultural, economic and environmental uses of Kimana Wetland and the third was to evaluate the management regimes at Kimana Wetland and the implications thereof. This was field based where questionnaires and key informant interviews

were conducted targeting communities that were in both the upstream and downstream areas of the wetland. The population as at the time was approximately 500 households. Some of the community members are migratory and thus the challenge of determining the exact number of households. To determine the sample size the following formula was applied:

$$n = \frac{Z^2 * (p) * (1-p)}{d}$$

Where:

$n$ = the desired sample size.

$Z$ =the standard normal deviate at the required confidence level.

$P$ =proportion of target population

$Q=1-p$  and  $d$ =the level of statistical significance set.

(Mugenda and Mugenda, 2003)

### 3.3.3 Sampling technique

Thereafter, the simple random sampling procedure was utilised to ascertain the exact sample size required.  $N$  is the desired sample size,  $Z$  is the confidence level (95%),  $p$  is the proportion of the target population being the households upstream and downstream of the wetland area. From the formula, the target sample size population was 220 households. However, the households within the area were vastly scattered and it was not possible to cover all the 220 households due to time, the communities were migratory and financial limitations.

The research was to gather information from the upstream and downstream communities. The downstream communities were more at 116 households as they were the major cultivators of the wetland area and thus were easy to locate while 93 households were interviewed from the upstream. This totalled to 209 sampled households. From the number of 209, 116 were from the downstream and 93 from the upstream households.

The questionnaires and key informant interviews were used to elicit information regarding the activities of the stakeholders on the activities that are affecting the wetland, considering the threats and challenges that they were facing; whether they were aware of any environmental laws, policies and institutions in regards to the wetlands, what management regimes were at the wetland and last but not least obtain the stakeholders perspectives in respect of any planning mechanisms that might be used to support wetland protection and restoration. To corroborate the above, field observations and photographs were conducted aimed at observing the stakeholders' uses of the wetland considering their cultural, economic, social, and recreational attachment to the wetland. The information gained from the primary data was determine the frequency of the responses and thereafter the information was coded to identify themes and categories and this was analysed using the excel software. The findings from the analysis were displayed using frequency tables, graphs and pie charts.

## **CHAPTER FOUR: RESULTS AND DISCUSSIONS**

### **4.0: Introduction**

This chapter presents the results and discussions of the data that was collected and analyzed from the field.

### **4.1: Policy, legal and institutional frameworks in wetlands use and management**

Management and utilization of natural resources as noted occurs within various stipulated laws, policies and legal instruments. The section will delve into the legal, policy and institutional aspects within the Kimana area and how the same interact with the wetland.

#### **a) Sessional Paper Number 12 of 2014- National Wetlands Conservation and Management Policy.**

The policy was launched in October 2014. The above policy is developed with the goal of ensuring wise use and sustainable management of wetlands in order to enhance sustenance of their ecological and socio-economic functions for the present and future generations of Kenya. The same was done through a rigorous multi-stakeholder consultative process, seeking to secure and ensure the benefits of wetlands for posterity. Further it aims at providing a framework for mitigating the diverse challenges that affect wetlands conservation and wise use in Kenya (ROK, 2014).

The policy tries to address the issue of participatory wetland management at Section 4; on the Sector Linkages at National and International Levels. It promotes for the development of an appropriate mechanism for achieving the harmonization of the various sectoral policies that relate to wetlands. This can be attained through formulation of a Technical Committee on Wetland Management under the umbrella of NEMA and the Ministry. This Committee comprised of all the major state and non-state actors who relate with wetlands as well as seek to decentralise the committee to smaller grass root committees in communities that rely on wetlands for their survival.

Currently we have the Ministry of Environment, Water and Natural Resources headed by one Cabinet Secretary. Under this leadership, an Inter-Ministerial Technical Committee could be formed that will seeks to unify all concerns as well as inviting representatives from other crucial ministries such as the Ministry of Lands, Housing and Urban Development, Ministry of Agriculture, Livestock and Fisheries among others.

Further the Policy statements 1-4 advocate for Education and Awareness noting that they shall promote education and awareness to all on wetland resources. However, the Policy has not expounded clearly on the institutional and legal framework of carrying this out. To borrow a leaf from the Uganda's National Policy for the Conservation and Management of Wetland Resources, their policy provides the legal framework for sustainable use and management of all the wetlands in Uganda through very specific policy strategies.

This policy is further reinforced by being adequately incorporated in the National Environmental Statute of 1995. The policy provides for proper institutional arrangements to ensure comprehensive management of wetlands. They have enacted the Wetlands Inspection Division guided by the policy under the Ministry of Water, Environment and Natural Resources. This is further decentralised to Regional Technical Support Units, further to District Units headed by Wetlands Officers who develop District Wetlands Action Plans and lastly the Sub-counties units that implement the Community Based Wetland Management Plans. This details the importance of wetlands management and conservation from the main Government to the local communities.

Community members should be active participants to ensure sustainability through advocating for alternative livelihoods within the wetland area. The country can also gain from resolutions passed under the Ramsar Convention such as Annex to Resolution VII.8 by the 7th Conference of the Contracting Parties, San José, Costa Rica, May 1999; Guidelines for establishing and strengthening local communities' and indigenous people's participation in the management of wetlands.

**b) Sessional Paper No. 3 of 2009 National Land Policy**

The National Land Policy looks at addressing environmental problem. These include soil erosion, pollution, and degradation from over grazing and unsustainable agricultural practices amongst others. The vision of the policy is guide the country towards efficient, sustainable and equitable use of land for prosperity and posterity.

The question of land has always been a thorny issue for the nation and there are injustices that are yet to be addressed. Kimana area is not presently noted as part of public, community and private land. Private land as there are ownership documents issued to some stakeholders, community land such as the Kimana Wildlife Sanctuary and public land managed by the forests and the Kenya Wildlife Service. One of the policy principles is that of conservation and management of land based natural resources, the principle of protection and management of fragile and critical ecosystems including wetlands and arid lands. The policy had noted that the Land Act be enacted to deal with land issues and the same has been enacted.

The National Land Commission is in the process of acquiring public land that was grabbed. The Government should be stern in ensuring that grabbed land is restored back for the purpose it was intended. In cases where it involved wetlands, they can be declared as protected areas which then will ensure that they are restored to the original use. At the moment there is the proposed land use planning bill, 2015.

**c) Draft National Environment Policy, 2014**

The goal of the said policy is to better the quality of life for the current generation without compromising the quality of life for future generations through sustainable management of the environment and natural resources. The guiding principles of the policy are amongst other the right to a clean and healthy environment and this is also a right enshrined in EMCA and the Constitution of Kenya 2010, the principle of inter and intra-generational equity, ecosystem approach, right to development, sustainable use just to name a few.

The policy recognises the need of freshwater and wetland ecosystems as providers of environmental goods and services. Some of these services are soil formation, flood control,

diluting or removing pollutants from the water, habitat for species and recreation just to state a few of the uses. The policy recommends that the Government seek to harmonize the roles of the various regulatory agencies charged with the mandate of management of these resources as well as those that interact with them. The same also recommends the development of a wetlands policy and management plans for these areas and the rehabilitation of degraded wetlands. This also applies for the coastal and marine ecosystems.

**d) Draft National Lands Reclamation Policy, 2015**

The policy looks at interlink between water cycle and land management. The goal of the policy is to look at the interests of all the stakeholders and actors whose actions are affected and affect land and water degradation and thereafter consolidate and coordinate the reclamation initiatives. The policy highlights the fact that every land use decision is also a water management decision and that water management directly relates to mitigating or preventing land degradation.

The policy recognises that there is the challenge of dealing with various stakeholders in the wake of sectoral management of these areas such as wetlands. Further the recognition of wetland as land that is wet is noted to be an area that the policy seeks to deal in collaborating with NEMA. This collaboration comes through the Land Reclamation Bureau when NEMA issues restorative orders the person against who such order has been issued will be required to restore the environment to the state that it was in before the destruction or pay for the cost of restoration of the wetland.

**e) Draft National Forest Policy, 2015**

The goal of the policy is sustainable development, management, utilization and conservation of forest resources and equitable sharing of accrued benefits for the present and future generations of the people of Kenya. The policy proposes to harmonise the forest laws with other sectoral laws to achieve the national development objectives. These other sectoral laws are laws touching on environment and areas of wetlands and water management. Forests depend on water resources to flourish likewise water resources depend on forests to exist.



**f) Draft Wildlife Policy, 2011.**

The proposed goal for the policy is to provide a framework for conserving in perpetuity, Kenya's rich diversity of species, habitats and ecosystems for the well being and benefits of the people of Kenya and the global community. The policy calls for ecosystem based management plans for wildlife conservation within and outside protected wildlife areas. As the focal point of the Ramsar Convention in Kenya, the Kenya Wildlife Service is charged with the mandate of ensuring that these areas are protected.

The policy calls for harmonization of all policies which manage coastal and marine ecosystems to remove overlaps as well as dealing with wetlands within protected and those outside the protected zones of the parks. They note that such areas as Kimana are wildlife corridors for wildlife and they are threatened by activities such as development and agriculture and hence call for protection of these areas as well as have participatory management agreements with the communities within these areas for sustainable management of these areas for benefit of both the communities and the wildlife.

The policy also calls for the mapping and the inventorying of wetlands and supports for the conservation and management of the same. The same supports the need for implementation of a National wetlands conservation and management policy as well support the restoration of degraded wetlands.

**g) Draft National Policy on groundwater resources development and management, 2016**

The purpose of the policy is to contribute to the national framework for the sustainable development and management of the groundwater resources. The policy notes that there inadequate policies, strategies and legislation relating to groundwater resources and their management or if the same is there, there is ineffective application of the said policies, legislation and strategies and also overlaps. The policy is proposed as a guide to other ministries that deal with groundwater.

It seeks partnerships with all sectors for sustainable resource use and management. It advocates for collaboration in land use management for groundwater protection. Last but not least it

proposes the review of legal, environmental and regulatory frameworks for sustainable development and management of these resources.

**h) The Environmental Management and Co-Ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009, Legal Notice No. 19 of 13th February, 2009**

The same were formulated by the Minister (now Cabinet Secretary) in exercise of the powers conferred by Section 42(3) and 147 of EMCA. Conservation is noted as the care and management of a resource so that the resource maintains its ability to fulfil its functions and provide goods and services for present and future generations. Regulation 3 applies to all wetlands whether the same are on private or public lands. This brings in an aspect of conflict with private lands owners who will note that wetlands in private lands are their property since they have the vested interest in the land. Kimana wetland is classified as public land. The same is within the Amboseli ecosystem which means that it is also protected by the Kenya Wildlife Service. The community through support of investors were able to open the Kimana Wildlife Sanctuary. Regulation 5 (2) notes that the obligations under these Regulations shall at all times take into account the provisions of other statutes.

Regulation 10 notes that an inventory of the wetlands should be carried out and that wetland management plans should be developed. The inventory is crucial to enable proper mapping of wetlands, setting their boundaries, uses, composition. Such an inventory will give guidance on how to deal with the wetlands based on whether they are on public, private or community land. Further whether such wetlands can be declared protected wetlands or not. This will enrich the management plan that will be drawn for each wetland as each will be dealt with specifically. Regulation 5 (1) (d) provides that sustainable use of wetlands shall be integrated into the national and local land use plans to ensure sustainable use and management of the resources. This gives a link between the Land and Environment Ministries. A consultative process between all relevant stakeholders in the fields of water, wildlife, agriculture, land, fisheries and public participation of the community will ensure that there is a workable wetlands management plan that is sustainably achievable encompassing the interests of all parties.

**i) Environment Management and Coordination Act (EMCA), Act No. 8 of 1999**

EMCA is the main legislative law on matters environment in Kenya. The same was enacted with the aim to remedy the effect of variances in legislation dealing with environmental issues to promote sustainable environmental management resources. The Act defines sustainable use at Section 2 as “*use of the environment or natural resources which does not compromise the ability to use the same by future generations or degrade the carrying capacity of supporting ecosystems*”. This was modified from the definition of sustainable development which under the Act is noted to be “*development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs by maintaining the carrying capacity of the supporting ecosystems*”.

The Act establishes NEMA at Section 7 and at Section 9 (1) it notes that the object and purpose for which the Authority was established was to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. Thereafter at Section 9 (2) of EMCA, NEMA is mandated with various duties as concerns the environment. Wetlands fall squarely therefore within the management of NEMA. Institutionally NEMA establishes the framework of the Provincial and County Environment Committees under Sections 29 (2) and (3). Kajiado County now has a County Director of Environment who is in charge of environmental matters. The Act notes at Section 42 that all activities on wetlands should be carried out only after prior approval has been issued. Further under Schedule 2 paragraph 8, agricultural activities are required to undergo Environmental Impact Assessment (EIA). From the stakeholders’ feedback, these have never been carried out nor are they aware that the same should be carried out. Small scale farmers in the area just plant without any assessments being carried out and there have been no EIAs conducted by the large scale farmers.

Farmers interviewed at Kimana noted that they weren’t aware of any permits that were required for them to grow produce on the land. They considered the wetland area very fertile as it gave them economic independence from the proceeds received after sale of the produce they grew. Further they felt that the government’s role was to intervene in situations of human-wildlife conflicts when the wildlife destroyed their crops, animals and also injured or killed humans.

NEMA's role therefore at this grass root level has failed in protecting the wetland that is now largely agricultural land.

Further they haven't sensitized the community of the importance of this area remaining as a wetland nor how to sustainably use the area so that they can maintain the wetland area as well as develop sustainable agriculture. Their presence is not felt within the area nor is its mandates clear to the community and various stakeholders therein. There is need for greater community sensitization and collaboration with the local community and the stakeholders who are the users of the wetland to have sustainable management of the wetland.

Restorative measures can be put in place to ensure that the wetland area is protected to enable the area regain its former ecosystem services of providing fish and papyrus harvesting activities as well as providing a means for the community to gain sustainable access to the water for the new developments such as agriculture and for increase domestic usage due to population increase.

**j) Water Act, Act No. 8 of 2002**

The Water Act 2002 provides for the management, conservation, use and control of water resources and for acquisition and regulation of rights to use water; and provides for the regulation and management of water supply and sewerage services (ROK, 2002). As noted above the Act operates under the following institutional framework in providing guidance to the management of water and sanitation: the Minister of Water, the Director of Water, the Water Resources Management Authority (WRMA), the Water Services Regulatory Board (WSRB), Water Service Boards (WSB), Water Service Providers (WSP), Catchment Area Advisory Committees (CAAC), Water Resources Users Associations (WRUA), the National Water Conservation and Pipeline Corporation (NWCPC), the Water Services Trust Fund (WSTF) and the Water Appeal Board (WAB). This is in addition to NEMA which has the environmental offices and the County Environmental Officers under the County Government regime.

Section 4 of the Water Act, 2002 gives the Minister (now the Cabinet Secretary) control over every water resource in accordance with the Act. The Act defines a water resource at Section 2 as: *“any lake, pond, swamp, marsh, stream, watercourse, estuary, aquifer, artesian basin or other*

*body of flowing or standing water, whether above or below ground;*” further a watercourse is defined as: *“any natural channel or depression in which water flows regularly or intermittently, unless declared not to be a watercourse under this Act”*. This is also noted in the proposed Water Bill 2014 at Section 6 which provides that the Water Resources Regulatory Authority shall be the agent of the National Government and regulate the management and use of water resources.

At the community level, farmers at the Mbirikani ranch in Kimana area when interviewed in 2011 noted that WRMA officers once come to the area and ordered that for them to access the water from the wetland area the stakeholders had to obtain permits from their offices. This didn't auger well with them. The stakeholders couldn't understand why an organization that was foreign to them all over sudden came on the ground and started demanding that they pay for a resource which they considered a free resource. The community rejected their demand and no permits were ever taken. WRMA at the time was targeting the large scale farmers who were depleting the volumes of water in the wetland by doing large water abstractions for their farms. The permit was to assist in controlling the amount of water to be abstracted and at the same time make the stakeholders pay for the service of using the water.

WRMA and NEMA are 2 institutions that seek to protect one resource being the wetland. On the one hand WRMA requires you to obtain a permit before one can use the water within the wetland. This is provided for under the Water Act, 2002 at Section 25. On the other hand, NEMA requires that you also obtain approval from its offices before any activities can be carried out on the wetland as per Section 42 of EMCA. NEMA receives reports on projects that are to be carried out within their environs. These reports are sent out to lead agencies who should respond and give NEMA their recommendations in regards to the project. Of interest is that under the Third Schedule of EMCA, various government representatives are nominated to the Standards and Enforcement Review Committee established under Section 70 of EMCA. The committee as formulated with the members represented therein gives an overall representation of all arms of government. At Section 71 EMCA states that one of the functions of the committee is to advise the Director General of NEMA on the water quality and the environment.

Under the Standards and Enforcement Review Committee a review of the overlapping laws can be proposed to address the issue of double payments for permits and licenses. The ripple effect is thus to refuse to adhere to what is set and in the confusion they will utilise the resource unsustainably even to its destruction. Involve the stakeholders for them to give their input on the subject of the permits and licences as well as sensitization of stakeholders on the issues of sustainable management of the wetlands.

#### **k) County Governments Act, 2012**

With the promulgation of the Constitution in 2010, came the formulation of County Governments. The County governments are established under Article 176 of the Constitution and they consist of a county executive headed by the County Governor, Deputy Governor and a County Executive Committee. Their mandates, role and function are specified and vested in them, by the Constitution and the various Acts of Parliament that effect and facilitate the implementation of the relevant provisions in the Constitution. The Constitution of Kenya, 2010, amongst others, provide for the functions in: Chapter Eleven at Articles 174 to 200 and the Fourth Schedule. At Section 5 (1) a county government shall be responsible for any function assigned to it under the Constitution or by an Act of Parliament. EMCA is an Act of parliament and thus each county is responsible to ensure that the provisions of EMCA are adhered to within their counties.

The role of the County executive is to prepare bills for consideration by a County Assembly; and implement Acts of the County Assembly; and the national legislation to the appropriate extent; manage and coordinate the functions of the County administration; including those in Sections 46 and 47 and provide to the County Assembly, full and regular reports on matters relating to the County. They are also required to deal with planning and development in the County where they manage and regulate the activities that occur within their counties such as looking into wetlands cultivation and restoration of degraded wetlands. Together with other government institutions such as NEMA, the County governments can deal with the implementation of specific national government policies on natural resources and environmental conservation.

The county government is also empowered to coordinate and assist communities to participate in governance at local levels through the village units provided under Section 48 (1) (e). These units

will allow members to give their opinions in the management of resources within their reach and in turn each member of the area is participating in environmental management. Further duties and responsibilities of the village units are noted under Section 52 and 53 of the Act. Citizen participation in the counties is noted at Section 87 of the Act.

NEMA offices are located in all the counties in Kenya and they are mandated to ensure that the environment is protected. Guided by the Constitution, EMCA and this Act, NEMA should spearhead environmental protection and sensitization within the counties as well as advocate for county laws in line with the main statutes to have sustainable use and management of resources in the area. The County Governments are responsible for implementation of specific national government policies on natural resources and environmental conservation, including; soil and water conservation; and forestry. Counties have to implement national laws and policies as appropriate within their jurisdiction. As per the 4<sup>th</sup> Schedule, the County Governments have functions and powers over agriculture, planning and development and have to ensure public participation. These rights especially in regards to the environment are managed under the County Environment Officers.

The County Government has to ensure that there is no further encroachment of the wetland area. A feasibility study should be conducted in collaboration with Ministry of Water and other stakeholders in environment and water resources to determine the number of wetlands in their area, where the wetlands are located, what these wetlands are used for and the size of these wetlands. This information can feed to a national inventory on wetlands and thus providing what challenges are facing these areas as well as threats and what measures are in place if any to remedy the same. If there are instances of efficient and sustainable use of wetlands resources best practices can be employed between counties to build the capacity of wetlands in other counties.

#### **D) The Wildlife Conservation and Management Act, 2013**

The Act defines Wetlands at Section 2-the interpretations Section. The definition is borrowed from the Ramsar Convention. Section 33 notes that the Cabinet Secretary on recommendation of the Kenya Wildlife Service and the National Lands Commission by a notice in the Gazette declare a wetland that is important for habitat or ecosystem for wildlife conservation a protected wetland.

Further in consultation with the community and relevant stakeholders they shall prepare an Integrated Wetland Management Plan for the protected wetland.

Kimana is a wetland that is an important wildlife dispersal area for Tsavo West and Amboseli National Parks. Maasai group ranches in Tsavo – Amboseli ecosystem support and provide wildlife corridors and dispersal areas that link the protected areas in the ecosystem (Amboseli, Tsavo West and Chyulu Hills) and community conservation areas (such as Kimana Community Wildlife Sanctuary (KCWS)). In support of wildlife conservation, KCWS was established in 1996 and it is approximately 40 km in area and is located in the north eastern corner of Kimana Group Ranch (KGR) (reference to figure 2 on the location of the sanctuary).

This wetland is an important area wildlife corridor that farmers have encroached on. The Kenya Wildlife Service (KWS) has established wildlife corridors for the migratory animals and even made efforts to put fences and buffer zones between the wildlife and the community but the community still encroaches on these areas. This has led to many cases of human-wildlife conflicts when plants are destroyed; humans and animals are killed or maimed by wild animals. The community retaliates by hunting down the wildlife and killing them or costing the tax payer more due to compensations that are offered. Why then can't the same be declared a national reserve and an Integrated Wetland Management Plan developed?

NEMA, WRMA and KWS should work alongside each other to ensure that the area serves the needs of all the stakeholders whilst at the same time it is preserved as a wetland. KWS is also a lead agency when EIA reports are sent to NEMA for approval. The service can give reports on whether certain projects are viable or not stating their reasons for the same. Also in conjunction with the communities they can also educate the community on the importance of maintaining wildlife corridors and why certain measures are put in place to protect them such as fencing to reduce the number of livestock in the parks.

Further KWS was involved in wider stakeholders planning sessions leading to the development of the 10 year Amboseli Ecosystem Management Plan. The plan was to look at issues arising from human wildlife conflicts for resources, causes of water pollution and what are the causes of



unsustainable use of natural resources within the area including such areas as wetlands. The plan proposes the formulation of an integrated wetland management plan between the communities in the group ranches who use it primarily for agriculture and ranches that use the same resource for domestic purposes and conservation.

**m) Agriculture, Fisheries and Food Authority (Amendment) Act, Act no. 37 of 2013**

Kimana is largely converted into agricultural land. Agriculture at Section 2 of the Act is defined as cultivation of land and the use of land (whether or not covered by water) for any purpose of husbandry, aquaculture and food production.

The question would be is Kimana gazetted as agricultural land within this definition or is the same a wetland or wildlife area? There is no proper classification of this area hence leading to the stakeholders using the area as they please and the resources therein as there is no one per se who is responsible. This non-committal approach to the sustainable use and management of this area has left it open to farmers to utilize the area unsustainably leading to destruction and possible permanent loss of the wetland in a few years to come.

**n) National Lands Commission Act, No. 5D of 2012**

Land is the key to all development. Under this Act, the National Lands Commission (NLC) is mandated to carry out the implementation of Articles 60 and 67 (3) of the Constitution as well as ensure the national land policy is implemented. Land in Kenya is divided in 3 areas either as public, private or community land. Wetlands are cross-cutting resources in these lands. Land is protected under Article 62 (1) (i) of the Constitution. It is further administered by the NLC as mandated by the Constitution at Article 62 (3). Thus as it stands Kimana wetland is public land that should be administered on behalf of the communities therein by the NLC. The NLC has its functions set out at Section 5 of the Act where the same at Section 5 (d) can conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities.

The Act allows the commission to establish committees and county offices for better carrying out of its functions. Members can be co-opted into these committees to enable the commission carry

out its functions. Such members can be from NEMA, WRMA, KWS, and Agriculture etc. This is another forum established under this Act to bring stakeholders together for efficient management of resources within the nation of Kenya. The same is noble however still plagued by the notion of independence of various ministries and stakeholders. What needs to be encouraged is also interdependence of all these relevant stakeholders to try and eradicate duplication of roles by these committees or forums.

**o) National Water Master Plan 2030**

The National Water Master Plan 2030 was launched on 26 March 2014 and brought together all water sector stakeholders from community based organizations to NGOs, from the county governments and the Ministry of Environment, Water and Natural Resources to Development Partners. The master plan seeks to have improved water and sanitation and that these are available and accessible to all by 2030; in agriculture, there be an increase of the area under irrigation to 1.2million hectares; to be a nation that has a clean, secure and sustainable environment by 2030 and to generate more energy and increase efficiency in energy sector.

A clean, secure and sustainable environment will depend on the protection of our water towers and our ecosystems. The plan further notes that the water deficits would require promotion of water resources development to the maximum in order to meet future water demand. Water demand management such as water savings and effective and efficient water use, recycling of water, etc should be introduced to control water demand increase. Mitigation measures need to be effected at Kimana as the area has been overtaken by agriculture.

There is need to check on the water abstractions in the area used primarily for irrigation of the large scale farms to ensure that there is sustainable use of the same. At the moment there is the practice of flood irrigation in the farms and this leads to inefficient water use. The plan should provide mechanisms of what needs to be done to achieve efficient use of water. What management structures are offered? Is monitoring and evaluation is in place to achieve efficiency? What is the institutional framework?

At Kimana the community has developed spring management to enable all the farmers have equitable use of the resource. This is only carried out by the upstream communities who are the conservationists of the area. They have furrow systems that ensure minimal wastage of water. This is yet to be replicated in the downstream communities who are the major water abstractors. The plan needs to be decentralised to the communities and also have a feedback from the members on what is working. Without community participation and information to the users there is no way of ensuring that the plan works. Communities can also be trained on water saving measures and programmes such as drip irrigation as well as giving incentives for efficient use of water.

**p) National Water Resources Management Strategy 2012-2017**

The National Water Resources Management Strategy of 2007 is provided for by the Water Act, 2002 per Sections 11(1) and 11(2). The water resources of Kenya shall be managed, protected, used, and developed conserved and controlled. The plan revealed that management and utilization of water resources have in the past been planned and implemented in a fragmented, sectoral and sub-optimal manner. This then has led to encroachment of catchment areas, degradation of the water catchments and water resources, lack of appreciation that water is life and also a finite. The situation analysis demonstrated that Kenya's economic sectors—agriculture, energy, livestock, fisheries, manufacturing, environment and tourism—are heavily dependent on available water and sustainable environmental flows (NWRMS, 2009).

The Plan under Environmental Planning and Governance, proposes several strategies related to water management. Amongst the strategies is to develop a policy framework to harmonise environment-related laws and institutions, and promote the capacity for collective enforcement of environmental standards; strengthen institutional capacities of multi-sectoral planning and strengthen linkages between institutions of planning and environmental management; have water conservation measures strengthened to enhance water availability for environmental and other uses (NWRMS,2009).

The plan proposes the strengthening of linkages between institutions of planning and environmental management. This can be achieved at the Standards Enforcement and Review

Committee. The committee would be advised on actions points to assist in the development of National Environment Action Plans as well as water and wetlands management plans that are all aimed towards the sustainable use and management of the resources.

**q) Kimana Integrated Wetland Management Plan (KIWMP) (2008-2013)**

Kimana community members and stakeholders did despite all the challenges come together with the support of the African Wildlife Foundation (AWF) and they formulated the Kimana Integrated Wetland Management Plan (KIWMP) for the period 2008-2013. The plan though expired had the Vision to: *“Have an environmentally sound and economically prosperous Kimana Wetland Basin”*. This consultation process was carried out amongst the stakeholders who sought to establish a sustainable institutional framework for the management of natural resources and promote integrated, sustainable and balanced development, management and utilization of environmental resources for the benefits of present and future generations. KIWMP noted the lack of clear strategic and updated instruments to regulate and promote sustainable use of and integrated management of wetlands in general. In terms of legal frameworks, the plan emphasised on EMCA and the Water Act that sought to establish the WRUA.

KIWMP proposed to have a local body established by the stakeholders with a Secretariat to oversee the water and environmental management of the Kimana Wetland. This would be headed by the Kimana Wetland Management Implementation Committee (KWMIC) which was the proposed institutional framework for the sustainable management of the wetland and other natural resources in Kimana.

The proposed membership at the local level was to be composed of Technical Officers from relevant Government Departments and three (3) representatives drawn from Community Based Organizations (CBOs), Faith Based Organizations (FBOs), Natural Resources Associations (NRAs) and National Resources User Associations (NRUAs), respectively. The Kimana Wetlands Association (KWA) was proposed as the secretariat of KWMIC and it required the requisite resources and technical capacity to implement the plan. The plan also proposed to incorporate key stakeholders from the water sector, youth affairs, local government, agriculture, forestry, environment and wildlife and tourism, amongst others.

The Plan had proposed to implement environmental management guidelines to ensure common, harmonized and effective management. It also proposed good collaborative management schemes by all the key stakeholders at Kimana but also the need to have political commitment on the part of the various government departments for the enforcement of appropriate regulations and adequate technical and financial resources. The plan was never implemented due to lack of financial support and at present there have been no subsequent or proposed plans to same.

Some of the institutional frameworks that were identified in the area were from community based organizations such as the Noomayiant Community Based Organization which offers protection of springs that feed water into the Kimana wetland. This is done through fencing of spring sources yet allowing the community access through outlet tunnels outside the fence to fetch water for their uses, there are also the spring management committees that regulate the usage of water, institutions such as KWS, NEMA, Agriculture play their sectoral roles in the area.

From the above analysis it indicates that indeed the policy, legal and institutional frameworks are located within the area yet there is still unsustainable management of the wetland. Most of the above structures give proposals on what should be done to conserve the wetland and the ecosystem by suggesting collaborative efforts yet at the same time implementing their own sectoral mechanisms in the management of the area. There is no active community participation to disseminate the information contained in the above documents and no feedback mechanism for the community to advise on any reforms that may be suggested.

There are no practical solutions offered to implement the sectoral linkages between these sectoral players as well as with other actors in the private sector who are also users of these resources. Through active collaborations between the parties, national wetlands inventory can be done so as to identify where these resources are, what are their uses, the land tenure systems that affect them and how the same can be addressed, what incentives if any can be offered to ensure sustainability, who is the oversight authority, what is the role of each of the stakeholders and other actors in ensuring the sustainable management of the wetland, what are the economic values of these areas and how the same translates to growth of the gross domestic product as well as achieving the sustainable development goals and our Vision 2030. There is need to move from suggestions to

action where we see formulations of partnerships for the management of these areas. Need to formulate a National Wetlands Steering Committee housing the various sectoral players for implementation of both international and national instruments on wetlands use, conservation and management.

## 4.2: Use and management of Kimana Wetland

### 4.2.1 Social-demographic data

From the information gathered the researcher wanted to identify the gender, marital status and the age of the households. The information was useful to assist analyse how men and women utilise the wetland, the age bracket that commonly interacts with the wetland as well as the family units. In terms of the men and women; 105 (50.2%) were females and 104 (49.8%) were male. There was an almost even distribution of this as most men within the brackets of 20-35 years were farmers who gained economically from the wetland.

The land was also leased to private developers for agricultural purposes. The women and children main use and need for the wetland was access to water for recreational activities such as bathing and swimming, for drinking for both the homes and livestock, for cooking and washing of clothes and for irrigation of the farms.

**Table 1:** Age of households members both upstream and downstream at Kimana

| Age brackets of households members | Number     | %            |
|------------------------------------|------------|--------------|
| 15-20                              | 8          | 3.8          |
| 20-35                              | 103        | 49.3         |
| 35-50                              | 66         | 31.6         |
| Over 50 Years                      | 32         | 15.3         |
| <b>Total</b>                       | <b>209</b> | <b>100.0</b> |

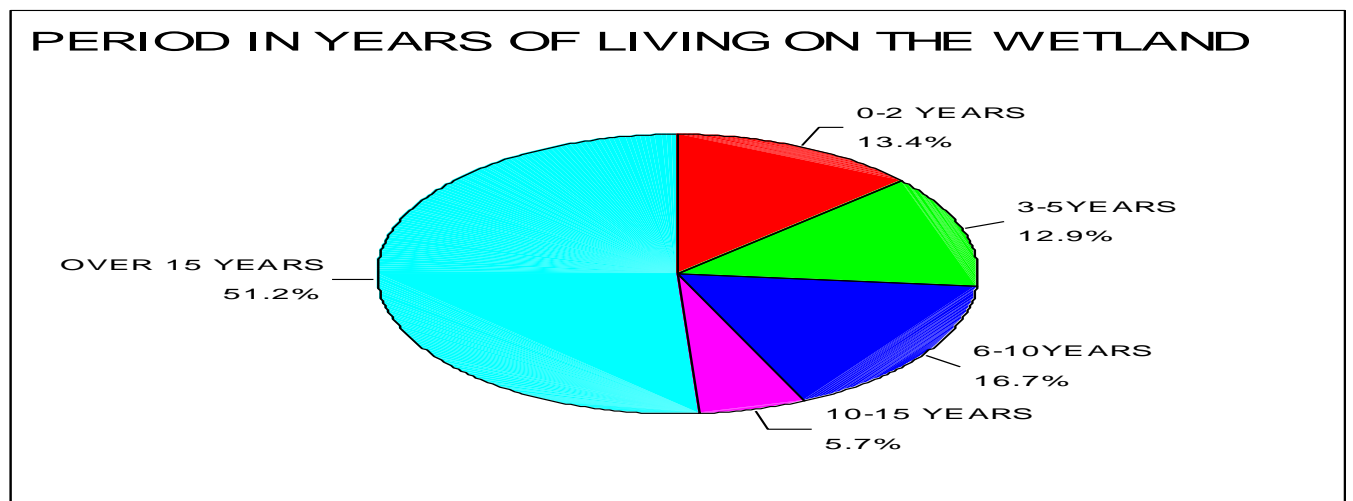
The marital status of households was as follows:

**Table 2: Marital status of both upstream and downstream households at Kimana**

| Marital status | Number     | %            |
|----------------|------------|--------------|
| Single         | 44         | 21.1         |
| Married        | 159        | 76.1         |
| Widow/Widower  | 3          | 1.4          |
| Separated      | 3          | 1.4          |
| <b>Total</b>   | <b>209</b> | <b>100.0</b> |

In these households 47.8% were married for over 10 years, 22.5% were married between 3-4 years, 20.6% were single and 6.5% were newlyweds. Further 122 (58.4%) households were living with between 2-5 people in the house, 59 (28.2%) were living with 6-10 people and 22 (10.5%) had single occupancy.

The researcher also looked at the length of stay by the households within the area. This was to support background information on the use of the wetland. 51.2% of the households noted to have lived within the wetland area for over 15 years, 16.7% for between 6-10 years, 13.4% for between 0-2 years, 12.9% for between 3-5 years and 5.7% for between 10-15 years. This is displayed in figure 3 below:



**Figure 3**

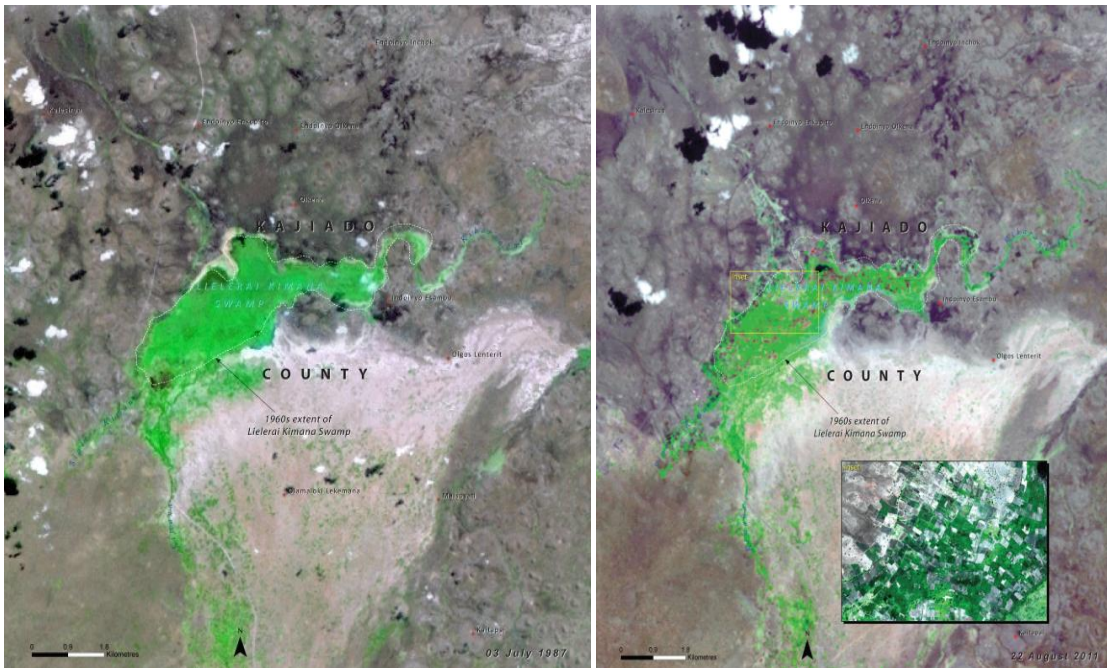
Some of the communities that were found within the wetland area aside from the Maasai were a mix of Kikuyu, Kamba, foreigners like Tanzanians, investors, and governmental institutions such as the KWS, hoteliers who had establishments such as the Amboseli Sopa Lodge, Serena Lodge and other lodges and camps.

#### **4.2.2 Changes in the wetland**

The Kimana Wetland was originally an extensive swamp area covering about 10.01km<sup>2</sup> (Okello and Kioko, 2011). The area was initially used for grazing and other activities such as fishing, domestic water services to the community, drinking areas for wildlife and papyrus harvesting. Later on as population increased and demands for food and settlement areas also increased, the swamp was converted to be more of agricultural land and urban settlements. With migration of communities to these areas crop farming at the wetland and its environs started in the early 1970s and steadily continued to rise notably. Studies indicate that in 1980, Kimana wetland ecosystem had a total area of 3,348.66 km<sup>2</sup> out of which farm/cropland had occupied 69.97 km<sup>2</sup>; settlement and urban areas, 2.08 km<sup>2</sup>; forestland, 62.27 km<sup>2</sup>; grassland, 2,555.71 km<sup>2</sup>; woodland, 58.93 km<sup>2</sup>; wetland/swamps, 492.66 km<sup>2</sup>; and other lands, 108.4 km<sup>2</sup> (Nyamasyo and Kihima, 2014).

This situation drastically changed and by 2013 farm/cropland occupied an area of 438.17 km<sup>2</sup>; settlement and urban areas, 16.26 km<sup>2</sup>; other lands, 303.47 km<sup>2</sup>; forestland, 32.65 km<sup>2</sup>; grassland, 2,349.13 km<sup>2</sup>; wetland, 153.05 km<sup>2</sup>; and woodland, 55.78 km<sup>2</sup> (Nyamasyo and Kihima, 2014). At the moment it is noted as the largest irrigated area within that ecosystem. These satellite images below provide a picture of the area as it was in 1987 and the status on 2011.





**Figure 4: Satellite images of Kimana wetland ecosystem in 1987 and 2011 (MEMR, 2012)**

Households were interviewed to seek their estimates on the original and the present size of the wetland. Their responses were as follows:

**Table 3: Estimated size of the wetland**

| Original Size    |            |              | Present Size     |            |              |
|------------------|------------|--------------|------------------|------------|--------------|
|                  |            | %            |                  |            | %            |
| Not aware        | 146        | 69.9         | Not aware        | 101        | 48.3         |
| Below 25 Acres   | 0          | 0.0          | Below 25acres    | 9          | 4.3          |
| 25-50 Acres      | 16         | 7.7          | 25-50 Acres      | 10         | 4.8          |
| 51-100 Acres     | 13         | 6.2          | 51-100 Acres     | 22         | 10.5         |
| 101-500 Acres    | 21         | 10.0         | 101-500 Acres    | 33         | 15.8         |
| 501-1000 Acres   | 5          | 2.4          | 501-1000 Acres   | 14         | 6.7          |
| Above 1000 Acres | 8          | 3.8          | Above 1000 Acres | 20         | 9.6          |
| <b>Total</b>     | <b>209</b> | <b>100.0</b> | <b>Total</b>     | <b>209</b> | <b>100.0</b> |

**1 Acre=0.00405km<sup>2</sup>**

146 households (69.9%) noted that they could not provide an estimate of the original size of the wetland and 101 (48.3%) could not estimate the present size of the wetland. Households estimated that the size of the wetland was larger as there was more agricultural land now available to them rather than that the wetland size had actually decreased due to this increase of agricultural activities. Further discussions with the Chairman of the Kimana Wetlands Association (KWA) gave views that the estimated size of the wetland area was originally about 10km<sup>2</sup> or thereabouts in range and this primarily consisted of the swamp and the springs and that now the current size was measuring in the range of 2.5-3km<sup>2</sup>. This last patch of uncultivated wetland area was the land formerly under the Kimana Community Wildlife Sanctuary (KCWS).

The major drivers that contributed to these drastic changes in the wetland area were attributed to increase in the population size which created demand for more land for human settlement and for food provision thereby intensifying the agricultural activities. Okello and Kioko, (2011) note that farmers expanded rain fed agriculture from the slopes of Mount Kilimanjaro onto the piedmont on the lower slopes and they grew the irrigated crops around the swamps and along the rivers. Field observations and interviews revealed that the lands within the area were fertile and also cheap to lease from the Maasai communities. This was seen as an alternate source of income and a direct economic benefit for the communities. It also encouraged agro-pastoralists. The most heavily cultivated side was the Imbirikani area where onions and tomatoes were cultivated for mainly commercial purposes as captured below in Figure 5:



**Figure 5: Farming in Imbirikani lands**

**Source: researcher, 2012**

The community seeks economic empowerment to grow the town into an urban area, also provide the resources to educate their children and improve their living standards. This is majorly achieved through agricultural production of tomatoes, onions and maize both for export to neighbouring countries such as Tanzania and Uganda and for local use especially in the counties of Nairobi, Mombasa and the Makindu areas. When the crops face attack from invasive species such as the *Solanium incanum* (common name is Thorn Apple) the farmers rely heavily on pesticides to deal with the invasive species but also it was noted that most of the farmers didn't practice sustainable agricultural practices within their lands such as crop rotation thereby causing them to plough deeper into the wetland when their lands dried up due to over reliance on fertilisers and chemicals. The runoff from this contaminates the water at the Isinet River flowing into the wetland (Okello and Kioko, 2011).

When this was not sufficient there were massive water abstractions from the wetland area for large scale flood irrigation of the farms in the area. Figures 6 (a & b) below are images of fuel powered water pumps used for the abstractions. This is why the water resources management authority went on the ground to try and issue permits to the land owners and users to control the use of the wetland. However, this was carried out arbitrarily on a first come first served basis by the authority which heightened conflicts between the communities on the use of the water. The

communities also failed to understand why a foreign organization was attempting to curtail their access to the wetland by introducing permits to pay for water which they considered a free resource.

Other changes to the wetland are the contamination of the water from fuel spillages caused by the heavy duty water pumps abstracting water for flood irrigation to the large scale farms. These pumps are noted in figures 6 (a & b) below. Aside from the above other causes leading to the change in size of the wetland were noted. These were attributed to the degradation of the unprotected springs, occurrence of droughts noting that the area was semi-arid and bimodal rainfall patterns, deforestation, population increase, land subdivisions, poor management practices, construction of roads and buildings, encroachment by illegal car washes, high illiteracy levels on the importance of the wetland and sustainable use of the same.



**Source: researcher, 2012**

**Figure 6 a & b: Fuel powered water pumps at Isinet River**

The households also were aware that the area was within a wildlife zone as they were constantly in conflict with wildlife. The wildlife would raid their farms and destroy their crops as well as kill their wildlife or the community would go grazing within the protected parks and therefore encounter wildlife that would attack their livestock as well as them. Others who were not within the wildlife dispersal areas rarely interacted with wildlife. Some of the wildlife that was within

the area was migratory herds of wildebeests, elephants, zebras, hippos and lions. These were spotted during the wet season across the bush lands and pastures concentrating in the basin woodlands and swamps. Some of the major conflicts highlighted as causes of human-wildlife conflicts were noted as and displayed in table 4 below:

**Table 4: Reasons for human-wildlife conflicts**

| <b>Reasons for human-wildlife conflicts</b>                 | <b>Number</b> | <b>%</b>     |
|---|---------------|--------------|
| Destroying crops and attacking domestic animals by wildlife | 160           | 77.6         |
| Wildlife attack people                                      | 7             | 3.3          |
| Insufficient pasture  | 38            | 18.1         |
| Limited space for animals                                   | 4             | 1.9          |
| <b>Total</b>  | <b>209</b>    | <b>100.0</b> |

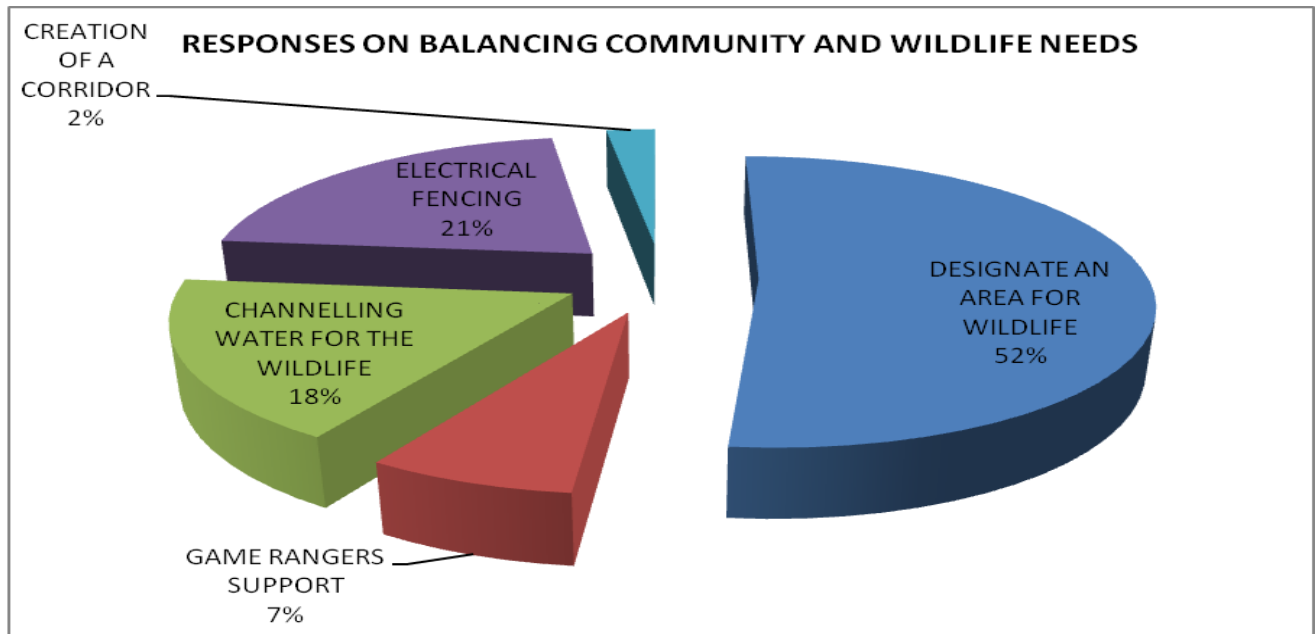
Kenya Wildlife Service as stakeholders in the area has developed an Amboseli Ecosystem Management Plan, 2008-2018. The plan notes that among the major threats to the Amboseli Ecosystem are farming, land sub-divisions, unplanned tourism housing and settlements. KWS as custodians of the ecosystem also note that the area has wildlife, is used for various cultural rites and also tourism and research amongst other things. The plan notes that there are conflicting impacts from the encroachments on the system by the threats and this had lead to conflicts between human to human and human to wildlife. Thus the plan seeks to coordinate the issues of agriculture, conservation, pastoralist, tourism by zoning off the Amboseli Ecosystem so as to reduce issues of conflicts within the area.

As noted, Kimana receives bimodal rainfall varying from 350 and 500 mm annually (Campbell *et al.*, 2003; Okello, 2005). Previously these rains were always anticipated in the months of March-April for the short rains and long rains around the months of November-December. The main source of water for humans, Maasai livestock and wildlife came from Mt. Kilimanjaro in Tanzania where rainfall was over 800mm annually (Campbell *et al.*, 2003). Further consultations from the Kenya Metrological Department revealed that most of the weather substations in the area

were closed as there was no funding for maintaining the said stations and thus obtaining current weather patterns from the area was a challenge.

The area being semi-arid experienced times of drought with food shortages, destruction of crops by harsh weather conditions, low pastures causing communities to venture into wildlife areas increasing human-wildlife conflicts. Discussions with the households on what were their suggestions on dealing with some of these conflicts was to have designated areas for the wildlife, agriculture and other activities, restoration of the electric fence, support for the game rangers, clear definition of the wildlife migratory corridor and establishment of mechanisms for channelling water for the wildlife such as releasing water to flow downstream to cater for the wildlife watering needs and constructions of watering pans and troughs for the wildlife during the dry seasons.

Aside from the above, other proposed measures were afforestation, the introduction of strict penalties and restrictions on tree cutting, intensification of awareness campaigns on the sustainable use of the wetland, encouragement of active participatory management by the community, stopping of wetland cultivation (though this was only perceived to be a last resort), employment and equipping of game rangers at the Kimana Wildlife Sanctuary to curb tree cutting, arresting charcoal burners, fencing off the wetland to preserve it and control farming, forest protection, introduction of measures to prevent soil erosion by planting cover crops and construction of gabions, introducing reserves and roof catchment incentives and mechanisms to reduce the over reliance by the community of the wetland water and other resources and mass education campaigns on awareness for wetland preservation and management.



**Figure 7**

Stakeholder interviews with the head game ranger at the Kimana Wildlife Sanctuary and the Commanding Warden at the Kenya Wildlife Service office noted that they had also tried to educate the members of the community as well as sensitize them on the importance of the wetland area. They had also implemented such measures as erecting a live fence around the Amboseli Ecosystem to keep the wildlife contained as well as keep the community safe but the same community members vandalised and destroyed the fence and stole the wires to use the same as hanging lines for clothes and other household uses. They had tried to separate the people from the wildlife by building watering holes for the wildlife to access mostly during the dry seasons but the community still encroached into these areas to give water to their livestock. So there was and still is a lot of interference by the community.

The rangers also noted that they lacked the capacity to patrol and manage these areas and the community if any gave very little monetary support to enable them do their work. Community members were not supportive of the initiatives as they never benefitted from the proceeds of wildlife and only suffered loss as a result of the destruction and lack of compensation for the destruction. However, KWS noted that they had ploughed back to the community in trying to sensitize members on the importance of wildlife and the need for the wildlife corridors. They

further assisted the community by building schools to further basic education and educated the communities on the importance of wildlife to the area to draw tourists and provide employment.

#### 4.2.3 Ownership of the wetland and its environs

Land ownership is a major contributing factor to the management and use of wetlands. Ownership is defined as having title to the land or having rights to the land due to ancestral ties. Land ownership in the area was administered by the Maasai community as well as the Kajiado County Council as they were then. Later there was a call to have more structured land ownership formula within the area and this later lead to the formulation of the group ranches which were self contained. Talks with the local leaders noted that disputes arose due to droughts and lack of water resources leading to the infightings within the group ranches.

Within the group ranches there was further subdivision of the areas into individual plots and the government gave letters of allotment and titles to the new owners. With these documents in hand the community could then deal with the land as they so wished. However, members of the community surrounding the wetland and its environs felt that the same was communally owned. Others thought that the government also owned part of the wetland through various governmental institutions such as the KWS, NEMA and local administration. Through interviewing the households, they were able to give information on the ownership aspect of the land coming from the historical aspects of inheriting the land from their forefathers, to being seasonal rental farmers or new owners due to purchase. Some of the information is captured in table 5 below:

**Table 5: Land ownership at Kimana**

| <b>Land ownership</b> |               |              |
|-----------------------|---------------|--------------|
| <b>Own land</b>       | <b>Number</b> | <b>%</b>     |
| Those who own         | 136           | 65.1         |
| Those who do not      | 73            | 34.9         |
| <b>Total</b>          | <b>209</b>    | <b>100.0</b> |

Actual land owners contributed to the management of the wetland with 25% advocating for afforestation and 49% contributing money and labour to ensure the wetland was taken care of.



About 45.9% of the households noted that they were only farm owners/overseers whilst 51.7% were purely rent farmers who planted, harvested and left the area after expiry of their crop planting year. These members were not participants in wetlands management. Permanent land owners had also permanent housing in the area.

**Table 6: House ownership at Kimana**

| <b>House Ownership</b> |               |              |
|------------------------|---------------|--------------|
| <b>Ownership</b>       | <b>Number</b> | <b>%</b>     |
| Own House              | 171           | 81.8         |
| Rent House             | 38            | 18.2         |
| <b>Total</b>           | <b>209</b>    | <b>100.0</b> |

Land is owned under three regimes in Kenya as provided by the Constitution. This is under public, private and community regime. Therefore when wetlands occur on public or community land the government can be able to secure the same and protect it. However, this is not so in cases where wetlands occur on what is considered private land. Private land as per Article 64 of the Constitution is land that is registered and held by any person under freehold tenure, leasehold tenure or any other land declared private under an Act of Parliament. The government as noted earlier classifies wetlands as areas that should be managed by the National Government administered on its behalf by the NLC. This is as per Article 62 (3) of the Constitution.

The Kimana wetland is a critical wildlife dispersal area for the Tsavo and Amboseli National Parks. The Constitution thus has empowered the Government to have a right over this land. The same can be declared a protected wetland area and massive wetland restoration initiatives commenced to gain back the wetland. There is need for proper land mapping of wetland areas to identify where these critical areas are located and under what ownership regimes.

#### **4.2.4 Management at Kimana Wetland**

Questions were posed to the households on the management of the wetland. 45% of the married households reported that family decisions were made by the husband, 32.1% noted that both the husband and wife made the decision whilst 23.0% noted that they made the decisions personally

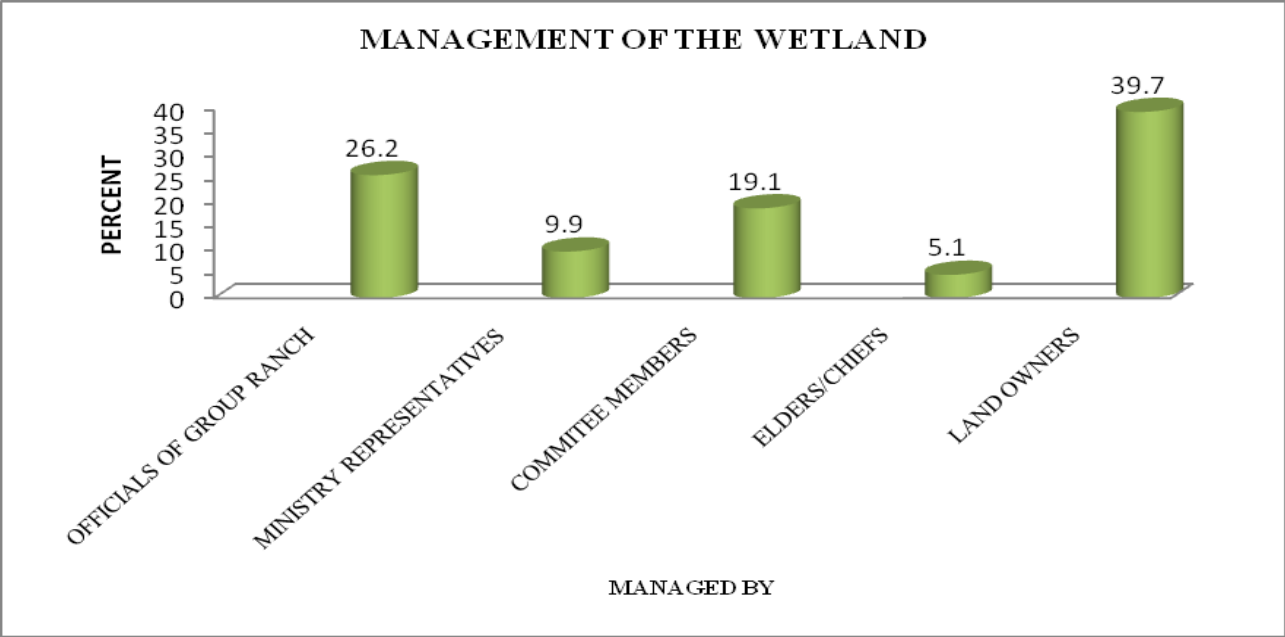
(these were mainly the single, widowed and the separated). Further their education, employment and income level information was important to ascertain how they participate in the management decisions in the area. 37% had attained primary level, 35% had informal education; 23% had secondary education and 6% had tertiary education. The Chairman of the Kimana Wetlands Association as well as other stakeholders noted that the low numbers in the level of education was one of the key reasons that the community found it difficult in participating in management issues.

In terms of employment, nearly 89% of the households were not employed and only about 11% were employed. Of the employed 2.4% were teachers, 3.3% were industrial workers, 3.8% were farm workers and 1.0% were casual and organization staff workers. On the income levels, 20 (9.6%) households earned a salary of below Kshs. 10,000/= and only one member of a household earned a salary of over Kshs. 20,000/= as at the time of the interview. Interestingly, majority of the households with an income did not contribute any monies to support the management of the wetland but they noted to pay for the use of the water in their farms to the chairman of the springs and some on occasion gave back to the community by participating in the construction of the perimeter walls to protect the springs.

The non-employed community members majorly relied on the agricultural activities to gain economic empowerment. As cultivators, most of them had low levels of education and they aggressively tilled the land in the belief that the area would never dry up. Of the sampled cultivators, 86.5% noted that they gained financially whilst 13.5% noted that they didn't gain from the activities on the wetland. Of those who were gaining financially, 77.5% benefitted from the growth and sale of farm produce mostly being onions and tomatoes, 6.2% benefited from water sales to those who weren't able to reach the water and 2.5% got income from renting out the land to investors. Of those who didn't receive any financial benefits, 3.8% stated that they were not owners of the land and 1.9% highlighted the lack of sufficient water supply. To elaborate more on their monthly financial benefits; 52.6% noted an income of over Kshs. 6,000/= (mainly from the farming activities on the wetland and its environs), 24.9% earned between Kshs. 1,500-2,500/= still from farming and other activities such as papyrus harvesting, 12.0% earned between Kshs. 2,600-4,000/= and 10.5% earned between Kshs. 4,100-6,000/=.

From the sampled households noted that this revenue was budgeted as follows: 25.8% budgeted for school fees, 16.7% budgeted for farming, 16.7% for school fees and farming and 40.7% on school fees, conservation fees for the wetland and farming. Support for wetland conservation and restoration activities was still minimal. On management, the study looked at the community member's and stakeholder's roles. The information was to evaluate what regimes are there, what roles they have in the management of the same, why if any they don't participate in the management and what they opine should happen.

Land ownership affected how the households participated in the management of the wetland. Of the sampled, 26.2% noted that land owned by officials of group ranches had long been plagued with many bureaucratic processes thereby being a major contributor to poor management. Others at 6.2% noted that the government managed areas with governmental institutions such as KWS, law enforcement and the KCWS, 4.3% were not aware of who manages the wetland, 1.4% noted collaborative management efforts between the community and government, 0.5% noted that the KWA managed it and 1.0% noted its managed by donors or investors.



**Figure 8: Management regimes at the wetland**

These varied management regimes each independent of the other only heighten the conflicts within the wetland area affecting all the stakeholders. Rental farmers who tallied at 33.0% were the least concerned with the issues of management as they were only there for temporary seasons to plant, harvest and leave. To them the owners they had rented from were the ones who should concern themselves with the management and other issues. Further, from the sampled households 67.0% of them opined that they contributed to management through monetary donation, labour and maintenance of gabions, pipes, attendance of organized meetings, awareness campaigns for conservation of wetland, tree planting and preservation of the water source.

**Table 7: Community contribution to wetland management**

| <b>Form of contribution</b>                   | <b>Number</b> | <b>%</b> |
|---|---------------|----------|
| Preservation of water source                  | 17            | 8.1      |
| Creating awareness on conservation of wetland | 26            | 12.4     |
| Afforestation                                 | 25            | 12.0     |
| Contribute money for support and labour       | 49            | 23.4     |
| Participating in meetings                     | 33            | 15.8     |

The community highlighted some of the challenges which were inhibitors to their participation in management. Firstly, distance from the wetland area was noted as an inhibitor to participatory management by the community. Of the sampled households, 67.0% noted they lived within the wetland area while 33.0% lived far from wetland area.

**Table 8: Households distance from the wetland**

| <b>Households distance</b> | <b>Number</b> | <b>%</b> |
|----------------------------|---------------|----------|
| Within the wetland         | 140           | 67.0     |
| Not within the wetland     | 69            | 33.0     |

Further, the households gave estimates of distance from the wetland as represented below:

| <b>Distance in KM</b> | <b>F</b>   | <b>%</b>     |
|-----------------------|------------|--------------|
| 0-0.5                 | 23         | 11.0         |
| 0.6-5                 | 127        | 60.8         |
| 5.1-10                | 40         | 19.1         |
| 10.1-25               | 14         | 6.7          |
| Over 50               | 3          | 1.4          |
| Don't know            | 2          | 1.0          |
| <b>Total</b>          | <b>209</b> | <b>100.0</b> |

**Table 9: Estimated distance from the wetland**

The households who had to travel long distances did not see the need to actively participate in management. They further noted that since they were away from the wetland they also did not gain from it and so why participate in any activities involving the same. Lastly, these distances meant that by the time they would want to reach meetings and forums they would have to transverse areas where they would face dangers from wildlife and other attacks.

Other reasons by the members of the households for their lack of participation in the management of the wetland was that they didn't have time or that they had elected officials to deal with those issues and thus they didn't see the need to commit themselves and others noted that the management was done by the government, ministry representatives, elders and donors. The then District Warden in Charge of the KWS, the District Officer, the Spring Chairman, the Chairman of KWA and the Chairman of NCBO were interviewed. The District Warden, Mr. David Mukobi noted that KWS's role in management of the wetland area was through community mobilisation and sensitization on the importance of the wetland as an area that is important for water supply to the wildlife community and thus sustaining the wildlife community and tourist activities.

The sensitization was also supported by the African Wildlife Foundation (AWF). They also engaged the community in conservation measures such as tree planting, fencing off of the wildlife areas and provision of necessary watering points for wildlife as informed by the Wildlife Act. As this area is part of the larger Amboseli National Park, he noted that a major problem was with animal control (both from wildlife which ventured into the farms and domesticated animals such as cattle and goats which also ventured into the park areas). With the increase of population and increased agricultural activities in the area, there was increasing expansion of urban development and pollution by the community into the park and its environs.

Further on sensitization they alerted members of what were the wildlife areas, that wildlife always have a right of way, the need to stay off the wildlife corridors, afforestation efforts, enlightening the community on the need to conserve the area due to the benefits which are derived from such conservation like bursaries for the children and assistance in emergency cases and construction of water troughs for the wildlife as secondary points during the dry season. He highlighted the need for a all encompassing management plan considering the needs of the community users consolidating the different interests of the users and emphasized that the plan could also be utilised to source for financial assistance to enable the community members to obtain money to implement various activities.

He also advocated that the farmers need to be removed from the wetland and the area restored. This is where the government should come in and move the people to other areas. The people should also be encouraged to do rain water harvesting into dams and community members encouraged to do the same to enable them have water even in the dry seasons. He proposed that other stakeholders such as banks and other institutions in the area should do corporate social responsibility to enable them support the conservation efforts in the area. The Member of Parliament of the area should also be at the fore front in encouraging his constituents on the importance of conserving the area.

The District Officer, Mr. Edwin Kongo Kuria at the time of the interview noted that his office was guided in looking at the riparian rights of the users to ensure that no one user was infringing on the rights of the other user. He noted that with the assistance and collaboration of the District

Forest Officer, they monitor the cutting of trees in the area which helps to protect and rehabilitate the various springs in the area. Through his office they had established collaborative efforts between the community members besides fostering partnerships for better spring protection which led to sustainable management of the wetland and its environs. These activities he noted were informed by EMCA and the Wetland Regulations, amongst other laws. He noted that once the Wetlands Policy and the National Environment Policy were finalized, the office would assist in the decentralization of the same. He noted that any activity towards restoration of the wetland required community participation for them to own the project.

The Spring Chairman of the Tikondo Spring at the time of the interview, Mr. Noah Saatia, revealed members of the Kimana Group Ranch (KGR) benefit from the spring. He noted that he was responsible for ensuring that the members had water for use in their farms and at home. He explained that the KGR had three (3) main furrows A, B and C which were constructed to distribute water from the springs to all the 470 members of the Ranch. He noted that members gave money, time and laboured in the construction of the furrows and thus in their own way did contribute to wetlands management.

Each of the furrows A, B and C had a chairman and they met every 1<sup>st</sup> Thursday of the month to discuss matters dealing with the furrow management. The 3 chairmen also rotated as the main spring chairman to allow for equal and fair management. His role in management involved collecting payments from the members for the use of the water in their farms and homes. This use was monitored by use of a rota system for all members to benefit. He noted that they only channelled a portion of the water and the rest flowed through natural channels to feed back to the Kimana Wetland. This provided a partial management framework for the Tikondo spring.

NEMA's Wetlands Officer, Mr. Bernard Opa affirmed that sustainable wetland use and management are guided by the principles of Wise Use as per Article 3 of the Ramsar Convention. However, he noted the concerns that the sectoral management of natural resources such as wetlands has led to the degradation of these ecosystems and lack of accountability led to mismanagement of the wetland. He further indicated that there was a Technical Advisory Committee in place involving various key stakeholders who sought to harmonise sectoral disputes

involving wetlands. It wasn't clear if this committee consisted of community members and stakeholders within the wetlands as they would be the ones affected by the resolutions of the committee.

The Constitution of Kenya 2010 provides at Article 69 (2) each person has a duty to cooperate with state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and the use of natural resources and further the Preamble of the Constitution gives the rights to the public. The environmental policies also give strength to public participation. The community should be educated on their rights to participate in activities and formulation of plans that will affect their areas and also on the importance of ensuring sustainable use and management of the ecosystem.

He reiterated that for effective wetland management there was great need to have a national wetlands management policy and in the interim have management plans in place to ensure efficient and sustainable use and management of the wetlands. He gave examples of the Lake Victoria, Lake Naivasha and now Lake Jipe management plans. It should be noted that although Kimana had an Integrated Wetlands Management Plan for 2008-2013, there was lack of sufficient resources or infrastructure to implement the same. There was no sensitization of the communities on EMCA and the wetlands regulations or forums by the stakeholders to discuss sustainable management of the wetland. The community and other stakeholders were requested for views on a proposed management formula. This is as shown in Table 10.

**Table 10: Members' proposal for the management of Kimana Wetland**

| <b>Members' proposals on management</b> | <b>Number</b> | <b>%</b> |
|---|---------------|----------|
| Community                               | 167           | 79.9     |
| Government                              | 26            | 12.4     |
| Community and government                | 8             | 3.8      |
| Individuals                             | 1             | 0.5      |
| Other-donor                             | 6             | 2.9      |
| I dont know                             | 1             | 0.5      |



|              |            |              |
|--------------|------------|--------------|
| <b>Total</b> | <b>209</b> | <b>100.0</b> |
|--------------|------------|--------------|



**Figure 9: Reasons for proposed management scheme for Kimana**

The community opined that with increased community management there would be closer supervision. They noted as farmers they gained the most from the wetland and thus they would ensure sustainable management and use of the same. There was a 12.4% margin proposal that the government should be in charge thus providing a guarantee of equal distribution and access to all. This is premised from the notion that under the group ranches officials' management there were conflicts and bias which led to poor management of the wetland. 7.2% further support government management on the basis that the government had adequate funds and facilities.

2.9% proposed collaborative government and community management as government provides facilities and funds while community provides support to ensure the wetland properly conserved (this being the participatory management by all the stakeholders) and 0.5% proposed privatization of the wetland which will ensure the land is effectively preserved for purely conservation purposes. Participatory Wetland Management involves all the stakeholders participation and decentralised management all sheltered under a harmonised system.

At Kimana the community is trying to manage and preserve the wetland by protecting certain springs to ensure sustainability of the wetland. The following photos show parts of protective walls built by the community members, KWA and the NCBO in protecting some of the springs that flow into the wetland. The photos indicate the robust life within the protected spring therefore not only being able to provide for the communities but also perform its other functions.



**Figure 10: Protective perimeter walls within Tikondo spring.**

The following pictures show the biodiversity within the protected spring ecosystems.



**Figure 11 (a & b): showing the researcher at the Kimana Wildlife Sanctuary and the other showing the Tikondo spring protected by KWA.**



**Figure 12: Mr. Kosei-Chairman of the Kimana Wetlands Association at the protected spring.**

However in contrast, those springs that are not protected suffer degradation and destruction of the spring eyelets and the environs they are in soon dry up. Figure 20 (a & b) are images of unprotected spring and wetland area.



**Figure 13: Images at the unprotected springs and wetland area.**

These efforts by the community and local non-state actors such as NCBO and KWA should be encouraged and supported. Lastly on the issue of use of the wetland, the households were sampled to ascertain if any of them paid for the use and services from the wetland. 59.8% noted that they didn't pay for the same while 40.2% paid for the same. From the 40.2%; 25.0% of the households

stated that they pay annually for use of the water, land rents, labour wages and maintenance fees. Those who did not pay state that the land was ancestral and thus there was no need for payment. 48.2% noted their employers owned the land and thus they didn't have membership to pay for the resource and 26.8% noted that since the wetland is community land there was nobody to ask them for the money.

#### **4.2.5: Summary discussions**

From the discussions, interviews and interactions with the community members indicates that most of the members are not aware that their use of the wetland is causing the same to be destroyed, drained and hence drying it. The members are also not aware of the laws, policies and institutional frameworks within the area. There is need for decentralization of the education and awareness of the importance of the wetland and its role in the community. This can be done through collaborative measures with County Environment Officers, KWS, NEMA, WARMA and the community associations such as KWA and NCBO. The National Lands Commission which has been mandated to reclaim all public land that has been grabbed should liaise also with NEMA in cases where wetlands are involved. They can push to reclaim wetlands and bring them under the protection of the county and national government and also seek to safe guard them as protected wetlands. The commission can also recommend national and county land use plans for such areas. Only if these members come together and have talks with the members will the wetland be saved.

It is noted that the sectoral management of the wetland is causing more harm than good to the area. There have been several talks on the merging of all these sectoral laws, policies and institutional frameworks but there has need been the actual meeting of the minds on the same. The sectoral players, government agencies, community organizations, representations from the community who are the users of the area and interested parties should have a meeting of the mind to deal with the issues of the wetlands. Meetings and forums can be organized on site to enable a site visit of the area and also get suggestions from the ground. Farmers and other stakeholders have noted that indeed the wetland is drying up and some see the need to have mitigation measures in place to have the wetland area improved.

These suggestions can be implemented with incentives granted to the community for innovative conservation and sustainable use of the wetland. Members need to foster unions that encourage all stakeholders to achieve equal social status between conservation and empowerment. Government support needs to be felt and implemented. Political backing in matters environment, learning from best practices as well as looking at the technological advances to reduce the threats and challenges faced by these resources. Increase in educational institutions as well as employment opportunities should be boosted to encourage the community reduce reliance on the wetland. Thereafter restorative measures on the wetland can begin. There is need to revive and support the wildlife sanctuary as well as financially support associations within the area such as KWA and NCBO so that they can be action-oriented in the restoration of the wetland area and community sensitization. There is need for finally clear institutional frameworks need to be established to know the chain of events in the management of the wetland.

## **CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

Wetlands ecosystems are at the heart of sustainable development as they are a critical natural resource upon which socio-economic and environmental activities depend. There is need to advocate for change in the sectoral management of these areas towards a consolidated policy, legal and institutional framework that encourages sustainable use and management of the natural resources. Wetlands are one of these resources. Only then will Kenya be in a position to accomplish the mission of the Ramsar Convention for the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world.

There is urgent need to engage the community of wetland users such as Kimana and propose alternative livelihoods to agriculture. Through restorative efforts, the community can reduce cultivations and allow the wetland area to rejuvenate. They could gain from previous activities of papyrus harvesting, tourism and fishing. The arm of the law should be felt by those who endanger these areas by encroaching into wetlands and carrying out unsustainable activities. At the management levels the communities and interested parties can be encouraged to attend forums and give feedback on management plans. Further they should be educated on the need to participate in management through the village units and other forums as once they own the process then implementation of action plans by the communities will not be met with resistance.

They need to see the gains of their participation as well as receive benefits. Once the wetlands policy is passed there is need for dissemination of the same to the wetlands users and carry out active educational drives to sensitize the public on the policy and legislations. County Environmental Officers as well as area chiefs and local administration can hold barazas for the communities to interact with each other and ask questions and for more understanding of the documents. Active participation will ensure that the community feels that their views have been taken into consideration and they will also appreciate the environment more and the need for sustainability.

## 5.2 Recommendations

This paper has shown that sectoral management of natural resources has led to misuse, mismanagement and degradation of these resources and especially wetlands. Thus the study recommends:

a) Mainstreaming the issues of sectoral management of wetlands. Harmonization of the sectoral policies, laws and institutional framework should be spearheaded. A proposed Wetlands Steering Committee can be established as part of the institutional framework, EMCA can provide the legal framework and the National Environmental Policy can be the guiding policy. This Committee will deliberate on all matters concerning wetlands bringing together all stakeholders in wetlands. They would then come up with National Wetlands Management Plan which would provide a general guideline for wetlands management. Borrowing from our Ugandan counterparts we can then have a Wetlands Inspection Division which will be decentralised to Regional Technical Support Units, further to District Units headed by Wetlands Officers who develop District Wetlands Action Plans and lastly the Sub-counties units that implement the Community Based Wetland Management Plans.

In these units the communities who are the ultimate users of the wetland areas will embrace the need for active participation in management of the wetlands, will also use the wetlands for activities that ensure its sustainability and will also gain from educational drives, talks at local market days and gatherings of chiefs and other forums on the importance of sustainable use and management of the wetland.

b) The urgent need to map, zone and plan for wetlands. Without knowledge of the wetlands in the country, their location, characteristic, which land regimes affect them, their size etc it is indeed difficult to attain sustainable use and management of wetlands. Time has come to action a National Wetlands Inventory to finally give recognition to these critical environments. The inventory can indicate the wetland size, its functions and ecological aspects, where it is located, the uses of the wetland, management and institutional frameworks surrounding the wetland, economic value of the wetland amongst other themes. Research should be supported to ascertain

what other functions the wetlands can perform and thus attract funding for projects. This will have the ripple effects of having training opportunities, employment opportunities for the communities within the research areas, growth of education institutions amongst other benefits.

c) Active and aggressive community based participation in management of wetlands. The communities can be taken through training and sensitization forums for them to understand what their role in the management of wetlands and also get educated on alternative measures to ensure that there is sustainable management and use in the area and integration between all the relevant stakeholders and actors in the wetlands sector from the Country Governments to National government to local institutions and the everyday users.

### **5.3: Future areas of study**

There is need to carry out demand-driven critical research in wetlands to determine their capacity to perform their various functions as well as other functions for sustainable management. For example, Kenya is yet to explore the capacity of its wetlands to act as carbon sinks. Such research can assist in scientific and adequate information on the capacity of wetlands to control carbon and thus effects of climate change. This can be carried out as pilot projects on some wetlands. An economic valuation of wetlands can be done to note the goods and services of wetlands in the country to assist policy makers and stakeholders in decision making and raise awareness on the importance and the value of these areas.



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## APPENDICES

### .1 Nema Data Form

|   | Wetland Name | Year of designation | Surface area (Ha) | Key biodiversity element  | Ramsar site number | Coordinates         |
|---|--------------|---------------------|-------------------|---|--------------------|---------------------|
| 1 | L. Nakuru    | 05/06/1990          | 18,800            | Provides support to some globally of the endangered mammal species such as the black rhino and the hippo, as well as regionally endangered bird species like the African Darter ( <i>Anhinga rufa</i> ), Great Egret, the range-restricted Grey-crested Helmet-shrike, the Lesser kestrel and the Madagascar pond heron | 476                | 00°24'S<br>036°05'E |
| 2 | L. Naivasha  | 10/04/1995          | 30,000 -          | Provides foraging and breeding ground for many resident and migrant bird species, including more than 350 species of waterbirds, with 1% of the world population of <i>Fulica cristata</i> and other mammals  | 724                | 00°46'S<br>036°22'E |
| 3 | L. Bogoria   | 27/08/2001          | 10,700            | A national reserve;<br>- A critical refuge for the lesser flamingo ( <i>Phoenicopterus minor</i> )<br>- A habitat for the endangered Greater Kudu ( <i>Tragelaphus strepsiceros</i> ) and other mammals   | 1097               | 00°15'N<br>036°05'E |
| 4 | L. Baringo   | 10/01/2002          | 31,469 -          | The tilapia <i>Oreochromis niloticus baringoensis</i> is endemic<br>- Hippopotomus, crocodiles,   | 1159               | 00°32'N<br>036°05'E |

|   |                   |            |          |  |      |                     |
|---|-------------------|------------|----------|--|------|---------------------|
|   |                   |            |          | -A habitat for over 500 bird species   |      |                     |
| 5 | L.<br>Elementaita | 05/09/2005 | 10,880 - | It provides a favourable environment for diatoms and the blue-green alga<br>Spirulina platensis<br>- Habitat to many (over 80) waterfowl species | 1498 | 00°46'S<br>036°23'E |

**Source: National Environment Management Authority, 2011**

## Questionnaire

### RESEARCH QUESTIONNAIRE

#### **RESEARCH TOPIC: POLICY IMPLICATIONS IN THE MANAGEMENT OF KIMANA WETLANDS IN OLOITOKTOK DISTRICT, OF KAJIADO COUNTY, KENYA.**

My name is Christine Njagi. I am a student at the University of Nairobi pursuing a Master's degree in Environmental Policy. This questionnaire is designed to gather information in regards to the use and management of the Kimana wetland and other community views. This research is for purely academic purposes (a Masters of Arts Thesis), it is anonymous and should take no longer than 15 minutes to complete. You are free to stop at any point. Kindly note that all the information provided will be confidential.

Name: \_\_\_\_\_

Contact phone NO: \_\_\_\_\_

### PART A

#### SOCIAL DEMOGRAPHIC INFORMATION

1) Gender  male  female

2) Age brackets:

15-20  20-35  35-50  over 50 years

3) Marital status

a. single      b. married      c. cohabiting      d. separated

4) Do you have children      Yes      No

a. How many children      2      4      6      over 10

5) Do you live in your own house or you rent?



6) How many people live in the same house?

- a. 5                                      b.10                                      c. 15                                      d. over  
15

7) Who makes the family decisions?

- a. My Husband                      b. My wife                      c. We both do                      d. I do

8) What is your educational background:

- a. Primary                      b. Secondary                      c. Tertiary                      d.  
Informal

### **SOCIO-ECONOMIC INFORMATION**

1) Are you employed?                      Yes                                      No

a. If yes, as who and where?

b. If yes also, do you live within the wetland area or far from the wetland?

c. If no, do you live within the wetland area or how far from the wetland?

2) If employed, how much are you paid?

- a. Below 5000    b. 5000-10000                      c.10000-20000                      d. over 20000

3) What else do you do for a living? I am a:

- a. Farmer                      b. Pastoralist                      c. Agro-pastoralist                      d.  
Businessperson

4) How much income do you receive from this activity?

- a. 1500-2500    b. 2500-4000                      c. 4000-6000                      d. over 6000

5) How is the income earned budgeted?

- a. School fees  
b. Conservation and management of the wetland  
c. Recreation  
d. Farming and pastoralist activities  
e. Other (please expound)

6) Who is in charge of the finances in the house?

- a. My Husband                      b. My wife                      c. We both are                      d. Myself

**PART B**

i. How long have you lived within the Kimana wetland?

- 2years                       5years                       10years                       over 15years

ii. Do you know the original size or can you estimate the original size of the wetlands and the size now?

- a. Much smaller                      b. Smaller                      c. Same size                      d. Bigger                      e. I don't know

Kindly explain your answer to the above.

iii. Where does the Kimana wetland get its water from?

iv. Who are the users of the Kimana wetland?

- a. the community                      b. Wildlife                      c. Others                      d. I don't know

b. kindly expound on the others

v. Who owns the Kimana wetlands? Expound

- a. The community                      b. The Government                      c. Private                      d. I don't know

vi. Kimana's original use was?

vii. How is the Kimana Wetland used?

- a. Agriculture
- b. recreation (Wildlife sanctuary)
- c. water source
- d. Other

Expound

b. How would you rate this current use of the wetland? Expound.

- i. Very good.
- ii. Good
- iii. Bad
- iv. Very bad

viii. Kindly approximate how far the wetland is from your home.

ix. What do you use the wetland for?

x. Do you benefit financially from this use of the wetland? Yes No

a. If yes, expound?

b. If no, expound?

xi. Do you own the land that you live in? Yes No

a. If Yes, you do as:

b. If No, who is the owner of the land?

For how long have you lived in this land and what do you use the land for?

xii. Do you pay for use of the wetlands? Yes No

a. If yes, how do you pay and what amount?

b. If no, expound.

- xiii.** How are the rainfall and weather patterns within the wetland?  
 a. Very good                      b. Good                      c. Fairly good                      d. Poor
- xiv.** Has this always been the case?              Yes                      no  
 a. If yes, expound  
 b. If no expound
- xv.** What has brought about the change in the rainfall and weather patterns?
- xvi.** Has this change been gradual or swift and why?
- xvii.** Are there any conservation measures in effect for the wetland?              Yes                      No  
 a. If yes, what measures are there?  
 b. If no, expound.
- xviii.** Do you participate in the conservation of the wetland?              Yes                      No  
 a. If yes, expound  
 b. If no, expound
- xix.** Are there any restoration measures in effect for the wetland?    Yes  
 No  
 a. If yes, what measures are there?  
 b. If no, expound.
- xx.** Do you participate in the restoration of the wetland?    Yes                      No  
 a. If yes, expound  
 b. If no, expound

- xxi.** Are there wildlife within the area? Yes No
- a. If yes, which wildlife?
  - b. If no, expound
  - c. If there is wildlife in the area, how does the community interact with the wildlife?
  - d. How does the community balance the use for the wetland between them and the wildlife?
- xxii.** Who manages the Kimana wetland?
- a. The Community      b. The Government      c. Other      d. I don't know
- (You can pick more than one)
- b. Kindly expound on your answer.
  - c. If you picked more than one, how do these institutions coordinate to ensure balanced management?
  - d. Are there any bylaws, laws or local rules and beliefs that govern the management of the wetland? Yes No.
  - e. Kindly expound on your answer.
  - f. Are you aware of any government laws and policies that deal with wetlands? Yes No.
  - i. If Yes, which ones do you know of?
  - ii. What you have mentioned above, how is this enforced within the wetland and by who?

**iii.** How have these helped or not helped at Kimana

**g.** Do you know if the wetland has a management plan? Yes                      No.                      Kindly  
expound.

**xxiii.** Do you contribute in any way to the management of the Kimana wetland?                      Yes  
No

**a.** If Yes, how do you contribute?

**b.** If No, expound?

**xxiv.** How would you propose that the Kimana wetland be managed?

**a.** The Community                      **b.** The Government                      **c.** Other                      **d.** I  
don't know

**b.** Kindly expound on your answer.

**I appreciate the time and input that you have provided.**

## Interview Schedule

### INTERVIEW SCHEDULE

#### I. Opening

A. My name is Christine Njagi and I am a student at the University of Nairobi. Currently I am pursuing a Masters Degree in Environmental Policy. My research topic is on: **POLICY IMPLICATIONS IN THE MANAGEMENT OF KIMANA WETLAND IN OLOITOKTOK DISTRICT OF KAJIADO COUNTY, KENYA.**

In this regards it ought it would be a good idea to interview you, so that I can gather information on the use, management, conservation and restoration measures of the Kimana Wetland and your views on the policy, legal and institutional frameworks of wetlands management to assist in my research. I hope to use this information to strengthen the cause of sustainable management of wetlands in the country. The interview should take about 10 minutes. Are you available to respond to some questions at this time?

Let me begin by asking you some questions about what you do for a living and where?

#### II Body

##### A. General information

1. Kindly give me a brief introduction of how long have you worked as a , your educational background, how long have you lived within the Kimana wetland (upstream or downstream) and what role you play within the wetland area?
2. Who are the users of the wetland? What are the major activities carried out within the wetland area and what are the outcomes of these activities on the wetland?
3. Looking at the current use of the wetland, would you opine that the use therein is sustainable? Kindly expound. What measures are being undertaken to ensure sustainability and how are these being carried out?
4. How is the Kimana Wetland managed? Are there any bylaws, laws, regulations or management plan(s) and how effective have these been? How were the same formulated?

5. Who deals with issues of enforcement of the above and how is this coordinated? Is this effective in the management and use of the Kimana Wetland?
6. How is the community integrated in the management of the wetland and how active are they? If not involved, what efforts are there to elicit community participation?
7. Other than the community, are there other stakeholders such as the local authority who play a role in the management of the wetland and how has their participation affected management?
8. What is the economic status and the literacy level of the wetland users (on a very general view)?
9. How would you say this affects the use, management, conservation and restoration measures of the wetland by the community?

Well, it has been a pleasure talking to you and I appreciate the time you took for this interview. Is there anything else you think would be helpful for me to know? I should have all the information I need. Would it be alright to call you on your personal number if I have any more questions?

Thanks you once again.