

**LAND USE PRACTICES AND THEIR IMPACTS ON WISE USE AND
CONSERVATION OF THE TANA DELTA WETLAND**

BY

ABDULLAHI GARANE ADEN

Z51/81346/2012

**A Thesis submitted in partial fulfillment of the requirements for the degree of Masters of
Arts in Environmental Law of the University of Nairobi, Kenya**

2016

Declaration

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

Signature _____ Date _____

The thesis has been submitted for examination with our approval as University Supervisors.

Dr. Kariuki Muigua

Centre for Advanced Studies in Environmental Law and Policy, University of Nairobi.

Signature _____ Date _____

Dr. Collins Odote

Centre for Advanced Studies in Environmental Law and Policy, University of Nairobi.

Signature _____ Date _____

Dedication

I dedicate this work to all those who positively contribute to protect our environment.

Acknowledgment

I extend my most sincere thanks to the Centre for Advanced Studies in Environmental Law and Policy (CASELAP), following their kind assistance. I wish also to convey my deepest appreciation to my supervisors Dr. K. Muigua and Dr. C. Odote who read the various drafts of the thesis at every stage and offered valuable guidance to complete this work.

Abstract

Globally, wetlands are under serious threat from the continuous reclamation due to demand to satisfy human development needs. Wetlands are the worlds' most productive environment and rich in biological diversity of plants and animals. Wetlands provide many ecosystem services to humans and the environment ranging from fresh water, food, regulation of climate, coastal protection, regulation of floods, tourism and recreational activities, and water purification. Despite the mounting recognition of the need to protect wetlands, many continue to be overexploited sometimes resulting to their total loss.

Wetland ecosystems in Kenya similarly face serious threats of degradation. This is mainly caused by conversion of wetlands for agriculture and industrial use and high population directly dependent on natural resources coupled with poor wetlands regulation. The situation is also worsened by lack of funding and the active participation of the people in the controlling of the various resources in the wetland regions, unplanned developments in wetland areas, and lack of a working National Wetlands Policy and crosscutting sectoral laws.

The Tana River Delta is among the most important wetlands in Kenya listed as a Wetland of International Importance under the Ramsar Convention; however, various land uses, either proposed or ongoing are not consistent with the wise use and conservation of the wetland ecosystem. Large-scale commercial land uses remain the biggest threat to the Tana River Delta wetland.

The purpose of the research was to study the environmental impact of land utilization practices in the Tana Delta wetland, assess the compatibility of the land uses with the principal of wise use, and recommend necessary mitigation measures.

The study was conducted in villages of Kulesa, Wema, and Hewani in Minjila area of Garsen in the Tana Delta. The local leaders totaling 23 and 9 key informants were selected through the purposive sampling method. Data was gathered from the local leaders and the key informants through focus group discussion and in-depth interviews respectively.

The findings of the study are that: the land use in the Tana Delta is not consistent with wise use and sustainable utilization of the Tana Delta resources. Some of the land uses include conversion of large tracks of land for rice irrigation, diversion of the river through a canal from Kitere area to a rubber dam at Sailoni, the creation of 43-kilometer long dyke affecting the hydrological cycle of the flood plain. It has also led to the involuntary displacement of people, loss of habitat for water birds and wildlife, over abstraction of water, and conflicts over resources.

List of Acronyms and Abbreviations

CASELAP	Centre for Advanced Studies in Environmental Law and Policy
CBD	Convention on Biological Diversity
EIA	Environmental Impact Assessment
EPA	The United States Environmental Protection Agency
EMCA	Environmental Management and Co-ordination Act
FAO	Food and Agriculture Organization
IUCN	International Union for Conservation of Nature and Natural Resources
JICA	Japanese International Cooperation Agency
KWS	Kenya Wildlife Service
KENWEB	Kenya Wetlands Biodiversity Research Team
MEA	Millennium Ecosystem Assessment
NEMA	National Environment Management Authority
NGO	Non-Governmental Organizations
OECD	Overseas Economic Cooperation Fund
SD	Sustainable Development
SDG	Sustainable Development Goals
TARDA	Tana & Athi Rivers Development Authority
TDIP	Tana Delta Irrigation Project
TRD	Tana River Delta
WCMA	Wildlife Conservation and Management Act
GoK	Government of Kenya

List of Figures

Figure 4.1 Gender of the Respondents	47
Figure 4.2 Level of Education.....	48
Figure 4.3 Duration of Living in the Area	48
Figure 4.4 Infrastructural Developments	50
Figure 4.5 Economic activities taking place in the Tana delta.....	51
Figure 4.6 Extent to which land use changes threaten peoples livelihoods	52
Figure 4.7 Government consultation on projects development.....	53
Figure 4.8 Land use planning and regulation.....	54
Figure 4.9 Relative significance of land use to residents' well-being	56

List of Tables

Table 4.1 Age of the respondents.....	47
Table 4.2 Types of Livelihood Activities.....	49

List of Statutes

1. The Constitution of Kenya, 2010.
2. Environmental Management and Co-ordination Act, No.8 of 1999
3. Wildlife Conservation and Management Act No. 47 of 2013
4. Physical Planning Act (cap. 286) Laws of Kenya
5. Water Act (cap. 372) Laws of Kenya
6. Tana and Athi Rivers Development Authority Act (cap 443) laws of Kenya.

Table of cases

1. Abdalla Rhova Hirbae & 3 others Vs. Attorney General & 7 others, Nairobi High Court civil case No. 14 of 2010.
2. V/D Berg Roses & Another Vs. Attorney General, Nakuru High Court Petition No. 23 of 2012
3. County Government of Tana River Vs. Tana and Athi River Development Authority & National Land Commission, Malindi High Court Elc Const. Petition No. 2 of 2015

Table of Contents

Declaration	ii
Dedication.....	iii
Acknowledgment	iv
Abstract	v
List of Acronyms and Abbreviations	vi
List of Figures	vii
List of Tables.....	viii
List of Statutes	ix
CHAPTER ONE: INTRODUCTION.....	1
1.1. Background	1
1.2. Wetland Landscapes in Kenya	2
1.3. The Threats to the Tana Delta Wetlands.....	5
1.4. Statement of the Problem	9
1.5. Research Questions	10
1.6. Research Objective.....	10
1.7. Research hypothesis	11
1.8. Justification of the study	11
1.9. Theoretical Framework	12
1.10. Conceptual Framework	13
1.11. Summary of Chapter One.....	16
CHAPTER TWO: LITERATURE REVIEW	17
2.1. Sustainable Development Goals 15	17
2.2. The Challenges to Sustainable Development and Wise Use of Wetlands.....	17
2.3. Ramsar Convention.....	19
2.4. The Convention on Biological Biodiversity	19
2.5. The Legal and Policy Framework and Management of Wetlands in Kenya	20
2.6. Wetlands Threats.....	31
2.7. Land Degradation.....	35
2.8. Sustainable Development of Wetlands	36
2.9. The Concept of Wise Use and Wetlands Management	38
2.10. Gaps in Literature	40
CHAPTER THREE: RESEARCH METHODOLOGY	41
3.1. Introduction	41

3.2.	Study Area.....	41
3.3.	Data Needs Types and Sources.....	42
3.4.	Research Design.....	43
3.5.	Target Population.....	43
3.6.	Sample Size.....	43
3.7.	Sampling Procedure and Data Collection.....	44
3.8.	Data Analysis and Presentation.....	46
3.9.	Study Limitations.....	46
3.10.	Ethical Consideration.....	47
CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF FINDINGS		46
4.1.	Introduction.....	46
4.2.	Response Rate.....	46
4.3.	Demographic and Socio-economic Description of the Respondents.....	47
4.3.1.	Gender of the Respondents.....	47
4.3.2.	Age.....	47
4.3.3.	Level of Education.....	48
4.3.4.	Duration of Living in the Area.....	48
4.4.	Land Use Practices in Tana Delta Wetland.....	49
4.4.1.	Livelihood Activities.....	49
4.4.2.	Aspects of Land use Practices.....	49
4.4.3.	Infrastructural Developments.....	50
4.4.4.	Economic Activity Taking Place in the Tana Delta.....	50
4.5.	Land Use Changes' Contribution to People's Livelihoods.....	51
4.5.1.	Extent to Which Land Use Changes Threaten Peoples Livelihoods.....	52
4.6.	Land Use Tradeoffs.....	53
4.6.1.	Government Consultation on Projects Development in the Tana Delta Wetland.....	53
4.6.2.	Land use Planning and Regulation.....	53
4.6.3.	The Relative Significance of Land Use to Residents' Well-Being.....	55
4.7.	Discussion.....	56
4.7.1.	Land Use Practices in Tana Delta Wetland.....	56
4.7.2.	Land Use Changes: Effects on People's Livelihoods.....	57
4.7.3.	Land use and Trade-offs.....	59
CHAPTER FIVE: CONCLUSION AND RECOMMEDATIONS.....		61
5.1.	Conclusion.....	61

5.2. Recommendations	63
Bibliography.....	64
Appendix : Questionnaire.....	69

CHAPTER ONE: INTRODUCTION

1.1. Background

Globally, wetlands are under serious threat from the continuous changing land use systems as demanded by the need to satisfy human beings. The loss of wetlands has continued despite the increasing recognition of their conservation. Across the world, wetlands are considered by many to have no or little value. These sentiments have led to the subsequent modification of wetlands for other purposes, such as large-scale agriculture and settlements causing the destruction of the wetland and other unrecognized social costs. Many continue to be overexploited at an alarming rate in spite of their priceless contributions.

The Ramsar Convention defines wetlands 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 meters.”¹

Wetlands act as sinks into which surface and ground water flows from the immediate catchment.² The EPA describes wetlands as “natural harvesters” of rainwater that play a critical role in an ecosystem.³ Wetlands have played a significant role in human development through history. Early civilizations depended on wetlands for their survival, including the Aztec, Maya, Inca, the Khmer, among others.⁴ Wetlands provide many ecosystem services that contribute to the well-being fauna and flora.⁵ The total value of the unconverted regions of the wetlands is often more than of the converted ones.⁶ According to a study done in Uganda the direct annual productive value of wetlands was estimated at US\$300-600 per hectare while the value of virgin wetlands, encompassing aspects, such as water purification, carbon sequestration, and

¹ Ramsar. Convention on Wetlands of International Importance Especially as Waterfowl Habitat 1971. Accessed March 24, 2016. <http://portal.unesco.org/en/ev.php>

² Ibid.

³ EPA. Why are wetlands important? 2016. Available from: www.epa.gov/wetlands/why-are-wetlands-important. Accessed March 24, 2016

⁴ McCartney, et al. *Wetlands, agriculture and poverty reduction*. Colombo, Sri Lanka: IWMI, 2008, p. 1.

⁵ MEA. *Ecosystem and Human-Wellbeing: Wetlands and Water Synthesis*. Report. Washington DC: World Resources Institute, 2005.

⁶ Ibid.

biodiversity are valued at over US\$10,000. These figures show that wetlands are more valuable when left unutilized for farming or other commercial activities.⁷

Wetlands worldwide are under serious threat, and many wetlands across the globe are currently experiencing high levels of degradation in spite of the critical functions they provide and Kenya is no exception.⁸ Population growth and an increase in economic development around the wetlands are the main indirect causes of the extensive degradations wetlands.⁹ Infrastructure development, conversion of land mainly for food production, abstraction of water, eutrophication and pollution over harvesting and extensive exploitation of the resources around the wetlands, and the introduction of intrusive exotic species are some of the direct causes of the degradation witnessed in most wetlands.¹⁰

Internationally, countries and Non-Governmental Associations (NGOs) in the 1960s negotiated the adaptation of the Convention on Wetlands of International, popularly known as the Ramsar Convention in 1971 and which come into force in 1975.¹¹

1.2. Wetland Landscapes in Kenya

Wetland ecosystems in Kenya face serious threats in spite of Kenya being a signatory to the Ramsar Convention.¹² Kenya acceded to the Ramsar Convention on October 5 1990, but she has not fully implemented the provisions of the Ramsar Convection because she lacks a coordinated and holistic policy and legal framework. Additionally most of these treats are because of inappropriate human activities within the catchment areas. Issues like climatic changes have been majorly contributed by human activities in these regions. Other limitations to conservation of wetlands in Kenya include lack of funding and the participation of the local communities in the management of various wetland resources, unplanned developments in wetland areas, and

⁷ Wood, Adrian P., Alan Dixon, and Matthew P. McCartney. *Wetland Management and Sustainable Livelihoods in Africa*. Abingdon: Routledge/Earthscan from Routledge, 2013.

⁸ UNEP. *Kenya Aims to Tackle Growing Degradation of Spectacular and Vital Wetlands*. 2013. <http://www.unep.org/newscentre/default.aspx?DocumentID=2723&ArticleID=9583>.

⁹ Kenya Wetlands Forum. *Threats and Challenges To Wetlands*. 2010. http://www.kenyawetlandsforum.org/index.php?option=com_content&view=article&id=24:threats-and-challenges-to-wetlands (accessed March 24 2016)

¹⁰ Ibid.

¹¹ Ramsar, 2016.

¹² Kenya Wetlands Forum, 2010.

lack of National Wetlands Policy and uncoordinated crosscutting sectoral laws and policies. The threats are a serious issue in Kenya because they threaten the livelihoods of populations and ecosystems spread across nearly 300,000 hectares of catchment and wetland areas.

Kenya's wetlands are vital ecosystems, indispensable to human health, wellbeing, national development, and ecological integrity. Ironically, because of these multifaceted roles and the associated threats and regulatory challenges, they are still being degraded and destroyed at an alarming rate.¹³

The conversion of wetlands for agriculture, industrial use, and human habitation, though unlawful, is happening in Kenya because of poor regulation and the inadequacy of the existing policy and legal framework. These aspects are some of the major drivers of the multifarious pressures exerted on Kenya's wetlands. The pressures themselves emanate from the fact that wetlands collectively rank as one of the Earth's most productive ecosystems (Kenya Wetlands Forum 2010). Wetlands provide a range of ecosystem goods and services that form the basis of many local livelihoods and remain essential to the national development processes.¹⁴

Kenyan wetlands occupy around 3-4% of the total land areas, roughly 14,000 km².¹⁵ Currently Kenya has designated 6 wetlands categorized as important zones in the international maps. Five are in the Great Rift Valley, namely lakes Bogoria, Elementaita, Nakuru, Naivasha, and Baringo. In 2012, the Tana River Delta was the sixth Kenyan wetland to gain entry into the Ramsar List of Wetland of International Importance.¹⁶ None of these wetlands has been gazetted as wetland protected area to give them the protection they need as per the Ramsar Convention, except a section of Tana Delta, the Kipini mangrove forest.

The Tana River Delta wetland similarly faces serious degradation even though it is among the most important estuarine and deltaic ecosystems in the Eastern Africa region. The delta is very rich in biodiversity as it is home to many different species of plants and animals. It is particularly home to more than 22 different avian species. The Millennium Ecosystem Assessment (MEA)

¹³Duvail, et al. The Tana delta case study. *Water Alternatives* 5, no. 2 (2012): 322-343.

¹⁴Kansiime, F. M., Saunders, J. and Loiselle, S. A. "Functioning and dynamics of wetland vegetation of Lake Victoria: An overview. *Wetlands Ecology and Management* 15, no. 2 (2007): 443-451.

¹⁵UNEP. *Kenya Wetland Atlas*. 2012. apps.unep.org/.../Kenya%20wetland%20atlas-2012Kenya_Wetlands.pdf (accessed 24 March 2016).

¹⁶Ibid.

revealed in 2005 that the biodiversity of inland waters is facing dire conditions that are incomparable to other ecosystems.¹⁷ An estimated 50% of inland water-covered region (excluding large lakes) has been lost in different parts of the world. The situation is not different for Tana Delta wetland where the per capita fresh water availability has reduced from 724 m³ per capita to 387 m³ per capita between 1999 and 2006. The Tana Delta has experienced extensive climatic changes over the past half century.¹⁸

Currently, the Tana River Delta wetland is facing serious threats emanating from development activities, poor environmental management, and increasing population pressure interfering with the biodiversity and ecological functions of the wetland.¹⁹ Threats to the Tana River Delta include conversion for commercial agriculture, land change, over flooding because of catchment degradation upstream, contamination through Agrochemicals, unsustainable resources harvesting, and over siltation because of poor farming practices upstream. Encroachment of settlements because of increasing demands for land, loss of biodiversity, and climate change are additional threats to the Tana River Delta. The Tana Delta wetland provides immense environmental services to the indigenous communities and the country by extension.²⁰ Land uses practices through conversion of large parcels of land to irrigation and industrial ventures are detrimental to the fragile ecosystem. The changes may foster undesirable results for the host communities that have traditionally depended on the associated natural resources for their livelihood.²¹ The construction of the Lamu Port, as part of the Lamu Port Southern Sudan-Ethiopia Transport (LAPSSET) is likely to introduce major infrastructure changes and pressures, and some of the proposed projects might have dire environmental implications to the wetland²².

¹⁷ MEA. *Ecosystem and Human-Wellbeing: Wetlands and Water Synthesis*. Report. Washington DC: World Resources Institute, 2005.

¹⁸ Ibid

¹⁹ Matiku, Paul. *Tana River Delta. Conservation and Development Plan. Draft for discussion*. London: The Darwin Initiative, 2009.

²⁰ Terer, Taita, George G. Ndiritu, and Nathan N. Gichuki. "Socio-economic values and traditional strategies of managing wetland resources in Lower Tana River, Kenya." *Hydrobiologia* 527, no. 1-3 (2004): 3-15. *Academic Search Premier*, EBSCOhost (accessed March 23, 2016).

²¹ Nunow, Abdirizak Arale. "The Dynamics of Land Deals in the Tana Delta, Kenya." *Land Deals Politics Initiative*, 2011: 1-27.

²² Weru, Ann. *Livelihood concerns as Kenya kicks off regional infrastructure project*. 2013. <http://www.irinnews.org/report/98908/livelihood-concerns-kenya-kicks-regional-infrastructure-project> (accessed November 19, 2016).

In addition, the Tana Delta is listed by the Government as one of the vision 2030-flagship projects for expansion of agriculture. Whereas the serious environmental concerns has been raised over the years there is no integrated development master plan for the Tana River Delta and various land use activities are approved through sectoral legislation.

The communities that live in the Tana Delta are highly dependent on the Delta's natural resources for their livelihoods²³; hence, the over-exploitation of the wetlands goods and services is a major concern. This is particularly true for wetlands where unclear tenure arrangements, growing populations and lack of alternative livelihoods are fueling over-dependence on these resources. The Tana Delta in Kenya is ranked as one of the most crucial estuarine and deltaic ecologies in the region. It comprises a variety of freshwater, pristine beaches and shallow marine areas, estuarine and coastal environments with extensive and various types of mangrove systems, floodplain, and marine brackish and freshwater intertidal areas, forming productive and functionally interconnected ecosystems.²⁴ The Delta has various seasonal oxbow lakes and some permanent lakes and marshes, including Lake Bisila, Dida, Warede, Harakisa, Kongolola, Moa, and Shakababo.²⁵ The Tana River Delta wetland has traditionally been used by local communities for cultivating various crops on subsistence basis, fruit trees and pasture during dry seasons.²⁶ The low population and limited human activities in the region led to the limited environmental degradation.

1.3.The Threats to the Tana Delta Wetlands

In the 1974 the Tana and Athi River Development Authority (TARDA) was created. One of its mandates is to provide directives and management of development projects in the regions around the Tana River and Athi River basins.²⁷ In 1976, an area of 17,000 Hectares was gazetted as

²³ Samoily, M., Osuka K., and Maina, G. W. *Review and Assessment of Biodiversity Values and Conservation Priorities along the Tana Delta - Pate Island Coast of Northern Kenya*. CORDIO Status Report, 2011.

²⁴ UNEP. Eastern Africa Atlas of Coastal Resources, Kenya. 1998. http://gridnairobi.unep.org/chm/EAFDocuments/Kenya/Eastern_Africa_Atlas_of_Coastal_Resources_Kenya.pdf (accessed 24 March 2016).

²⁵ Ibid.

²⁶ Odhengo, et al. *Tana River Delta Strategic Environmental Assessment Scoping Report*. Nairobi, Kenya: Ministry of Lands, Physical Planning Department, 2012.

²⁷ GoK. "CAP. 443. Tana and Athi Rivers Development Authority Revised Edition 2012." *Laws of Kenya*. Nairobi: National Council for Law Reporting, June 7, 1974.

Tana River Primate Reserve to protect two endangered species, the Tana Mangabey and the Tana River Red Colombus.²⁸ The land use and conservation question revolves around land tenure in the Tana Delta. Nearly the entire land in Tana River and Tana Delta districts was categorized as trust land, but is designated as community land under Constitution of Kenya 2010, and has remain un-adjudicated to date. The vast fertile land in the Tana Delta, its low population and lack of clear tenure framework has made it to be viewed as wasteland available for conversion to agricultural and industrial use.

TARDA in 1981 proposed establishment of 16000 Ha of rice irrigation in the lower Tana River basin.²⁹ TARDA with funding from Japanese Government introduced implemented Phase 1 of the rice irrigation project covering 1,763 HA in the 1997 but this was mostly destroyed by the 1998 El Nino rains.³⁰ In 2009/2010 TARDA under the Economic Stimulus Programme rehabilitated 1,300 Ha of the rice irrigation scheme³¹. TARDA also constructed infrastructure to support the irrigation including 43-Kilometer dyke around the flood plain and a rubber dam that interferes with the normal hydrological cycle in the wetlands. The local communities have also undertaken small-scale irrigation, including Hewani scheme involving 150 Acres, Wema 100 Acres, Ngao 100 Acres, Oda 100 Acres, and Golban 100 Acres³².

Other private and multinational investors have followed suit in the scramble to exploit the Tana Delta resources. Some of the current land uses in the Tana Delta include proposals forwarded by large companies such as the Mumias Sugar Company, alongside TARDA, to convert about 20,000 Ha of the delta into a monoculture plantation of sugarcane. Other companies like Mat International have also forwarded proposals to convert 64,000 ha into farmlands for sugarcane plantations.³³ Additionally, a biofuel company from Canada has also sent proposals for Jatropha planting in the region and the neighboring lands to be used for producing large amounts of ethanol and biofuels. The company has already established plantations on about 10,000 ha

²⁸ Odhengo et al., 2012, p 18.

²⁹ Kabukuru, W. 2015. "Tana: The delta of discontent." *New African* no. 555: 46-49.

³⁰ Ibid.

³¹ Wolvekamp, et al. *Governance, agricultural development, nature conservation and land and water distribution in Africa* . Amsterdam, The Netherlands: Both ENDS, 2015, p. 65.

³² Ibid.

³³ Odhengo, et al., 2012, p. 6.

“pilot” plot north of the main delta³⁴. An additional 40,000 ha of the land has also been proposed to be leased to the Qatar Government for horticulture production.

The local communities who are mainly peasant farmers or pastoralist feel that they have been unlawfully dispossessed of their ancestral land. The County Government of Tana River in High Court Petition No. 2 of 2015³⁵ challenged Title issued by the Government to TARDA for land measuring 35,875 HA in Tana Delta. In its Judgment dated 14th September 2016 the court held that the title issued to TARDA contravened Articles 10, 40 and 56 of the Constitution and ordered the revocation the title LR No. 28026. This is a pointer to the serious land tenure issues in the TRD.

The Tana Delta is a Wetland of international importance because it has unique biodiversity, zoology, plant life, and hydrology aspects. The Tana Delta wetland supports critically endangered animal species, such as the Tana River Mangabey and the Red Colobus primates³⁶. However, various land uses, either proposed or ongoing threaten the wetland ecosystem and the wetland biodiversity. Large-scale commercial land uses remain the biggest threat to the Tana River Delta wetland. Therefore, Kenya needs to develop environmental governance systems with respect to the Tana Delta wetland to preserve the fragile ecosystems and biodiversity.

The Tana Delta Wetlands lacks an integrated development plan. However, projects activities are approved through use of sectoral legislation. The EIA’s are commonly associated with legal processes that facilitate smooth running of the implementation process.³⁷ Participation to the EIA process is often ineffective because local communities are largely excluded in public participation.³⁸ In most cases, local populations are often quite powerless when confronted with

³⁴ Neville, Kate J. "The Contentious Political Economy of Biofuels." *Global Environmental Politics* 15, no. 1 (2015): 21-40. (accessed March 23, 2016).

³⁵ County Government of Tana River Vs. Tana and Athi River Development Authority & National Land Commission, Malindi High Court Petition No. 2 of 2015

³⁶ Maltby, Edward. *Waterlogged Wealth: Why Waste the World's Wet Places?* New York: Routledge, 2013.

³⁷ Duvail, et al., 2012.

³⁸ Mbonde, Omari. 2012. *A Guide to the EIA Process*. Nairobi: East African Wildlife

big projects that may have quite varied underhand political or economic purposes.³⁹ The Tana Delta communities encounter these challenges.

The trend of draining and reclaiming the Tana Delta Wetland⁴⁰ has not stopped even after it has been categorized as one of the Wetlands of International Importance in the Ramsar Convention. These activities have exerted pressure through inappropriate land uses and have degrading impacts on the wetland. There is over abstraction of water mostly for irrigation, conversion of large parcels of land to agriculture, overstocking of livestock, and conversion of land to settlements, loss of catchment forests, high population, competition, and increased demand for resources, reduced water levels, land subdivision, and fragmentation.

Land use change in the Tana Delta Wetland has had a huge impact on the natural ecosystem as well as the local communities. According to a 1975 research, the Tana River Delta used to support a unique diversity of flora and fauna, which did not exist in other coastal areas.⁴¹ The researchers found out that no other coastal forest had as rich a higher primate fauna as the Tana River forest. The study also noted land changes in the Tana River Delta influenced negatively on the environment as forest remained as patches because of the slow drying up of river channels in the Delta.⁴²

The lack of a comprehensive plan to develop the land around the Tana Delta, especially on large-scale bases, has led to the development of cultural/traditional, environmental, social, and economic impacts. The impacts have been felt by the societies living in the region as they have experienced the involuntary displacement of people, loss of natural resources that have been vital for survival, and community denial of customary rights. Other consequences include reduced land productivity, reduced communal surviving plans on their livelihood support systems, and restricted access to grazing lands, forests and water catchments.⁴³

³⁹ Ibid.

⁴⁰ Leauthaud, Crystele, et al. "Floods and Livelihoods: The Impact Of Changing Water Resources On Wetland Agro-Ecological Production Systems In The Tana River Delta, Kenya." *Global Environmental Change Part A: Human & Policy Dimensions* 23, no. 1 (2013): 252-263.

⁴¹ Andrews, Peter, C. P. Groves, and J. F. M. Horne. "Ecology of the Lower Tana River Flood Plain (Kenya)." *Journal of the East Africa Natural History Society And National Museum* 151 (1975): 1-31.

⁴² Ibid.

⁴³ Leauthaud, et al., 2013, pp. 252-263.

Further, the lack of proper legal framework to protect the wetland exposes the wetland to unsustainable exploitation of the resources.⁴⁴ The current environmental legal framework has failed to give a coordinated approach in the management of the wetlands.⁴⁵ Moreover, the poor legal framework has contributed to poor regulation in land use resulting in degradation of the fragile ecosystem.

1.4.Statement of the Problem

For many years, the Tana Delta wetland has been subjected to land reclamation for agriculture and commercial development without proper legal or policy framework. The Tana River Delta wetland is facing serious threats emanating from development activities, poor environmental management, and increasing population pressure interfering with the biodiversity and ecological functions of the wetland.⁴⁶ Threats to the Tana River Delta include conversion for commercial agriculture, land change, over flooding because of catchment degradation upstream, contamination through Agrochemicals, unsustainable resources harvesting, and over siltation because of poor farming practices upstream. Encroachment of settlements because of increasing demands for land, loss of biodiversity, and climate change are additional threats to the Tana River Delta. Most of the land uses were approved or undertaken prior to the Tana River Delta being designated as a wetland of international importance under the Ramsar Convention in 2012. The poor regulation of property and tenure in the Tana Delta has compounded these conflicts, and compromised the effectiveness of the efforts to conserve the wetland's natural resources and respective interests of the communities living in the Delta. Additionally, no integrated development plan for the Tana River Delta guides the various human activities being undertaken in the wetland ecosystem. The lack of proper land use framework has also led to the inappropriate land allocations in Tana River delta, contravening the concept of wise use, such as not realizing a balance between the benefit to the people and nature. Therefore, there is a need to undertake a study of the land uses in the Wetland to assess how far they are compliant with the

⁴⁴ Odote, 2008.

⁴⁵ Odhengo, et al., 2012.

⁴⁶ Matiku, Paul. *Tana River Delta. Conservation and Development Plan. Draft for discussion*. London: The Darwin Initiative, 2009.

principal of wise use and conservation of the wetland resources.⁴⁷ Achieving the right balance between socio-economic rights and environmental conservation challenging. According to McCartney,⁴⁸ there is no design for finding the equilibrium between conservation and development of wetlands. However, in every development process, it is imperative to understand how ecosystem services contribute to people's livelihoods, in terms of the benefits and the loses associated with the developments.⁴⁹ The balance between socio-economic rights and environmental conservation can be accomplished by assessing the trade-offs, supporting the more important of the ecosystem services for sustainable development of wetlands. Therefore, the thesis sought to assess the environmental impacts of land use practices on the Tana Delta wetland and recommend how an enhanced legal and policy framework can help mitigate against the negative effects.

1.5. Research Questions

1. To what extent do the current land use practices in the Tana Delta Wetland comply with the internationally accepted guideline on wise use of the wetland?
2. How is land use change in the Tana Delta Wetland contributing to the livelihoods of the people and who are the winners and losers?
3. What trade-offs can support the balancing of the land uses and conservation for sustainable development of the Tana Delta Wetland.

1.6. Research Objective

The main objective of the research was to assess the environmental impact of land use practices on the Tana Delta wetland and recommend the necessary mitigation measures.

1.6.1. Specific Objectives

1. To evaluate to what extent are the current land use practices in the Tana Delta Wetland comply with the internationally accepted guideline on wise use of the wetland.

⁴⁷ The Ramsar Convention Secretariat. "Resolution VIII.34. Agriculture, wetlands and water resource management." *8th Meeting of the Conference of the Contracting Parties o the Convention on Wetlands (Ramsar, Iran, 1971)*. Valencia, Spain: The Ramsar Convention Secretariat, 2002. 1-4.

⁴⁸ McCartney, et al. *On Target for People and Planet: Setting and Achieving Water-related Sustainable Development Goals*. Institute for Land, Water and Society, Charles Sturt University, n. d, 2015. 28-32.

⁴⁹ McCartney, et al., n. d, p. 28-32.

2. To evaluate how the changing land uses are contributing to the livelihoods of the people, and who are the winners and losers?
3. To assess the trade-offs that can support the balancing of the land uses and conservation for sustainable development of the Tana Delta Wetland?

1.7. Research hypothesis

The land use practices in the Tana Delta wetland are consistent with the principles of wise use and sustainable utilization of the Wetland.

1.8. Justification of the study

Land use and the associated changes in land allocation for various activities, as one of the key steering forces of global environmental change, is central to the sustainable development of wetlands debate. As a result, monitoring and evaluation of sustainability indicators; for example, change in land use and settlement, social process, loss of natural vegetation cover, and pressure on land resource and ecosystems are required. The major goal of sustainability indicators is to show the state of human, environmental, and economic conditions. Moreover, it is to assess the trend of changes in these conditions and identify issues that need to be addressed within each of these three pillars of sustainable development. These indicators also provide information crucial to decision on national and international policy. The Tana River Delta wetland is facing a serious threat from a wide range of development activities, poor environmental management, and increasing population pressure interfering with the ecological and biodiversity elements of the wetland. The study also discusses the current land uses in the Tana Delta Wetlands, their impact on the environment, whether they conform with wise use concept, and conservation of the wetland. The research will be a useful reference material to the policy makers, government agencies, NEMA, students of environmental policy and law and other stakeholders and may influence legal and policy change. The land uses in the Tana River Delta were mostly approved or undertaken before it was designated as a wetland of international importance in 2012. There has been no research undertaken to assess the land uses and their impact on wise use of the wetland resources which presents a gap in literature which has not been addressed before.

1.9.Theoretical Framework

The research is anchored on the theory of sustainable development. Wise use of wetlands and conservation of wetlands can only be achieved through sustainable use of the wetland resources. The Brundtland Commission referred to sustainability in development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.⁵⁰

The concept of wise use of wetlands has gained prominence since the adoption of the Ramsar Convention on Wetlands. The wise use philosophy was defined by the third meeting of the conference of parties to the Ramsar Convention in 1987 as “sustainable utilization of wetlands for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem”.

After the report of the Brundtland Commission of 1987 and adoption of the Convention on Biological Diversity (CBD) that brought about the concept of sustainable development, the definition of wise use was updated and redefined as the preservation of their natural character achieved through the application of ecosystem strategies in the viewpoint of sustainable development.⁵¹ The model of wise use in the context of sustainable development recognizes that some wetland developments are unavoidable and many developments have vital paybacks to society. Moreover, it also recognizes that these developments can be facilitated in sustainable ways by methods elaborated under the Convention, and use of integrated development plan.⁵²

The CBD in its implementation uses the concept of ecosystem approaches. The concept was retained after the changeover of MDG to Sustainable Development Goals (SDG). Under SDG 15, the ecosystem-based methodology is used as a strategy for the integrated administration of water, land, and living resources that endorses preservation and acceptable use in a justifiable

⁵⁰ Dinçer, Ibrahim, and Marc Rosen. *Exergy: Energy, Environment, and Sustainable Development*. Amsterdam: Elsevier, 2007, p. 60.

⁵¹ Ibid.

⁵² Ramsar Convention Secretariat. *Wise use of Wetlands*. 4th. Vol. Handbook 1. Gland, Switzerland: Ramsar Convention Secretariat, 2010.

manner.⁵³ Thus, the implementation of the ecosystem method will help to reach a poise of the three goals of the Convention. Therefore, the CBD's principal "ecosystem approach" can be regarded as compatible with Ramsar's central concept of wise use.⁵⁴

The principles of Sustainable Development (SD) make it possible to integrate the various sectorial and development schemes with the horizontal strategy on justifiable development.⁵⁵ The principles also provide a guidance for setting priorities in a coordinated and harmonized way. The link between wise use and viable development is that the approaches of meeting SD are driven by the idea of wise use of resources. The wise use approach guarantees sustainable development by placing societies' well-being at the center of the decision-making processes. In doing this, the wise use approach recognizes the vital connections that exist between societies and the sustainable development of natural resources.

In the perspective of ecological development, wise use recognizes that while some wetland developments are unavoidable and that many developments have significant benefits to society, these developments can be facilitated in ecological techniques by methods elaborated under the Convention, and use of integrated development plan. The meaning of the wise use concept in wetland conservation for countries is it informs the approaches of utilizing wetland resources besides policy and planning framework. Under the concept of wise use, countries need to see wetlands as dynamic systems to allow for the consideration of variability of their specific environments over time. The concept also allows countries to achieve a balanced use of wetland resources by delivering ecological, economic, and socio-cultural values over the long-term.

1.10. Conceptual Framework

The conceptual framework is based on land use changes in the Tana Delta Wetland and ways these land uses influence the wetland ecosystem. The conceptual framework also considers the necessary interventions through land use regulation and implementation of wise use principles

⁵³ Secretariat of the Convention on Biological Diversity. "CBD Guidelines. The Ecosystem Approach." Montreal, Canada: Secretariat of the Convention on Biological Diversity, 2004. Accessed from: <https://www.cbd.int/doc/publications/ea-text-en.pdf>

⁵⁴ Ibid.

⁵⁵ Csaba, Juhász, and Szöllősi Nikolett. *Environmental management. Chapter 11. Life cycle management*. Hungary: University of Debrecen, 2008.

for sustainable utilization of the ecosystem services of the wetland. Currently, the Tana wetland faces numerous threats that threaten its sustainability. Large-scale agricultural development, deforestation, poor farming practices, wildlife poaching, hydraulic changes through damming and diversion of the river upstream, and oil and gas exploration define some of the threats. In the Tana Delta, the local communities are also contending with unclear land tenure, conflicts over resource use and insecurity. Overall, the current state of the Tana Delta wetlands is because of poor environmental governance and fragmented decision-making.

The indirect drivers of wetland change in the Tana delta include economic, socio-political, culture, science technology, and demographic aspects. These drivers contribute to direct drivers of wetland change, such as change in local land use, resource consumption, and climate change. The direct drivers of wetland change define the types of ecosystem in the Tana wetland as well as the species diversity and number. In turn, the wetland defines the wetland services that influence the wellbeing of the wetland services beneficiaries. The interaction between the variables is nonlinear, such that the wellbeing of the wetland services beneficiaries influences the direct and indirect drivers of wetland change. Moreover, the wise use and protection of the wetland influences the latter and the wellbeing of the people in the Tana delta in terms of Health, security, and good social relations.

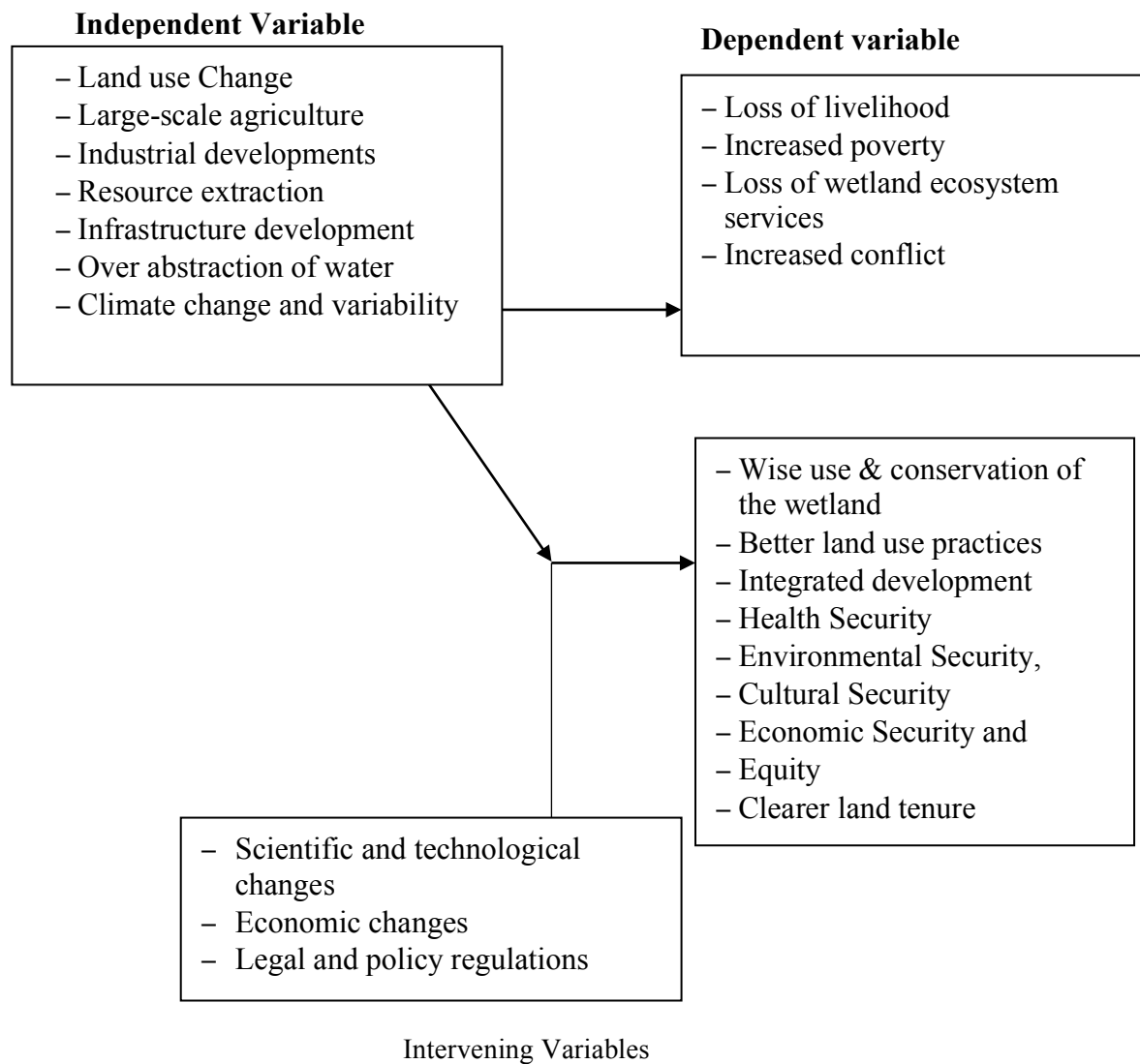


Figure 1.1 Conceptual framework

1.11. Summary of Chapter One

Chapter one introduces the global position on Wetlands and narrowed down to Kenya and to the subject of the thesis Tana Delta Wetland. In the statement of the problem section, the gaps in the knowledge about wetland management were outlined. In the significance of the study section, the importance of conducting the study was outlined, whose aim was to fill the gap in the knowledge. The research questions and the hypothesis were defined to guide the review of literature. In the theoretical framework section, several foundational theories were used to provide a perspective upon which the study was based. Last, the conceptual framework provided the perspective on how various variables touching on land use in the Tana River delta influenced the wetland ecosystem.

The second chapter is on the literature review where discussion on the existing literature on the topic was undertaken. The international conventions, national policies and laws on the topic is also discussed with a view to identify the gaps in research.

CHAPTER TWO: LITERATURE REVIEW

This chapter entails the discussion of international conventions and instruments on wetlands wise use and management namely the Ramsar Convention, and the Convention on Biological Biodiversity and the national laws and policies.

2.1. Sustainable Development Goals 15

The Sustainable developments goal's focus is to preserve diverse forms of life on earth. It targets to protect, restore, and encourage conservation efforts, as well as sustainable use of land, and other ecosystems. The goal relates to wetland conservation because it specifically targets to combat desertification, ending loss of biodiversity, and managing natural habitat resources sustainably⁵⁶. The establishment of the goal was informed by the rapid loss of natural ecosystems through agricultural and infrastructural developments. The goal works towards the instituting and identification of key biodiversity areas to safeguard the global biodiversity.

2.2. The Challenges to Sustainable Development and Wise Use of Wetlands

Kenya faces several challenges to Sustainable Development in the manner in which wetlands are used. Currently, a comprehensive surveillance platform for wetlands is essentially non-existent and as a result, decisions concerning wetlands are based on insufficient data. The existing data has deficiencies in satisfactorily measuring the productivity of wetland ecosystems and their importance to food security and the national economy. Data on many other wetland products essential to rural livelihoods such as shrimps and fish caught for household use have long been neglected. Lack of proper documentation of these values has led to long-term neglect of these values because they are seen to have little commercial importance. It is very important to know the actual value of a wetland because this is the only way people can appreciate and therefore conserve wetlands.⁵⁷

⁵⁶ United Nations. *Progress of goal 15*. 2015. <https://sustainabledevelopment.un.org/sdg15>. (accessed November 19, 2016).

⁵⁷ Kecha, et al. "Status of Wetlands in Kenya and Implications for Sustainable Development." In *Environment and Sustainable Development*, 193-208. School of Environmental Studies and Human Science, Kenyatta University, 2007.

Because of poverty and unreliable land use practices, communities inhabiting wetlands engage in activities such as damaging farming practices, draining of wetlands, and tree felling for charcoal, among other products. The instantaneous endurance needs of the population clash with the long-term preservation and management of wetlands. These communities also do not have the knowledge on various wetland preservation methods and on alternative use of the wetlands in non-consumptive mode such as ecotourism and recreation.⁵⁸ Very few wetlands communities have access to education, health services, clean water, and electricity. Most wetland communities have low per capita income, are poor, and remain generally ignorant. These aspects lead to overuse, misuse, and degradation of wetland resources through a vicious cycle.

The complete lack of wetland specific management policies has seen wetlands integrity being compromised and misused. Lack of management plans has seen important wetlands like the Tana delta turned into ecologically mismanaged ecosystems where the wetlands socio-economic potential has been compromised.

The growing human population and alterations from subsistence to profitable use of wetland resources continue to put much pressure on wetland resources, leading to a debility of services and biodiversity.⁵⁹ These aspects have led to the encroachment of wetlands over exploitation of wetland resources leading to wetland degradation.

Reclamation and conversion of wetlands is a challenge to sustainable development in the manner wetlands are used of wetlands. The process of draining and reclamation of wetlands for developments is the chief threats to wetland conservation and management. The regard of wetlands as "wastelands" has harbored conservation, leading to significant drain and conversion for alternative uses with no regard to environmental and socio-economical values.⁶⁰ Other challenges include climate change, poor resource mobilization, policy and legislative dimensions, lack of awareness about wetland values, and acculturation among others

⁵⁸ Ibid.

⁵⁹ Ibid.

⁶⁰ Ibid.

2.3. Ramsar Convention

The Ramsar Convention is an intergovernmental agreement that provides the framework for the preservation/protection and “wise use” of global wetlands and their invaluable resources. The Convention was adopted in 1971 in the Iranian city of Ramsar and it came into force in 1975. As of 2016, nearly 90% of all UN member states have adopted the Convention⁶¹. The Convention mainly draws attention to the philosophy of the “wise use” of wetlands and their resources. Therefore, all Contracting Parties commit to working towards the wise use of wetlands in their territory, by employing national plans and policies, laws, administration actions, and civic education. The Convention defines **“wise use” as the preservation of wetland ecological integrity by implementing ecosystem approaches, within the framework of sustainable development**. Therefore, the Convention supports both the conservation of wetlands and the sustainable use of their resources for the benefits of all, that is, people and nature.

The relevance of the Ramsar Convention in various world jurisdictions is that it promotes the adoption of national environmental policies, environmental management plans, environmental research, and wetland inventory programs that ensure the preservation of wetlands and sustainable use of their resources.

Kenya has acceded to the Ramsar Convention in October 1990 and has designated 6 wetlands as wetlands of international importance. Five are in the Great Rift Valley, namely lakes Bogoria, Elementaita, Nakuru, Naivasha, and Baringo. In 2012, the Tana River Delta was the sixth Kenyan wetland to gain entry into the Ramsar List of Wetland of International Importance.⁶²

2.4. The Convention on Biological Biodiversity

The Convention entered into force in 1993 and has three major objectives. First, it seeks to promote the conservation of biological diversity. Second, the Convention seeks to encourage the sustainable use of the constituents of biological diversity. Third, the Convention promotes the fair use of biological diversity and equitable sharing of the benefits arising from biological

⁶¹ The Ramsar Convention Secretariat. *The Wise Use of wetlands*. 2014.
<http://www.ramsar.org/about/the-wise-use-of-wetlands> (accessed November 19, 2016).

⁶² Ibid.

biodiversity⁶³. While the Convention recognizes the sovereign right of the signatories to exploit the resources within their jurisdictions and pursuant to their own environmental policies, it also encourages them to conserve the resources. The relevance of the Convention to sustainable development and ecosystem approaches is that it recognizes biodiversity as an asset that needs preservation. Moreover, the Convention recognizes the importance of biological resources to the economic and social development of humankind⁶⁴. At the same time, the Convention recognizes that the threat to species and biological environments remains relevant in the contemporary world. Therefore, the Convention provides a principal framework on which countries/parties can engage in biodiversity management and policy development.

2.5. The Legal and Policy Framework and Management of Wetlands in Kenya

There are various legislation in Kenya that support the conservation and sustainable management of wetlands. However, Kenya has not attained sustainable management of wetlands despite the numerous pieces of legislation because of lacks of comprehensive wetland policy and implementation of proper legal framework.⁶⁵ One of the legislative aspects hindering wise use of wetlands in Kenya is the failure to adopt a National Wetlands Conservation and Management Policy, which is still in the draft stage.

2.5.1. The Constitution of Kenya 2010

The Constitution of Kenya 2010 provides broad legal and policy principles that govern Environmental matters. *Article 2(5)* of the Constitution provides that “*the general rules of international law shall form part of the law of Kenya*”, further, *Article 2(6)* provides that, “*any treaty or convention ratified by Kenya shall form part of the law of Kenya under this Constitution*”. Therefore, the Ramsar Convention that Kenya is signatory to enjoys legal status in Kenya and is enforceable by the Kenyan Courts.

⁶³ CBD. *History of the Convention*. 2015. <https://www.cbd.int/history/> (accessed November 19, 2016).

⁶⁴ *Ibid.*

⁶⁵ Ministry of Environment, Water and Natural Resources. "Draft National Wetlands Conservation and Management Policy." Nairobi: Republic of Kenya, November 2013.

Article 10(2) of the Constitution of Kenya outlines the national values and the principles of governance and the principle of sustainable development is one of the key of the values and aspiration of the Constitution. Therefore, the Constitution of Kenya provides that all persons and entities within the Kenyan jurisdiction to undertake economic development without depletion of natural resources. *Article 42* of the Kenyan Constitution 2010 articulates that every individual has a right to clean and healthy environment. Moreover, it provides that the environment should be preserved for the advantage of present and future generations through legislative and other actions.⁶⁶ *Article 60* on Principles of Land policy states that, *land in Kenya shall be held, used, and managed in a manner that is equitable, efficient, productive, and sustainable*".⁶⁷ *Article 61* (1) provides that "*all land in Kenya belongs to the people of Kenya collectively as a nation, as communities and as individuals*".⁶⁸ *Article 69* prescribes requirements of the state with regard to the environment, including "*the sustainable exploitation, utilization, management, and conservation of the environment and natural resources*".⁶⁹ *Article 70* (1) creates a channel for people to seek legal interjections if they feel that this right is denied, violated, infringed, or threatened.

The relevance of the Article 2(5 & 6), 10 (2d) Article 42, Article 60, Article 61 (1), Article 70 (1), regarding wetland management in Kenya is that they provide firm foundation on which relevant policies, regulations and guidelines can be anchored on.

Based on the above provisions of the Constitution, the Constitution of Kenya also created Environment and Land Courts with the ranks of the High Court⁷⁰ to control disputes connecting to the environs and the utilization and occupation of, and title to property. The court has helped resolve several environmental disputes; thus supporting the conservation and administration of wetlands in Kenya.

⁶⁶ GoK. "The Constitution of Kenya." Nairobi: National Council for Law Reporting, August 2010.

⁶⁷ GoK, 2010.

⁶⁸ Ibid.

⁶⁹ Ibid.

⁷⁰ Article 162(2) of the Constitution of Kenya 2010

The people of Tana River Delta have challenged the proposed development projects in the wetland.⁷¹ The court in its Judgement directed the Government to reconsider, short term medium and long term plans in consultation with and with the contribution of the local communities and ensure all government and private parties interested in the Tana Delta comply with Article 60 and 69 of the Constitution.⁷²

2.5.2. Draft National Wetlands Conservation and Management Policy (2013)

Kenya has various sectoral pieces of legislation on wetlands inscribed under various Acts all relevant to wetlands conservation and management.⁷³ These legislations have not helped Kenya conserve and manage her wetlands because of duplications and conflicts. The existence of all these frameworks however has not created the desired impact, necessitating a national wetland policy to be in place. For Kenya, the need to have a public policy to direct the preservation and management of wetlands was documented in the 1990s upon the country's endorsement of the Ramsar Convention. The actual process of developing a national policy on wetlands conservation management commenced in 1997 and peaked in 2008 with the documentation of a reviewed Draft Sessional Paper on National Wetlands Conservation and Management.

The draft National Wetlands Conservation and Management Policy 2013 is in line with Kenya's aspirations outlined in Vision 2030, the National Environment Policy 2013, and the National Land Policy 2009. The draft policy sets out to address the myriad of challenges involved in the conservation and administration of wetlands in Kenya. The draft policy proposes to address the challenges by guiding the establishment of an operative and competent institutional and lawful agenda around the protection and management of wetlands in Kenya. The draft policy when adopted will help strengthen institutional capacity on conservation and management of wetlands and support functions and values derived from wetlands. The draft policy also proposes to advance scientific evidence and information base on Kenyan wetland ecosystems, reinforce institutional capability on safeguarding and management of wetlands, and ground-breaking development and incorporated management methodologies. Besides, the draft policy will help

⁷¹ *Abdalla Rhova Hirbae & 3 others Vs. Attorney General & 7 others [2013] eKLR*. Civil Case No. 14 (High Court of Kenya in Nairobi, February 2013, 2010).

⁷² *ibid*

⁷³ Republic of Kenya. *Final Draft Sessional Paper on National Wetlands Conservation and Management*. Nairobi: Republic of Kenya, 2008.

create public awareness through communication, and encourage collaborations that will help conserve and manage wetlands at all levels.⁷⁴

Kenya had for nearly 20 years failed to come up with wetlands policy because of various challenges involved in the process of developing the policy. Several complexities are involved in the development of a program. According to Ulmer⁷⁵, the existence or lack of political will, policy-relevant information, opportunity, and stakeholder buy-in often confront the process include. The restricted nature of policy actions, including tributary modifications, accommodations, and conflicts that modify and intermediate the policy affected the enactment of the draft policy. The interpretational process of policy actors, deficiency of resources, and distorting or enabling responses to policy also confronted the enactment process. Besides these challenges, the manner in which the existing and at times contradictory environmental legislation interact, acted as a challenge to the process of enacting the draft policy. The socio-cultural, political, and contextual factors influenced the process of enacting the draft policy.

The Draft National Wetland Conservation and Management Policy 2013⁷⁶ provides for the management and regulation of all wetlands. The draft policy provides that the GoK shall Map, describe and broadcast boundaries for all wetlands in the nation, seek to regulate, safeguard, administer, and preserve all wetlands including those within community, private and municipal land as stipulated in the Constitution.⁷⁷ The draft policy further provides that deltas should be sustainably managed through participatory planning and co-management.

The draft National Wetland Conservation and Management Policy when ratified and implemented will better protect wetlands in Kenya and ensure Kenya meets the requirements of the Ramsar Convention, as it will prohibit unsustainable land uses in wetlands including reclamation. The Policy will also ensure as coordinated approach in wetland management. It proposes that any land use change in wetland for public interest will be subject to endorsement customary procedures including the process of Cost Benefit Analysis (CBA), the Environmental

⁷⁴ Republic of Kenya. "Draft National Wetlands Conservation and Management Policy." Nairobi: Republic of Kenya, June 2013.

⁷⁵ Ulmer, Vanessa M., Adrienne R. Rathert, and Donald Rose. "Understanding Policy Enactment." *American Journal of Preventive Medicine* 43, no. 3, Supplement 2 (2012): S116–S122.

⁷⁶ Republic of Kenya. "Draft National Wetland Conservation and Management Policy." Nairobi: Kenya, 2013.

⁷⁷ Ibid.

Impact Assessment (EIA), Strategic Environmental Assessment (SEA), and wide stakeholder consultations.⁷⁸ Wetland management is a challenge in Kenya because Kenya lacks specific laws exclusively dealing with conservation of wetlands.

2.5.3. National Environment Policy, 2013⁷⁹

Kenya's endeavours to accelerate the pace of development has brought about the unprecedented social, political, and technological changes resulting in serious environmental concerns. Environment and natural resources are also valuable national assets. The National Environmental Policy 2013 introduces imperative provisions involving to the management of ecologies and the viable use of natural assets. It identifies that natural schemes are under powerful stress from social undertakings, particularly for precarious ecosystems comprising wetlands, grasslands, forests, and dry and semi-arid lands. The goals of the program include developing a combined strategy to ecological administration, strengthening the licit and institutional structure for operative organization, indorsing environmental administration implements, and supporting the execution of other eco-friendly acts.⁸⁰

Regarding the management and conservation of freshwater and wetlands ecosystems, the National Environmental Policy 2013 proposes integrated wetland and water resources management methodologies and action plans for sustainable utilization of freshwater and wetland resources and the conservation of river and lake ecosystems through development and application of river basin management campaigns. The policy initiates to develop a National Wetland Policy, regulations, and map wetland areas nation-wide. It also pledges to develop and implement catchment-based wetland administration strategies for all Ramsar sites through a partaking process and ensure re-establishment of degraded wetlands and where appropriate, encourage and support the founding of constructed wetlands. It also proposes to integrate the roles of various regulatory organizations charged with the running of freshwater and wetland ecosystems.⁸¹ The policy will enable the preservation and management of wetlands in Kenya by strengthening the capability of the National Environment Management Authority (NEMA) as the

⁷⁸ Ibid.

⁷⁹ Republic of Kenya. "National Environment Policy, 2013. Nairobi: Ministry of Environment and Mineral Resources.

⁸⁰ Ibid.

⁸¹ Ibid.

chosen national body in charge of the general regulation and coordination in all matters correlated to the environment. It will also support EMCA and harmonize the sectoral policies on the environment in Kenya.

2.5.4. The National Land Policy 2009

The policy recognizes land as an economic resource, a finite resource, and cultural heritage that every member of the society has an equal right to access. Nonetheless, it must be utilized in a sustainable manner.⁸² The policy recognizes land panning as indispensable to efficient and justifiable utilization of land and the associated resources.⁸³ The policy, in an attempt to address the problem provides the proposal for the grounding of land use plans at national, regional, and local levels based on the fixed goals and assimilating rural and urban development. The policy also recommends the review and synchronization of existing land use planning laws, and the competent and sustainable consumption and administration of land and land based resources. Besides these proposals, the policy also proposes the formation of a proper context for public input in the development of land use. The relevance of the policy in relation with research is that the proposals have not been effectively implemented and land use practices in Tana Delta are not consistent with the provisos of the policy; hence, the threat to the wetland.

2.5.5. The Environmental Management and Co-Ordination Act (NO. 8 OF 1999)

One of the key statutes on ecological conservation is the Environmental Management and Co-ordination Act⁸⁴, which is the framework law on conservational management in Kenya.

The 2009 EMCA Wetland Regulations⁸⁵ seeks to ensure wetland resources are exploited in a sustainable mode attuned with the continual existence of wetlands and their ecological commodities. The regulations articulates for defensible use of wetlands through adaptation into the national and local land use campaigns to certify ecological use and managing of the

⁸² Republic of Kenya. "Sessional Paper No. 3 of 2009 on National Land Policy." Nairobi: Ministry of Lands, Kenya, 2009.

⁸³ Ibid, Section 13.

⁸⁴ Act No. 8 Of 1999 as amended in 2015

⁸⁵ Environmental Management and Co-ordination Act (Wetlands, Riverbanks, Lakeshores and Seashores management regulations, 2009.

resources. The Regulations provide for the conservation and sustainable utilization of wetlands and their resources in Kenya.

A component of EMCA, the Environmental Impact Assessment and Environmental Audit is compulsory for all undertakings likely to have adversative impacts on the supervision of wetlands. According to Ongugo⁸⁶, the Kenyan administrative function has tried to harmonize policy regulation for the controlling of natural properties through EMCA. However, the implementation and enforcement of the Act have been constrained by poor human capacity on the field and the lack of an up-to-date catalogue of the amount of land under different natural resources.

One of the key foundations established under EMCA is the National Environment Management Authority (NEMA).⁸⁷ The Authority applies all policies concerning environmental issues. The NEMA mainly focuses on the implementation of Integrated Water Resources Management (IWRM), and it looks at the connection between water and biodiversity.⁸⁸ The objective is to adopt an ecology based methodology, which implies to regard a Delta as an ecosystem, and to look at the interlink ages between different ecosystems. The chief duty is the rehabilitation of the environment, the execution of laws, guidelines, and policies.⁸⁹ This includes the direction of the EIA, the SEA, and the Land Use Plan (LUP). NEMA has published Integrated National Land Use Guidelines⁹⁰ that have specific provisions with regard to land use in Wetlands. The guidelines are meant to safeguard and conserve the environment by facilitating the sustainable use of water and land resources. The Authority also recommends that efforts should be made to rehabilitate degraded wetlands through exclusivity to allow natural regeneration, enrichment planting and controlled use. Some of the wetlands regulations made by NEMA have faced legal challenges.

Legal notice No. 108 of 2004 dealing with Lake Naivasha Management plan was challenged by the owners of the affected land in the petition of **V/D Berg Roses & Another Vs. the Attorney**

⁸⁶ Ongugo, Paul O, et al. *A review of Kenya's national policies relevant to climate change adaptation and mitigation: Insights from Mount Elgon*. Vol. 155. CIFOR Working Paper, 2014.

⁸⁷ NEMA. *National Environment Management Authority*. 2016. <http://www.environment.go.ke/?cat=>

⁸⁸ Kooij, P. van der, and E.L. Voermans. *Integrated Water Resources Management in the Tana Delta, Kenya*. Case Study. 2013, p. 11.

⁸⁹ Ibid

⁹⁰ NEMA, 2016.

General & others, ⁹¹ where the landowners challenged some of the guidelines dealing with territory controlling and nature conservation of the lake zone. The petitioners argued that their right to property under article 40 of the constitution has been infringed. However, the court stated that Lake Naivasha has been recognized under the Convention on Wetlands of International Importance. It further noted that Kenya as a party has an obligation under Article 3(1) of the Convention which provides *'the contracting parties shall formulate and implement their planning so as to promote the conservation of wetlands included in the list, and so far as possible the wise use of wetlands in their territory'*. The court dismissed the petition noting that the regulations by NEMA was constitutional about the as contained in legal notice 108 of 2004.

The National Environment Tribunal is also created under section 125 of EMCA.⁹² The tribunal has mandate to hear appeals from NEMA's decisions and can give environmental restoration orders. Upon receiving an appeal, the Tribunal can make an award, order, or decision or give directions; authorize, set aside or diverge decision in question and implementing any of the powers that could have been exercised by NEMA.

2.5.6. Wildlife Conservation and Management Act (2013)

Another sectoral legislation relevant to wetland conservation and management is the Wildlife Conservation and Management Act⁹³ (WCMA 2013). The law was enacted to improve the protection, preservation, sustainable use and management of Kenya's wildlife resources.⁹⁴ The law also seeks to address the loss of wildlife. The Act is relevant to wetland management because wetland support wildlife and the conservation and wise use of wetlands mean reduced loss of wildlife. The WCMA 2013 delivers restructured governance of wildlife resources by untying the regulation and supervision functions from those of research. The WCMA 2013 also sets out the several principles including the use of the ecosystem method in the organisation of wildlife, sustainable use, and recognizes and encourages wildlife conservation and management as a procedure of land use.

⁹¹ V/D Berg Roses & Another vs. The Attorney General Nakuru High Court Petition No. 23 of 2012 (2016) eKLR

⁹² National Environmental Tribunal. *About Us*. 2011. http://net.or.ke/index.php?option=com_content&view=article&id=51&Itemid=57 (accessed March 25, 24).

⁹³ Act no. 47 of 2013

⁹⁴ Kenya Law Report. "Wildlife Conservation and Management Act, 2013 (No. 47 of 2013)." Kenya Gazette Supplement No. 18 of 27 December, 2013, 2014.

Kenya Wildlife Service (KWS) is the national focal point for the Ramsar Convention on Wetlands.⁹⁵ It has the directive of conserving Kenya's wetlands in the gazetted threatened areas, which include the national parks and game reserves. The KWS coordinates with various ministries to ensure the management of wetlands in Kenya. As regards wetlands in Kenya, Kenya Wildlife Service is mandated to conserve biodiversity through viable conservation area system⁹⁶. The body undertakes the conservation of wetlands through the adoption of integrated resource management based on sustainable land use and collaborating with stakeholders in the formulation and implementation of biodiversity conservation programmes. The wildlife service body also undertakes active management of diversity and undertaking comprehensive inventory and monitoring of essential biological diversity in wetlands.

Despite KWS being the national focal point for Ramsar Convention it does not have the mandate of development control in wetlands. Development approvals and regulations of land use is not under this specific government authority but is key for ensuring the wise use and conservation of the Tana River Wetland.

2.5.7. Physical Planning Act (PPA) 1996

The Physical Planning Act⁹⁷ provides for the grounding and development of physical development strategies. The Physical Planning Act has the potential to provide a basis for the nature conservation and environmental management in Kenya. The Physical Planning Act provides for the planning and execution of physical expansion plans. The Act requires that before any development commences, the proponent should apply to the relevant authority for approvals. The process of obtaining an approval for any development involves local mandates whose obligations include reviewing and approving all development applications and granting development approvals. According to Odote⁹⁸, although the Act does not mention wetlands, it can be used as a basis of conserving and sustaining wetlands as delicate ecosystems in cases where it is considered necessary.

⁹⁵ Kiai, S. P. M., and Mailu, G. M. *Kenya country paper. Wetland classification for agricultural development in Eastern and Southern Africa*. n.d. <http://www.fao.org/docrep/003/x6611e/x6611e02a.htm>.

⁹⁶ Kenya Wildlife Service. "National Report on the Implementation of the Ramsar Convention on Wetlands." *Ramsar COP12 of the Conference of the Contracting Parties*. Uruguay: Ramsar, 2015. 1-29.

⁹⁷ Cap.286 Laws of Kenya

⁹⁸ Odote, et al., 2008.

2.5.8. Water Act 2002

The Water Act⁹⁹ provides for the supervision, conservation, utilization and control of aquatic resources and for attainment and management of rights to use water.¹⁰⁰ The Act also provides for the creation and management of water resource and sewerage amenities. The Water Act has relevance for the management of wetlands in Kenya because wetlands are water based ecosystems. The Act outlines the management of water resources and has provisions for the protection of water catchments areas. The relevance of the Act is that it governs some of the aspects of wetlands management, but lack specificity in dealing with preservation and sustainable utilization of wetlands in Kenya.

Water Resource Management Authority (WRMA) is a corporate body under the Kenya Ministry of Environment Water and Natural resources and works according to the Water Act (2002). WRMA is the principal organization on water controlling in Kenya, and its mission is to control and manage water resources use effectively involving stakeholders for sustainable development.¹⁰¹

2.5.9. Tana and Athi Development Authority Act

The Tana and Athi River Development authority Act¹⁰² was enacted in 1974 principally to create an institution to advice on the foundation and co-ordination of development projects in the area of Tana and Athi River basins.¹⁰³

The Tana and Athi Rivers Development Authority (TARDA) is a state corporation established by the Tana River and Athi Development Authority Act and is charged with integrated planning and co-ordination of all development of the Tana and Athi River Basins.¹⁰⁴ TARDA undertakes most of the irrigation activities in the Tana Delta; however, under the Parent legislation the role of TARDA is stated to be providing advice on institution and co-ordination of development

⁹⁹ Cap.372 Laws of Kenya

¹⁰⁰ "No. 8 of 2002." *The Water Act, 2002*. Kenya Law Report, 2002.

¹⁰¹ WARMA. *Roles and Functions*. 2013. <http://www.wrma.or.ke/index.php/about-us/functions.html> (accessed March 25, 24).

¹⁰² Cap443 Laws of Kenya

¹⁰³ Tana and Athi River Development Authority Act (cap 443) Laws of Kenya.

¹⁰⁴ TARDA. *About Tarda*. 2015. www.tarda.co.ke (accessed March 25, 24).

projects in the Tana and Athi Rivers basins. TARDA has extended to leasing out the Tana Delta land to other private entities. In July 2014, TARDA advertised to lease 10,000 Hectares of the Tana Delta for rice irrigation to private firms. The lease was issued to Braken Agriculture (K) Ltd. The process of the lease has already drawn controversy with another bidding firm Unifresh Exotics filing a case in court to challenge the award of the lease.¹⁰⁵

Kenya has made some strides in putting in place a wetland regulatory framework. Besides ratifying the Ramsar Convention and enacting EMCA, the EMCA Wetland Regulations (2009) contain comprehensive measures on these important ecosystems.¹⁰⁶ However, while these regulations are comprehensive, their effective implementation is hampered by the fact that as subsidiary legislation, they do not enjoy the same prominence and legal authority as Acts of parliament. The country therefore needs to formulate a national wetlands policy urgently that would set out comprehensive strategic objectives to foster the wise use of the country's wetlands, and enact a statutory wetlands law. The policy and law should be cross-cutting and address the mandates of the ministries and institutions responsible for the environment, natural resources, water, irrigation, agriculture, fisheries and national planning that impinge on the wise use of wetlands.

According to Odote, Kenya needs a national action to advance institutional and organizational measures and address judicial and policy needs.¹⁰⁷ Moreover, the GoK needs to increase awareness and responsiveness of wetlands values, prepare portfolio, and observe the status of wetlands.¹⁰⁸ Kenya needs to pay particular attention to these issues to ensure conservation and wise use of its wetlands. The discussion will provide a good background to this research.

The IUCN Integrated Wetland Management an Integrated Wetland Assessment Toolkit discusses the provisions of the Ramsar Convention on the appropriate utilization of wetlands and various

¹⁰⁵ Wasuna, Brian. "Court Stops Firm's Rice Project in Tana Delta tender row." *Business Daily*, December 16, 2014: Online.

¹⁰⁶ Mwacharo, Mshenga. "State Must Pre-Empt Threat To Our Life-Sustaining Wetlands." *The Daily Nation*, February 1, 2014: Online.

¹⁰⁷ Odote, et al., 2008, 1-20.

¹⁰⁸ Ibid.

progress of implementation.¹⁰⁹ The toolkit sets out a progression for harmonized valuation and delivers a set of procedures that can be applied to examine the links among biodiversity, finances, and livelihoods in wetlands, and to label and focus on probable conflicts of interest between preservation and development objectives. The toolkit discusses conceptual framework for addressing wetland management problems, protection and development trade-offs, through integrating biodiversity, financial assessment and livelihood calculation. It further deliberates on case studies of the actualization of integrated wetland assessment in an organization framework in Stung Treng Ramsar Site and Mtanza-Msona Village, as well as Cambodia, Tanzania. The discussions are useful to this research on the effect of land use change in Tana Delta Wetland, as we will inquire on the necessary balance between development and conservation.

According to Verhoeven, increased agricultural activities are happening in wetlands because of increasing population and the need of food and energy crops to satisfy the growing demand.¹¹⁰ Therefore, a sustainable perspective recovery of peatland for agriculture ought to be strappingly discouraged. However, wide-ranging use of wetlands without extreme repossession measures and without fertilizers and pesticides might result in balancing food production with other wetland services and less damage to the biodiversity.¹¹¹

2.6. Wetlands Threats

According to Matthew, “most acute trade-off between environmental protection and development resulted from dynamism and complexity of wetlands.”¹¹² While wetlands still face numerous threats from natural factors worldwide, the majority of research findings acknowledge that direct or indirect human interaction with the environment are the principal threats to wetlands. Humans and their activities cause 65% of wetland disturbances, while 35% are from

¹⁰⁹ Springate-Baginski, O., Allen, D. and Darwall, W. "An Integrated Wetland Assessment Toolkit." 2009. Gland, Switzerland: IUCN and Cambridge, UK: IUCN Species Programme. (Accessed March 25, 2016. <https://portals.iucn.org/library/efiles/documents/2009-015.pdf>.

¹¹⁰ Verhoeven, Jos T.a., Merel B. Soons, Ron Janssen, and Nancy Omtzigt. "An Operational Landscape Unit Approach for Identifying Key Landscape Connections in Wetland Restoration." *Journal of Applied Ecology* 45, no. 5 (2008): 1496-503.

¹¹¹ Ibid.

¹¹² Matthew P, Mutsa M and Helen A. "Working Wetlands: a new approach to balancing agricultural development with environmental protection." IWRM, 2006.

natural causes.¹¹³ Out of the human cause distractions, over 70 % are assumed to be because of direct human activities, while the remainder are from indirect sources.¹¹⁴ In the African continent, most of the threats in wetlands are because of the direct and indirect unsustainable human interactions with these valuable but vulnerable environments. Kenya, Ethiopia, and Uganda¹¹⁵ are facing these threats today.

The debate about the use and conservation of wetlands has been ongoing for several decades and the division tends to be between the stakeholders seeking to develop wetlands for economic purposes, particularly agricultural production and those who consider that wetlands should be conserved and protected.¹¹⁶ The ecologists argue that wetlands must be sustainably preserved to preserve their ecological influences to the environmental system.¹¹⁷ According to Gebreslassie¹¹⁸, the views of those seeking to develop wetlands encompass the assumption that wetlands are wastelands. These assumptions are concentrated in developing countries, where the desires for economic development and food security supersede the conservation discussions. Governments of developing nations consider converting wetlands to agricultural land as a better option than preserving them and gaining their values.¹¹⁹ The notion has made wetlands an attraction for conversion to irrigated agricultural land because of the flat landscape, fertile soils, and reliable sources of water in dry seasons.

In the African continent, the wetlands debate is between costs on one side and the stakeholders on the other side. Conferring to the Food and Agriculture Organization (FAO), African countries have leased or sold to foreigners over 20 million hectares of land within the last 3 years, with extended leases of up to 99 years.¹²⁰ The World Bank figures estimates that 37% of all “land

¹¹³ Dugan P (1990). “Wetland Conservation: A Review of Current Issues and Required Action.” IUCN, Gland, Switzerland. 1990, p. 94.

¹¹⁴ Ibid.

¹¹⁵ Glass, Sophie, "Implementing Uganda's National Wetlands Policy: A Case Study of Kabale District" (2007). *Independent Study Project (ISP) Collection*. Paper 101.

¹¹⁶ Ibid.

¹¹⁷ Ibid, p. 41.

¹¹⁸ Gebreslassie, et al., 2014. "Wetland Degradation in Ethiopia: Causes, Consequences and Remedies." *Journal of Environment and Earth Science* 4 (11): Online.

¹¹⁹ Ibid.

¹²⁰ FAO. *Foreign Land Investments in Developing Countries. Contribution or Threat to Sustainable Development?* Publication Series, no 7, Sweden: FAO, February 2011.

grabs” is for agro-fuels production, and is expected to increase several folds by 2045.¹²¹ In the Tana Delta, acts of cultivation by the locals used to take place for subsistence, however, since the entry of TARDA, wetland cultivation in the Tana Delta has extended beyond small-scale cultivation to include thousands of hectares of land and big investors. Currently, the reclamation and farming of wetlands has become a common phenomenon throughout the delta that threatens the Tana Delta wetland.

Wetlands in Kenya continue to face constant degradation as the administration and populations around wetlands continue to exploit wetland resources unsustainably through unsustainable grazing and cultivation and over abstraction of water for domestic use, large-scale agricultural practices and industrialization.¹²² According to Odote, poor regulations of property right and property rights regimes in Kenya are primary threats to wetland management in Kenya.

Samoilys¹²³ also point out that in Kenya, the extensively inefficient governance, a sectorial strategy to resource administration, a lack of civic access and involvement in decision-making, lack of access to environmental information for local populations, and land tenure insecurity threaten wetlands in Kenya. Wetlands in Kenya are also threatened by the creation of new human and livestock settlements, deforestation, illegal clearing of natural vegetation for various economic activities. Unplanned development activities, lack of an operative National Wetlands Program and crosscutting sectorial policies in Kenya, and management plans also threaten wetlands in Kenya.

The Tana River Delta in Kenya is experiencing numerous environmental challenges in spite of being a wetland of international importance included in the Ramsar List. The Tana River Delta lower flood plain supports a range of social and economic activities, and its biodiversity provides valuable habitats in an otherwise very arid landscape.¹²⁴ Before, the Kenyan government and private multi-nationals expressed interests in the Tana Delta, the wetland used to support subsistence livelihood for the local communities, such as crop farming and dry seasons

¹²¹ FIAN. *Land Grabbing Large Scale Rural Transformation*. Heidelberg, Germany: Food First Information and Action Network, 2010.

¹²² Odote, C., Ochieng, B., and Makoloo, O. "The Implications of Property Rights for Wetlands Management in Kenya." *Institute for Law and Environmental Governance*, 2008: 1-20.

¹²³ Samoilys, et al., 2011.

¹²⁴ Odhengo, et al., 2012, p. 18.

grazing.¹²⁵ The destruction of the Tana Delta wetland began after commercial farming of rice started in the 1980s. The rice irrigation scheme occupied 16,000 ha of land, alienating much of subsistence livelihood for the local communities and wetland fauna and flora.¹²⁶

According to Odhengo, the Tana Delta is home to pastoralists who rely overly on the resources in the region for their cattle throughout the year, especially during the dry seasons.¹²⁷ The Delta also supports substance farmers who grow various food crops on the declining floodplain bounds and along the riverbanks. The Delta also supports fishing activities in the numerous lakes and channels. The ongoing commercial land uses and the growing demand from the national government and local and international investors has degraded the wetland and ignored the needs of local communities and conservation efforts. The investors undertaking large-scale farming in the Delta are venturing into bio-fuel crops and large-scale rice production.¹²⁸ These interests have expediently disregarded the indigenous people and the growing pressures they face from natural and human-made phenomena. Additionally, they have ignored the conservation of the Tana Delta Wetland as per the Ramsar Convention. TARDA and other large-scale investments justifications totally ignore the rights, interests, and pressures faced by the indigenous communities.¹²⁹

In the 1980s, TARDA obtained major support from Dutch Bilateral Development Aid to study the potential of the Lower Tana basin for numerous development options, including irrigation and navigation and this included a thorough viability study of the Tana Delta Irrigation Project (TDIP). The viability research emphasized potentially detrimental environmental consequences. The EIA report identified key biodiversity, ecosystem, and livelihood concerns, prompting the Dutch aid agency to withdraw from funding the first phase.¹³⁰ The report acknowledged the risk of the interference with Orma pastoralists' use of the rangelands and their ability to water their livestock, the threat to the fragile, threatened riverine forests and two threatened monkey

¹²⁵ Ibid., p. 21.

¹²⁶ Ibid., p. 6.

¹²⁷ Ibid.

¹²⁸ Ibid.

¹²⁹ The East African Wildlife Service. *Scarcity of Land and Resources is cause of Tana Delta Violence*. 2013. <http://www.kenyawetlandsforum.org/Reports/Tana%20Delta%20fact%20sheet.pdf> (accessed March 24, 2016).

¹³⁰ Mbonde, Omari. *A Guide to the EIA Process*. Nairobi: East African Wildlife, 2012.

species.¹³¹ However, TARDA rejected the recommendations of the EIA report. TARDA went ahead and found a new donor, the Japanese International Cooperation Agency (JICA) and their Overseas Economic Cooperation Fund (OECE). During this period, neither JICA nor OECE seemed appropriately informed about the suggestions of the EIA report. Moreover, TARDA was not obligated to acknowledge the EIA as it was not a requirement in Kenya then. The destruction of the Tana Delta wetland today was occasioned by the lack of laws, policies, and institutions on wetland management policy.

2.7. Land Degradation

Land degradation describes the long-term loss of ecosystems and the lands capacity to provide ecosystem goods and services. Land degradation is common in dry areas, affecting nearly 33% of the world's potentially arable land. High population growth and undertaking development in dry land increase pressure on land leading to degradation. According to FAO, the transference of critical production features to other uses, such as through irrigation and the attraction of water for industrial or commercial uses at the expense of the local water needs disruptions the continuity in traditional production systems in dry lands. Land degradation is costly, as it costs an estimated US\$40 billion yearly globally¹³². The effects of land degradation include socioeconomic problems, such as conflict for resources, drought, loss of biodiversity, and reduce land output. The interaction between the transference of critical production features and climate change has accelerated the rate of land degradation.

Land degradation significantly affects sub-Saharan Africa, resulting in loss of land productivity, averaging 8% annually¹³³. The rate is expected to increase significantly with increasing pressure of climate change, population increase, and water scarcity. In Kenya, land degradation is causing habitat loss and fragmentation. The two aspects are the greatest threat to biodiversity. Poverty, high population growth and the drive for economic growth are the underlying causes of land

¹³¹ Lebrun, Delphine, Olivier Hamerlynck, and Judith Nyunja. "The importance of flexibility: An analysis of the large-scale Tana-delta irrigation project in Kenya, implemented under an estate system." In *Shared waters shared responsibilities Hydropolitics in East Africa*, by Stéphanie Duvail, 261-282. Nairobi: IFRA, 2010.

¹³² FAO. *Land degradation assessment*. 2016. <http://www.fao.org/nr/land/degradation/en/> (accessed November 19, 2016).

¹³³ GRID-Arendal. *Impacts On Environmental Degradation on Yield And Area* . 2014. <http://www.grida.no/publications/rrr/food-crisis/page/3567.aspx> (accessed November 19, 2016).

degradation. Almost all forest, grasslands and wetlands are undergoing land degradation. In the case of Tana River Delta, overgrazing, irrigation, and over abstraction of water are accelerating the rate of land degradation. A report published by the UNEP about the trends of land degradation in Kenya, under the current drier climate, Tana River wetland will see a decline in forest cover, loss of biodiversity because of changing land uses¹³⁴. Moreover, land degradation will see the fragmentation of the wetland ecosystem and eventual loss.

Despite the many challenges facing wetlands management in Kenya, Kenya has instituted a long-term plan to protect its varied wetlands¹³⁵. Kenya has drafted a Master Plan for the Conservation and Sustainable Management of Water Catchment Areas in Kenya in line with the concept of wise use outlined by the Ramsar Convention. The Master Plan recognizes water catchment pillars that necessitate critical protection and sustainable management. The implementation of the plan will reverse land degradation because it draws a roadmap for incorporating planning that involves all stakeholders¹³⁶. It also provides a framework upon which wetland management should be implemented.

2.8. Sustainable Development of Wetlands

According to Kecha,¹³⁷ sustainable wetland use contributes towards environmentally sound development decisions that sustain and improve the livelihoods of those who rely on the wetland resources, for their unique, financial, ecological, and social values. Kecha also note that sustainable wetlands use depends on understanding the way the parts integrate into the whole system, managing the underlying problems, understanding nature's limits, and learning to live in balance with natural systems. Consequently, some of the principles of sustainable wetland utilization include, wise use, precautionary principle, concerted and participatory approach, and the global dimension. These principles are addressed by the Ramsar Convention to which Kenya is a signatory and guide the National Wetlands Conservation and Management Policy. The

¹³⁴ UNEP. "Land Degradation." 2009.
http://na.unep.net/atlas/dAtlas/sites/default/files/unepsiouxfalls/atlasbook_1135/Kenya_Screen_Chapter4b.pdf (accessed November 19, 2016).

¹³⁵ Nuttall, Nick. *Kenya Aims to Tackle Growing Degradation of Spectacular and Vital Wetlands*. 2013.
<http://www.unep.org/newscentre/default.aspx?DocumentID=2723&ArticleID=9583> accessed November 19, 2016).

¹³⁶ Ibid.

¹³⁷ Kecha, 2007.

Ramsar Convention falls under the category of intergovernmental accords on wetlands that provides for the agenda for domestic action and international co-operation for the preservation and wise use of wetlands and the associated properties. The Convention was assumed in the Iranian city of Ramsar in 1971; however, it came into force in 1975.¹³⁸ The Ramsar Convention proposes sustainable use of wetlands, and identifies the vital environmental functions that wetlands play. The convention also recognizes the recreational, socio-cultural, scientific, and economic value of wetlands in different nations.¹³⁹ Consequently, the key pillars of the Ramsar Convention outline the role of stakeholders in protecting wetlands within their jurisdictions or shared jurisdictions.

The Convention's major goals are to avert the loss of wetlands and to safeguard their protection from degradation. To meet these goals, the Ramsar Convention requires the contracting entities to obligate to apply efforts for the application of the wise use of all their wetlands. First, the parties ought to select at least one wetland for the List of Wetlands of International Importance (the "Ramsar List") and ensure its effective management. Alongside the provision, a contracting party should inspire the preservation of every wetland on the Ramsar List. Second, the Ramsar Convention requires the contracting parties to include wetland conservation issues in their natural resources planning agenda and promote the judicious use of wetlands in their jurisdictions. Third, the Convention requires the contracting entities to establish reserve areas on wetlands within their borders. Last, the Convention expects the contracting parties to share information and experiences with each other regarding wetlands, as well as cooperate transnationally, particularly as regards shared wetlands, water systems, and species, and development schemes impacting wetlands¹⁴⁰. The key pillars of the Ramsar Convention act as broad guidelines for the protection of wetlands; however, each member state can adapt the Convention's provisions to meet its specific needs.

¹³⁸ The Ramsar Convention Secretariat. *About the Ramsar Convention*. 2014. <http://www.ramsar.org/about-the-ramsar-convention> (accessed May 16 2016).

¹³⁹ Groot, et al. *Valuing wetlands. Guidance for valuing the benefits driven from wetland ecosystem services*. Ramsar Technical Report No. 3, Gland, Switzerland: Ramsar Convention Secretariat, 2006.

¹⁴⁰ Kruchek, B. L. "Extending Wetlands Protection under the Ramsar Treaty's Wise Use Obligation." *Arizona Journal of International and Comparative Law* 20, no. 2 (2003): 409-442.

The Ramsar Convention definition of wetlands is rather broad and covers natural and manmade wetland habitats.¹⁴¹ The breadth of the definition means that the member states can adapt the description to suit their specific bio-geographic situations and develop additional comprehensive cataloguing structures as a basis for local or national legislation. Further, the Ramsar Convention fails to identify any specific measure for applying the classification; therefore, member states have the option to choose the best applicable method. The flexibility of the definition has had many member states develop comprehensive ordering systems of wetlands as a basis for domestic wetland regulation and administration plans than the Ramsar Convention needed, enabling comprehensive management and protection of wetlands. Contrariwise, where a contracting party narrows the scope of the classification, policymakers should act appropriately to ensure conformity with the Ramsar requirements. Alongside the key pillars, a philosophy of wise use of wetlands is central to the concept of wetland conservation and protection in the Ramsar Convention.

2.9. The Concept of Wise Use and Wetlands Management

According to the Ramsar Convention, when contracting parties accede to the accord, they commit to working to the wise use of the catchment areas for water and wetlands in their jurisdictions, through nationwide plans, guidelines, and lawmaking, administration programs and civic training.¹⁴² According to the Ramsar Convention, the wise use of wetlands is the “conservation of wetlands ecological character, achieved through the execution of ecosystem methods within the context of sustainable development.”¹⁴³ The wise use approach guarantees sustainable development by placing societies’ well-being at the center of the decision-making processes. In doing this, the wise use method distinguishes the vital connections that are between societies and the viable development of natural resources. According to Finlayson¹⁴⁴, the wise use concept of sustainable development, emboldens community commitment and openness in discussing trade-offs and establishing equitable consequences for conservation.

¹⁴¹ Ibid.

¹⁴² The Ramsar Convention Secretariat. *The Wise Use of Wetlands*. 2014. <http://www.ramsar.org/about/the-wise-use-of-wetlands> (accessed March 24 2016).

¹⁴³ Ibid.

¹⁴⁴ Finlayson, et al., 2011. "The Ramsar Convention and Ecosystem-Based Approaches to the Wise Use and Sustainable Development of Wetlands." *Journal of International Wildlife Law & Policy* 14 (3-4): 176-198.

Under the MEA framework, the wise use concept has been stated to be the upkeep of ecosystem benefits/services to guarantee long-term conservation of biodiversity and social well-being and poverty mitigation. According to Finlayson¹⁴⁵, in the framework of justifiable development, wise use identifies that while some wetland developments are unavoidable and that numerous developments have significant benefits to civilization, developments can be facilitated in justifiable conducts by approaches expounded in the Convention, and use of integrated development plan.

The meaning of the wise use concept in wetland conservation for countries is it informs the approaches of member states when utilizing wetland resources besides policy and planning framework. Under the concept of wise use, countries need to see wetlands as dynamic systems to allow for the consideration of variability of their specific environments over time. The concept also allows countries to achieve a balanced use of wetland resources by delivering ecological, economic, and socio-cultural values over the long-term. Countries can achieve these benefits by ensuring the decisions on management of wetland resources involve key stakeholders. The decisions need to be reached after consulting, coordinating, and collaborating with land administrators, national and local government agencies, and the community. However, in the case of Kenya, the decisions are not all inclusive, as signified by the court battles and conflicts among communities living with Kenyan wetlands such as the Tana Delta.

The wise use concept also benefits decision makers because it ensures they use the best available information, understand, and implement sustainable uses of wetlands by recognizing the natural variability of wetland aspects and knowing the limits to use of the resources. The overall goal of the Ramsar Convention relates to operative preservation and wise use of wetlands as a basis of biodiversity conservation and sustainable development. The goal relates to Kenya because various sites and locations are encompassed in the current Ramsar List. The threats facing Kenyan wetlands are because the wise use of wetland resources has largely been overlooked with the decisions on management of wetland resources involving a few stakeholders. The wise use of wetland resource needs to be supported by the relevant laws and policies to ensure sustainability.

¹⁴⁵ Ibid.

2.10. Gaps in Literature

The existing literature shows that Kenya has legislated several laws and policies relevant to wetland management; however, the country lacks of an all-inclusive institutional framework and this acts as one of the primary barriers to the effective management of wetlands in Kenya. The lack of a coordinated wetland conservation and management in Kenya is contributing to increased wetland degradation and loss as in the case of the Tana Delta. Most researchers point that by coming up with the necessary wetlands conservation and management policies, Kenya will enhance wetland management because it will outline the steps to be implemented to address wetland conservation and management challenges in Kenya by acting as a guideline. Based on the literature review, the recognition of the Tana Delta wetland as a Ramsar site was a turning point that would have seen the proper management and conservation of the ecosystem if Kenya had taken the steps to enact the necessary laws and policies in a timely manner. Recent literature indicates that the wetland is at a crucial turning point and it may change drastically with the drafting of a wetland policy and environmental policy as key decisions regarding the wetland future depend on the implementation of these laws. Most of the researches address the implications of changing water resources, loss of biodiversity, land-scale development projects, and the implications of conservation of the wetland. The gap in the literature is that no researcher has related land uses in the Tana Delta to wise use of the wetland resources. Therefore, the research proposes to address the gap by assessing the environmental impact of land use practices on the Tana Delta wetland.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

The chapter defines the scheme and procedural aspects of the research. It describes the characteristics of the target population, the research plan, study population, sampling methods and procedures, data gathering procedures and instruments, data analysis methods and ethical consideration in the study.

3.2. Study Area

The Tana River Basin in Kenya lies approximately between latitudes $0^{\circ}0'53''$ and $2^{\circ}0'41''$ South and longitudes $38^{\circ}25'43''$ and $40^{\circ}15'$ East. The basin occupies a total area of 120, 925 sq. km (Figure1).¹



¹ MEMR. Kenya Wetlands Atlas. Ministry of Environment and Mineral Resources, Nairobi, Kenya, 2012.

Figure 1: Location map of the study area.²

The Tana River Delta (TRD) is in Tana River and Lamu Counties and occupies a land region of more than 130,000 ha of which 69,000 ha are regularly inundated by floodwater. The delta is characterized by little and undependable rainfall. The delta experiences a bimodal rainfall pattern. The Tana River originates from the Mount Kenya region and meanders through nearly 10 counties and over 1000 Km before settling into the Indian Ocean. As of 2012, the estimated population of the Tana River Basin was 5.7 million.³ According to the Kenya National Census of 2009, Tana and Lamu Counties had a population of 240,008 people.⁴ The specific area of the study is in the lower Tana Delta in Garsen and has an estimated population of nearly 100,000 people.⁵ The Tana River Delta supports various land use types and practices. The communities living in the area practice subsistence crop farming, livestock keeping and pastoralism, and fishing. The Delta also support commercial land use practices including, commercial farming of rice and other cereals, sugarcane, *Jatropha curcas* for biofuel, horticulture farming and oil and gas exploration⁶. Other land use types and practices include construction of dykes and a water dam in the upstream parts of Tana River among others. Most of the land in the Tana River Delta was trust land now designated as community land.

3.3.Data Needs Types and Sources

Qualitative data from primary and secondary data sources were needed to answer the research question. Qualitative data was preferred in the research because the research was descriptive; hence, it entailed finding out the ways various stakeholders felt about the issue of land change in the Tana Delta. The data included aspects describing land use changes and practices in the TRD. The data were collected using semi-structured questionnaires. Primary data were collected from the key informants selected from government agencies, civil society, and local residents in Garsen area of Tana River County. EIA reports, national laws, court cases, international conventions and declarations, books, reports, journals, and newspapers and website articles provided the secondary qualitative data.

²Ibid.

³ Odhengo, et al., 2012, p. 1.

⁴ Odhengo et al., 2012, p 1.

⁵ Ibid, 1.

⁶ Odhengo, et al., 2012, p. 5-6.

3.4. Research Design

The study adopted a descriptive survey design. The design was chosen as it enables the researcher to study a representative sample and generalize the results to a larger population that has the same characteristics as the sample. A descriptive research design describes the situation as it is at present; hence, it was used to obtain information concerning the status of the TRD. The primary purpose of using the design was to describe information or data using numbers. According to Mugenda and Mugenda, this type of research design defines such things as possible behaviour, characteristics, and values and beliefs of the phenomenon being studied.⁷ The descriptive research matches the purpose of this study, as its intention is to determine the impacts of land use change on wise use and conservation in TRD.

3.5. Target Population

A study population describes a collection of fundamentals from which the sample is essentially selected. A group of people, objects or items from which samples are taken for measurement describes a study population.⁸ The study targeted locals from the Tana River Delta because they have experienced and witnessed the impacts of land use change in the Tana delta. Organizations, such as TARDA, NEMA, KWS, Kenya Wetlands Biodiversity Research Team (KENWEB) and Nature Kenya were also selected because they are some of the primary organizations involved in wetland management in the Tana Delta. Key representatives from the institutions were chosen based on their administrative responsibilities and understanding of the subject under study.

3.6. Sample Size

According to Mugenda and Mugenda (2003), a sample of between 10-30% is considered adequate for generalization of the findings to the whole population if the sample is representatively selected, avoiding various types of bias.⁹ Mugenda and Mugenda also state that the Rule of the Thumb is to obtain as big a sample as possible. The researcher used the table

⁷ Mugenda, O. M., and Mugenda A. G. *Research methods: Quantitative and qualitative Approaches*. Nairobi: African Centre for Technology Studies, 2003.

⁸ Whitley, Bernard E., Mary E. Kite, and Heather L. Adams. *Principles of Research in Behavioral Science*. New York: Psychology Press, 2013, pp. 484-86.

⁹ Mugenda and Mugenda, 2003.

below for finding a base sample size with the sampling error of 5% and confidence level of 95%, taking a population size of 100%.

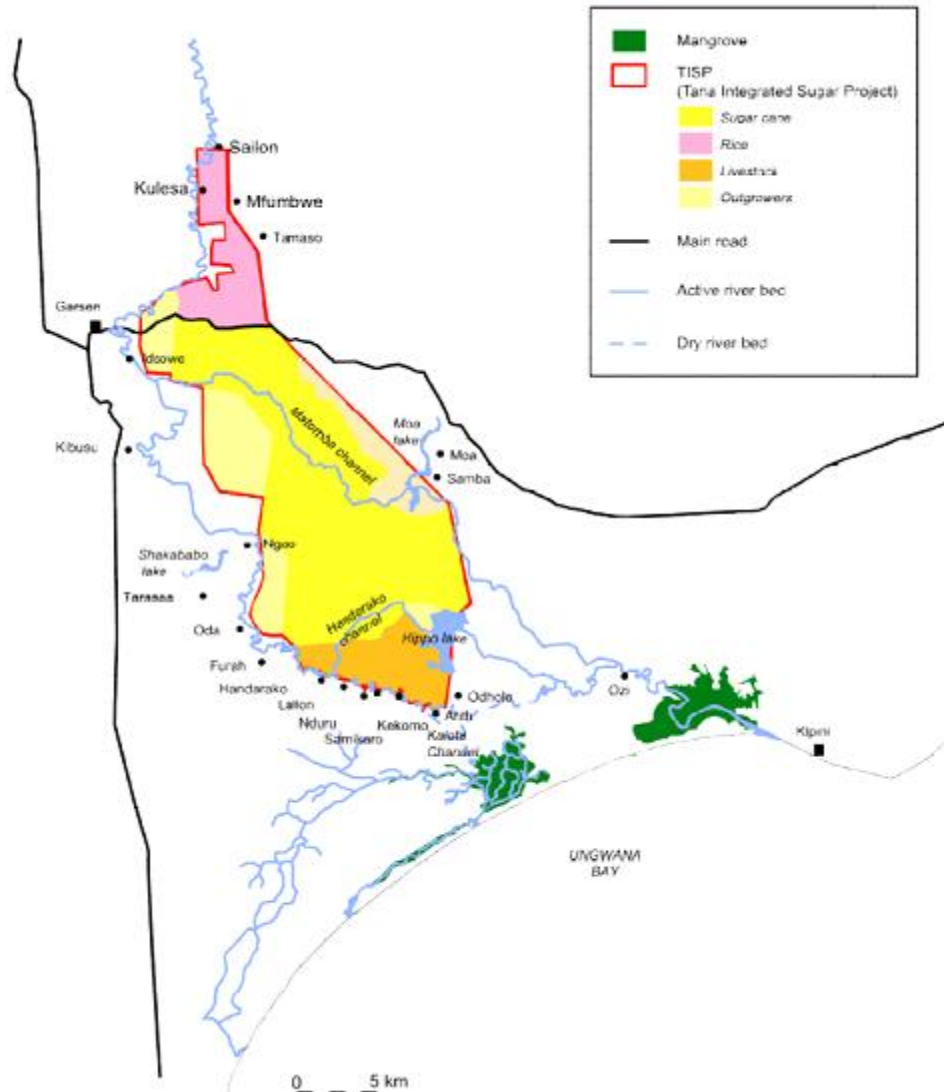
Table 3. 1. Sampling frame

Target population	Variability				
	50%	40%	30%	20%	10%
100	81	79	63	50	37
500	222	212	128	84	52
1,000	286	269	147	92	55
10,000	385	356	169	100	58
50,000+	397	366	172	101	58

Based on the relatively small number of the target population the researcher employed a 20% ratio from the table, taking a target population of 100 and above. This gave a sample size of 50 respondents.

3.7.Sampling Procedure and Data Collection

The research was conducted in Tana River County, Kenya. The county borders Lamu County to the East and Indian Ocean to the South. Three sites were selected in Minjilla area of Garsen Constituency namely Kulesa, Wema, and Hewani. The sites were chosen because they host the Tana Delta Irrigation Project, which so far accounts for the single biggest project in the delta and located upstream of the river delta where land use changes and practices have taken place since the 1970s.



(Source: Temper)¹⁰

The researcher adopted purposive sampling to select respondents that provided the required information. Through purposive sampling, 29 local leaders and 10 government and non-governmental agencies officials were selected because they were knowledgeable about the research problem or possessed the necessary information. Focus group discussions were used to collect data from the community leaders while structured in-depth interviews through questionnaires were used to collect data from organizational stakeholders including TARDA, Kenya Wildlife Service, NEMA, KENWEB, and Nature Kenya among others. The data

¹⁰ Temper, Leah. "Let Them Eat Sugar: Life and Livelihood in Kenya's Tana Delta." *Case Study*. Barcelona: Ecological Economics and Integrated Assessment Unit, 2010.

collection tool and methods were most suitable, because the researcher was able to collect the appropriate data within a short period and the respondents well informed.

The institutional respondents were contacted and the representatives to be interviewed were chosen based on their administrative role and familiarity with the research problem and subject under study. A semi-structured interview was adopted for the research to allow the respondents to give more input. Focus groups were used because they provided the researcher with the opportunity to clarify certain points with the participants. Moreover, they helped the researcher get the input of the locals who could not read or write.

3.8.Data Analysis and Presentation

Questionnaires were first cleaned and checked for completeness. Data was the input into Microsoft Excel and analysis done. Transcripts from the in-depth interviews were studied and major themes identified. Qualitative data analysis was then performed. Qualitative analysis embroils the identification, scrutiny, and analysis of patterns and themes in textual information and defines how these configurations and themes support the answers to the research questions at hand. Qualitative was used to identify and summarize the themes from the responses given by key informants during the focus group discussions. Descriptive statistics such as means, standard deviation, and percentages were computed to describe the variables under study. Later the data was presented using tables, graphs, and pie charts.

3.9.Study Limitations

First, access to the project area was very difficult due to security concerns and the researcher had to get police escort during the field study and meeting with the local community. Also getting vital reference documents, such as the EIA reports from the NEMA offices and TARDA was a challenge. Where the researcher managed to access the EIA reports, it was difficult to secure an interview or undertake focus group discussions with the concerned agencies. The obstacle was foreseen, especially on the perception that the research acted as a bottleneck on the economic development in Tana Delta, especially from the private developer's perspective who might have felt that the research is intended to make negative recommendations against their development projects. Further, the expansive nature of the study area and the numerous land uses being

undertaken tends to complicate the research based on the costs, time, and travel. The researcher therefore sampled a few of these projects and interviewed a few of the representatives of the community projects proponents and other stakeholders.

3.10. Ethical Consideration

The respondents were informed of the purpose of the research was purely academic. The researcher assured the participants of the privacy and confidentiality of the information, that the information was only to be used for the purpose of research, and that their identity would not be disclosed.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF FINDINGS

4.1.Introduction

In this chapter, the findings of the data analysis are presented and interpreted. The findings are grouped into those from key informants and the residents of Tana Delta. The findings are summarized using tables, graphs, and charts, and qualitative analysis done in prose.

4.2.Response Rate

The study targeted 29 local leaders. Out of 29 questionnaires distributed, 23 met the inclusion criteria of being complete, representing a 76% response rate, which is a reliable response rate for data analysis. Mugenda and Mugenda (2003) points out that for generalization, a response rate of 50% is adequate and for analysis and reporting, a response rate of 60% is good and a response rate of 70% and over is excellent.

The study also targeted 19 lead experts for the in-depth interviews. However, 50% of the lead experts (key informants) declined the interview because of perceived conflict of interests. The key informants felt that the research intended to make negative recommendations against development projects that they were undertaking in the Tana delta wetland. Out of 19 intended in-depth interviews, nine lead experts from the selected organizations agreed to an interview, representing a 50% response rate. According to Mugenda and Mugenda, a 50% response rate represents a reliable response rate for data analysis. The nine lead experts were drawn from the Kenya Wildlife Service, TARDA, NEMA, KENWEB, and Nature Kenya.

4.3. Demographic and Socio-economic Description of the Respondents

4.3.1. Gender of the Respondents

From the findings, the majority (58%) of the respondents were males while 42% of the respondents were females. Figure 4.1 shows the summary of the results.

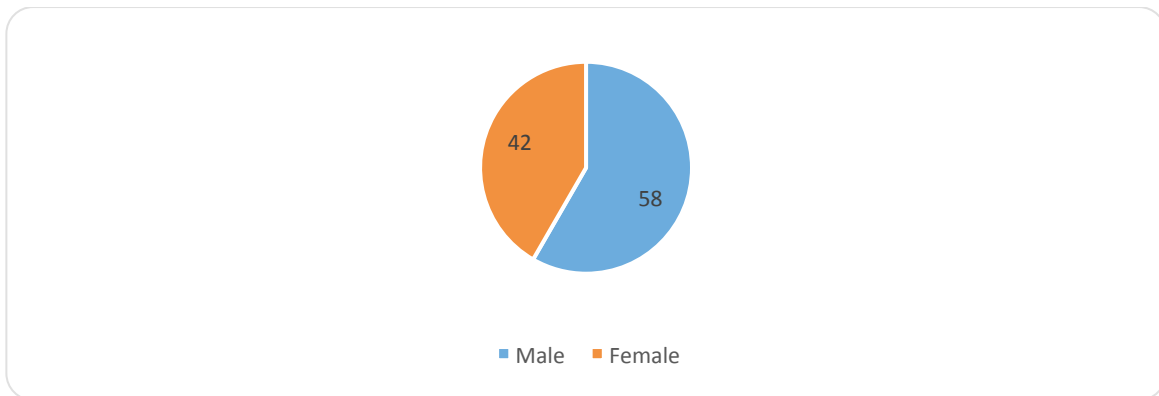


Figure 4.1 Gender of the Respondents

4.3.2. Age

From the study, most of the respondents (43%) were in the 38-46 years age group. Table 4.1 shows the summary of the findings

Table 4.1 Age of the respondents

Age group	Frequency	Percentage
20-28	2	9
29-37	7	30
38-46	10	43
47-55	3	13
Above 55	1	4
Total	23	100

4.3.3. Level of Education

According to the results of the study, most of the respondents (39%) had no formal education. Those who had attained primary school education came second (32%). Figure 4.2 shows the summary of the findings.

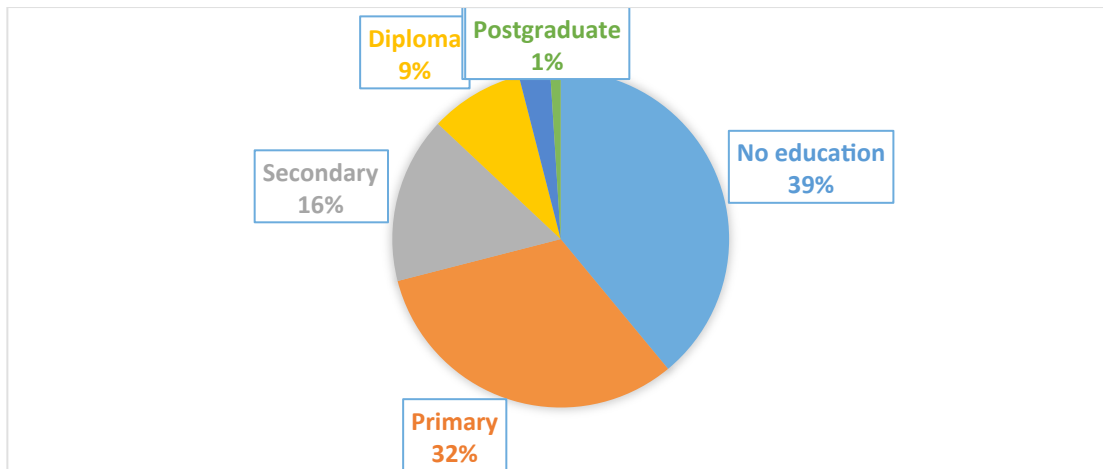


Figure 4.2 Level of Education

4.3.4. Duration of Living in the Area

The finding of the study showed that most of the respondents (35%) have been living in the area for more than 16 years. Figure 4.3 shows the summary of the result of the study.

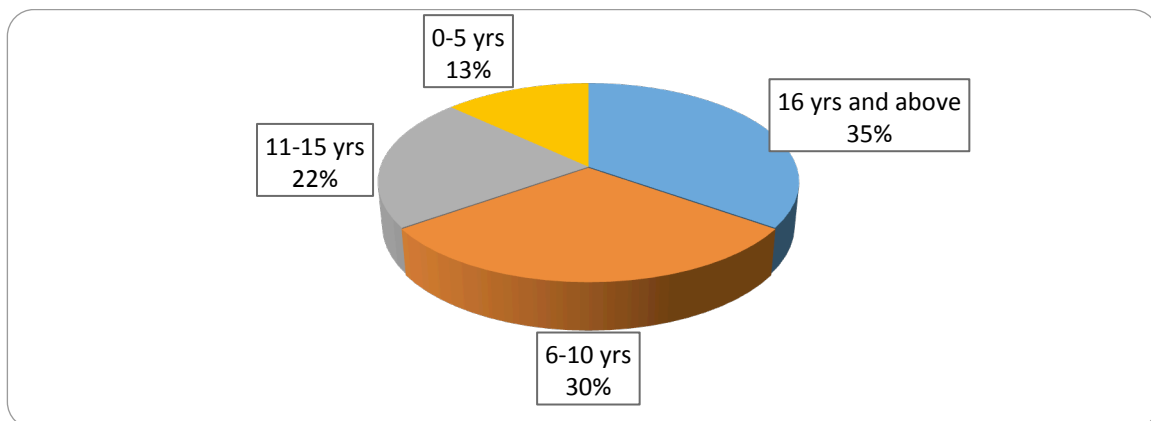


Figure 4.3 Duration of Living in the Area

4.4.Land Use Practices in Tana Delta Wetland

4.4.1. Livelihood Activities

The majority of the respondents (30%) engaged in crop production. Table 4.2 shows the summary of the findings.

Table 4.2 Types of Livelihood Activities

Livelihood Activities	Frequency	Percentage
Crop production	7	30
Livestock keeping	5	22
Farming and livestock keeping	6	26
Trade	5	22
Total	23	100

4.4.2. Aspects of Land use Practices

From the findings, describing the types of livelihoods in TRD, small-scale crop farming and other agricultural activities were the most prevalent (78%) social economic activities in the delta. The cultivation of rice and other food crops was taking place on the disappearing floodplain edges and by the riverbanks. The findings also indicated that the respondents were aware of the proposed and ongoing large-scale agricultural activities being undertaken by the government agencies and the private companies. Further, small-scale farming, fishing, and pastoralism were some of the economic activities undertaken by the communities living in the delta, which were dependent on the Delta Wetland.

4.4.3. Infrastructural Developments

From the findings, 77% of the respondents pointed out that infrastructural development are taking place in the Tana Delta alongside agricultural developments.

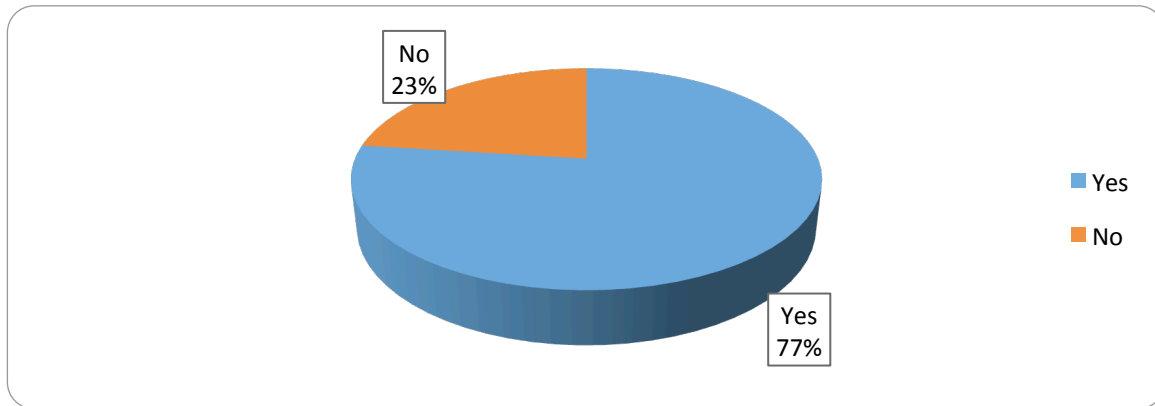


Figure 4.4 Infrastructural Developments

4.4.4. Economic Activity Taking Place in the Tana Delta

According to the findings, the majority (39%) of the respondents, pastoralism is the main economic activity in the Tana Delta, characterized by livestock keeping and herding. in the Tana Delta. Figure 4.5 has the summary of the findings.

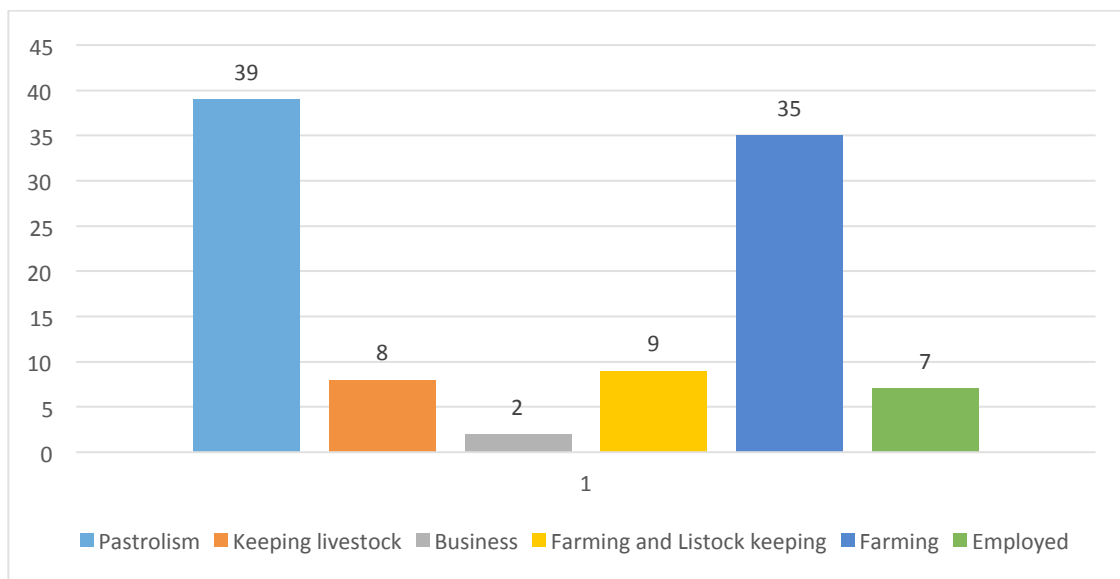


Figure 4.5 Economic activities taking place in the Tana delta

4.5.Land Use Changes' Contribution to People's Livelihoods

Most of the respondents agreed that land use changes have affected people's livelihoods. The involuntary displacement of people for development purposes, over abstraction of water mostly for irrigation, conflicts between societies mostly between animal keepers and horticultural farmers and local communities against external investors, and loss of sources of livelihood were identified as some of the effects of land use changes in the Tana Delta wetland. Conversely, some respondents were of the view that the communities have benefitted through improved livelihoods.

4.5.1. Extent to Which Land Use Changes Threaten Peoples Livelihoods

The findings indicate that most (41%) of the respondents claimed that land use changes threaten peoples livelihoods largely. Figure 4.6 shows the summary of the findings.

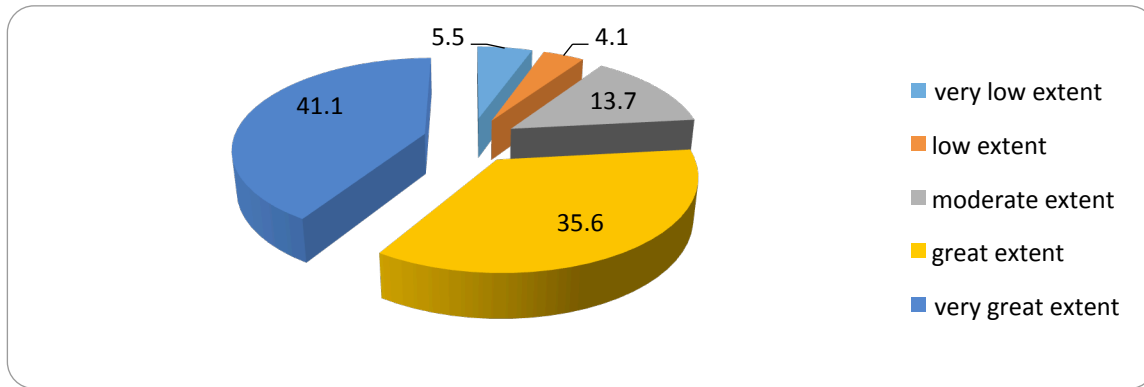


Figure 4.6 Extent to which land use changes threaten peoples livelihoods

4.6.Land Use Tradeoffs

4.6.1. Government Consultation on Projects Development in the Tana Delta Wetland

The majority (60%) of the respondents pointed that the government does not involve other organizations when setting up any projects in Tana Delta Wetlands. Figure 4.7 shows summary of the findings.

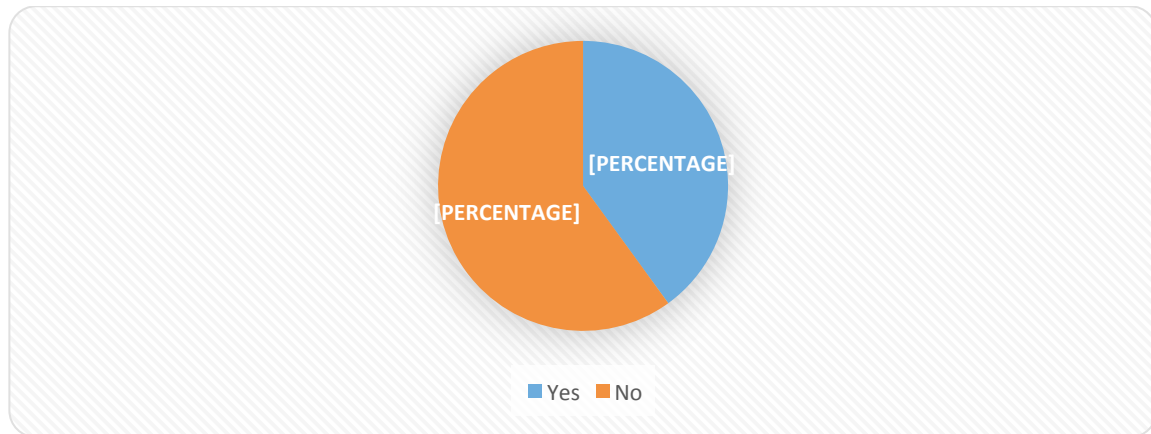


Figure 4.7 Government consultation on projects development

4.6.2. Land use Planning and Regulation

The researcher wanted to know if the respondents were involved in the planning of projects in the Tana delta wetland. The majority (74%) of the respondents indicated that they were not involved or consulted in the planning. Figure 4.8 shows the summary of the results.

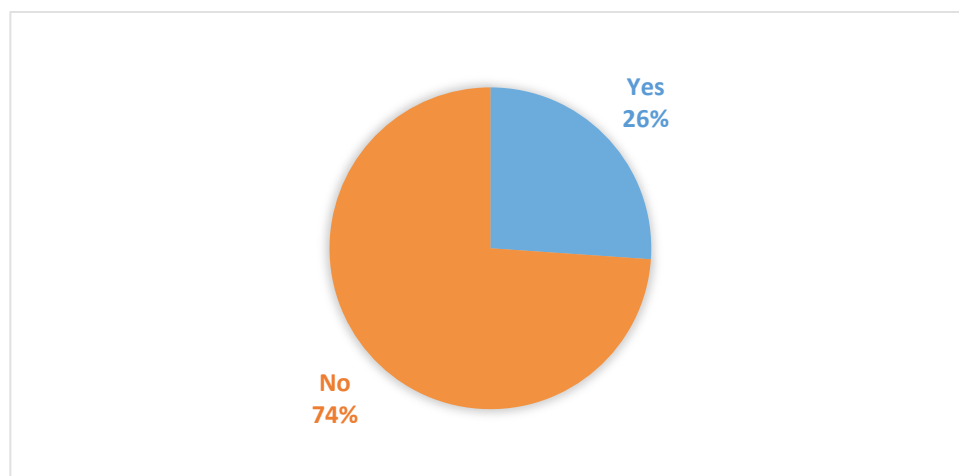


Figure 4.8 Land use planning and regulation

Three key themes arose from the in-depth interviews and they touched on the current legal framework, land use practices, and conservation of the Tana delta wetland. The lead experts agreed that the current trend of exploitation of Tana River Delta wetland resources is unsustainable because there lacks clear land use planning and regulation, resulting in unsustainable land use practices. They have noted that most of the projects were planned and approved before the TRD was listed as a Ramsar site. However, they noted that there is significant shift in the regulation policy even after the TRD has been listed as a wetland of international importance. Clearing of the wetland vegetation, large-scale agricultural projects, and damming and diversion of the rivers in the wetland were identified as some of the major practices.

Lead experts from the KWS articulated that, no particular organization is in control of the wetland, making land use planning and regulation a complex issue. The Kenya Wildlife Service noted that despite being the Ramsar Convention implementing authority, and national focal point, it has no mandate over the land use regulations. The fact that the different aspects of Tana River Delta conservation and management are handled by different agencies makes it difficult to regulate land use activities. Moreover, the experts noted that the agencies lack a defined legal mandate on any of the wetland resources. The implications have been that no single agency is responsible for the overall coordination, making planning and regulation difficult.

The key informants noted that the current legal framework is inadequate and cannot support the management of the wetland resources effectively because despite its significance as a wetland of international importance Tana River Delta is still greatly threatened through continuous degradation. They noted that the enactment of different legislations related to conservation and management of wetlands in Kenya has not helped in the conservation and wise use of the Tana Delta wetland because of duplications and conflicts. They observed that the national wetland policy, which is the final drafting stages, would streamline wetland management and conservation by ending the duplications. They noted that the national wetland policy would guide the establishment of an operative and resourceful institutional and legal structure around the conservation and management of wetlands in Kenya. Moreover, it would support the institutional capacities.

The key informants noted that land ownership in the Tana River Delta is Community land, held as trust land by the local county in trust for the public and local communities. This legal position makes locals have little control over the use of the resource. Private individuals and government agencies have also been accorded ownership through 99-year land leases mainly for agricultural purposes. The high demand for the Tana Delta resources, particularly the fertile land has led to serious environmental degradation and marginalization of the indigenous local communities. Large areas of the Tana Delta wetland have been set aside for industrial, farming, and mining by government and private agencies, and foreign investors. Settlement schemes have also taken up some of the most vital dry season grasslands in the Tana delta as societies from outside the pastoral areas were settled in the region to cultivate crops. These land use practices have threatened the wetland ecosystem leading to loss of catchment areas, diversion of rivers, and other adverse environmental impacts. The key informant noted that the Tana delta wetland provides enormous environmental services to the country; however, the unsustainable land use practices that do not take the unusual situations of the delta into consideration are causing environmental degradation at an alarming rate. They also noted the urgent need for the delineation of the wetland boundaries along fragile ecosystems to be undertaken for regulation and conservation needs.

4.6.3. The Relative Significance of Land Use to Residents' Well-Being

The researcher grouped various land uses in the Tana Delta wetland into socio-cultural, biodiversity, recreational, and commercial and wanted to know which were the most important for the residents. The aim was to identify where tradeoffs can be made during the planning for multiple land uses in the wetland. Most (39%) of the respondents identified land uses that support social-cultural aspects as the most important. Those that support biodiversity were ranked second. Figure 4.9 shows the summary of the findings.

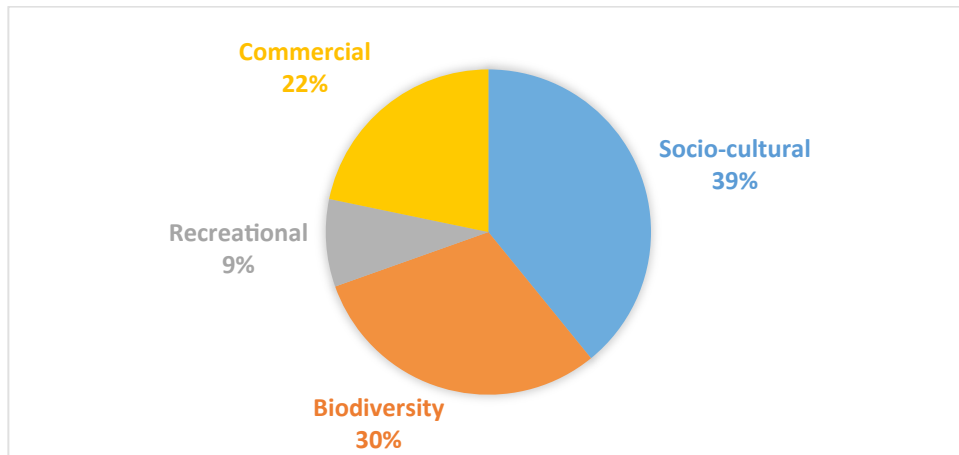


Figure 4.9 Relative significance of land use to residents' well-being

The key informants noted that most of the residents feel debarred from the projects in the name of progress and are troubled by the socio-economic concerns resulting from the projects. For instance, one of the key informants noted that because of the changing land use in the delta the indigenous pastoralists are losing their grazing areas. For instance, the Orma, Wardei, and Somali pastoralists are progressively losing their pastoral lands, and being forced to adopt crop farming for their subsistence. Others are taking up low paying jobs like working in the rice irrigation schemes to supplement their livelihoods. Most of the key informants agreed that the conflicts witnessed recently in the Tana delta could be correlated with the exclusion of the locals from use of the wetland resources. They also noted loss of habitat for water birds and wildlife. Overall, the key informants noted that the current land use practices are unsustainable and do not conform to the principal of wise use of the Tana Delta wetland.

4.7. Discussion

4.7.1. Land Use Practices in Tana Delta Wetland

The Tana Delta wetland currently supports various land use practices at both small-scale and large-scale levels. The locals engaged in small-scale agricultural activities including rice farming and fishing, pastoralism, supported by the rich flood plains. Alongside these land use practice, there are ongoing large-scale agricultural activities being undertaken by the Kenyan government agencies and the private companies. These land use practices have been driven by the highly productive ecologies in the Tana Delta wetlands that stemmed from plentiful water and rich

residues conveyed in by the floods. The introduction of large-scale farming in the wetland has resulted in unsustainable land use practices as thousands of hectares in the wetland have been converted for large-scale developments. This study established that the land use changes in the Tana delta have failed to adhere to the wise use and conservation of the Tana Delta Wetland. The primary reason is that the proponents have failed to address central concerns, such as competing interests in land use and property rights. Odote noted that lack of adequate protection of property rights is frustrating efforts to conserve wetlands in Kenya.¹

In the case of Tana Delta wetland, the failure of the policy and legal framework in Kenya is blamed for the unsustainable land use practices. Mbonde noted that in Kenya, the EIA process is often disregarded as it is considered a formal procedure provided for by the legal and policy frame, but with little meaning or implications.² The Kenyan government, the main proponent in Tana Delta development projects, through agencies, such as TARDA has over the years disregarded the EIA reports and worked to promote development projects. As a result, it has promoted unsustainable land use changes and practices in the name of development. Other aspects that were noted to disregard and thwart the wise use and conservation of the wetlands land resources included the lack of institutional control over the management of the land resource. This allowed various agencies and stakeholders to influence the land use changes and promote project implementation regardless of their impacts. The consequences have been conflict for land resources, unsustainable land practices, and strong opposition from the locals and NGOs, and other proponents of wetland conservation.

4.7.2. Land Use Changes: Effects on People's Livelihoods

The land use changes in the Tana Delta have resulted in social economic impacts, changing the livelihoods of the residents. The large-scale rice farming is concentrated on the most fertile parts of the delta where also the richest pastures exist. Given that pastoralism was identified as the major economic activity in the Tana delta area, the conversation of the lands for agriculture meant that the pastoralist could no longer access the land for grazing. Subsistence livelihoods involving fishing and crop farming have also been adversely impacted because of the flood

¹ Odote, et al., 2008. p. 20

² Mbonde, 2012.

control measures using dykes and damming of the river. In their study, Duvail³ had similar finding whereby they observed that the change in water regime in the Tana Delta have affected people's livelihoods through the loss of pasturelands, fishing zones, and farming opportunities. In another study, by Leauthaud, the authors established that the changes in the flooding regime in the Tana Delta have impaired the economic development of the locals because they can no longer practice small-scale irrigation for subsistence.⁴ In this study, it was observed that with changing water systems because of the changing land uses in the delta, agro-ecological production systems have also changed, affecting the residents' livelihoods adversely. The effects have been the abandoning of sustainable means of livelihoods that supported the wetland ecosystem by depending on the natural flooding patterns, the diverse agricultural, and the ecological zones in the wetlands, which have since disappeared.

Farmers in lower parts of the Tana wetland have been forced to diversify their agricultural activities and introduce new crops because of the unavailability of water and reduced water flow. The Pokomos, who are predominately farmers, noted that the diversion of the water upstream was initially beneficial as it helped control the frequency, duration, and extent of flooding, facilitating crop farming by making arable land available. However, they reported that over the year, agriculture, particularly rice farming became unsustainable because of the unavailability of water caused by over abstraction of water upstream through large-scale rice farming conducted by TARDA. Farmers in the Tana delta reported that they have changed their crop systems and now plant rain-fed maize in place of biannual rice crop because of the unavailability of water. The respondents reported that they currently farm maize crop once a year, which often fail because of the changing weather patterns because of global warming. The changing land use practices have affected the livelihoods of the locals through loss of food security as they currently depend on rain fed agriculture and pasturelands. Leauthaud⁵ confirms the study findings by indicating that, from the 1960s, crop yields have been declining gradually, particularly from the early 1990s because of flood control mechanism initiated through large-scale rice farming by TARDA. Crafter, has noted that fish populations in Kenyan wetlands have

³ Duvail, Stéphanie, Claire Médard, Olivier Hamerlynck, and Dorothy Wanja Nyingi. "Land and Water Grabbing in an East African Coastal Wetland: The Case of the Tana Delta." *Water Alternatives* 5, no. 2 (2012): 322-343.

⁴ Leauthaud, et al., 2013, p. 262

⁵ Ibid, p. 260.

been dwindling as of the mid-1960s because of the exploitation of wetland resources through modern farming methods.⁶ The study found out that some lakes that used to be replenished by floodwaters have since disappeared because of upstream land use changes that have affected the flow of water. Fishing, once a defining livelihood component of the Pokomo has since been abandoned or is done occasionally. Livestock rearing of the Orma has endured the most of direct effects of land use changes as pastoralists now travel longer distances in search of pasture and others have abandoned the practice all together. Moreover, floods that supported the quick regeneration of pastures by bringing in fertile sediments have since decreased. Consequently, the effects of the changing land use practices on the residents' livelihoods cannot be more evident.

4.7.3. Land use and Trade-offs

The study established that no trade-offs had been reached in TRD as economic developments have taken precedence over the welfare of the locals, explaining the oppositions directed toward the land use changes in TRD. Additionally, trade-offs could not be realized as the large land deals in TRD have excluded community engagement and open negotiations in establishing equitable outcomes for conservation. Smalley and Esteve support the research findings by indicating that large-scale land deals in the TRD were largely half-done and decisions uneducated.⁷ The balance between socio-economic rights and environmental conservation has not been accomplished in TRD because the wetland continues to be degraded. Moreover, the land use changes have not supported the more important of the ecosystem services for sustainable development of wetlands because they have disrupted the resident's livelihoods, resulting in food scarcity and creating a wasteland in a wetland.

The land use practices and changes in the Tana River Delta were found not to correspond to the wise use of wetlands because they have led to the destruction of the wetland ecological characters. In the Tana Delta wetland, no ecosystem approaches within the context of sustainable development had been implemented by the government and private businesses utilizing the wetland resources. Additionally, the proponents have continually failed to place the local

⁶ Crafter, S A, S G Njuguna, and Geoffrey W Howard. *Wetlands of Kenya: proceedings of the KWWG Seminar on Wetlands of Kenya, National Museums of Kenya, Nairobi, Kenya, 3-5 July 1991*. Gland, Switzerland: IUCN, 1992, pp. 48-52.

⁷ Smalley, Rebecca, and Esteve Corbera. Large-scale Land Deals from the inside Out: Findings from Kenya's Tana Delta. *Journal of Peasant Studies* 39, no. 3-4 (2012): 1039-075.

community well-being at the center of the decision-making processes. The study found out that decisions relating to large-scale land use changes and practices were skewed with the national government making largely unilateral decisions when setting up projects in Tana Delta Wetlands. As a results, the decision making process has been exclusive, discouraging community engagement, openness in negotiating trade-offs, and the establishment of equitable outcomes for conservation. The effects of the unilateral decision-making process have affected livelihoods in the Tana. Conflicts for resources have become regular, droughts have become a yearly occurrence, and the residences have become overdependence on relief food assistance.

The respondents reported that they current land uses do not support social-cultural aspects, which they identified as the most important and indication that they have been overlooked as regard sharing the wetland resources and services. As result, the changes in land use and practices have largely benefited big corporations and the Kenyan government. Smalley and Esteve noted that large-scale land deals in the Tana Delta land were largely partial and reflected the decision-making influence of the elite in government and private sector that was mostly uninformed.⁸ Moreover, they noted that the decision-making process regarding large-scale land deals needed to be comprehensive through cross-scale agency involvement and agreements in fostering support for, or disapproval to, such deals.

⁸ Smalley, et al., 2012.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The case of the Tana Delta wetland has demonstrated lack of sustainable management, wise use, and conservation of the wetland resources. The major reason is that most development projects were proposed before the Tana Delta wetland was listed as a Ramsar site in 2012. However, the change of status and the enactment of the Kenyan Constitution 2010 have not resulted in enhanced conservation measures for the wetland. As a result, the land use practices in the Tana Delta wetland have resulted in many environmental impacts, endangering the flora and fauna, besides affecting the locals' livelihoods adversely. They have also resulted in the interference of the normal hydrological cycle of the water through damming of rivers and construction of dykes, and reclamation of wetland for large-scale agricultural developments. The land use practices have also led to the involuntary displacement of people and conflicts over the wetland resources. In efforts to ensure sustainability in TRD, key proponents of ecosystem conservation in Kenya including Nature Kenya, KENWEB, and other community-based organization have spearheaded efforts to ensure the wise use of the TRD wetland resources. They have done so by opposing projects that threatened the conservation of the Tana Delta wetlands, such as the sugarcane project and lease of the wetland lands by the Qatar government. Moreover, they have worked with communities to promote ecological sustainability in the TRD wetland. The organizations have also collaborated with various government agencies to develop a land use plan that will lead to the long-term sustainable management of the Tana River Delta in an equitable way. The land use plan will support law and policies governing wetland management. However, these efforts have not addressed the challenges facing the TRD wetland adequately because they lack backing from a solid environmental law regime.

The inadequacy of the legal and policy framework governing wetland management remains the primary factor that has contributed to the degradation of the Tana Delta wetland at an alarming rate. The implication of this is that no clear land use planning and regulation exists, and only few stakeholders control the planning and decision making process regarding the use of wetland resources. Moreover, the lack of an operational wetland policy has meant that the use of the wetland resources remains largely unregulated and no government agency has a clear mandate

over the management of the wetlands in Kenya. It is the view of this study that the past and existing land use practice in Tana Delta wetland have not adhered to the wise use concept given they have led to numerous adverse environmental impacts. Moreover, the current legal framework is incapable of supporting the management of the Tana River Delta wetland resources effectively because the degradation of the wetland has continued in their existence.

Much as the Constitution of Kenya 2010 has prompted a paradigm shift in the management of the environment in Kenya, a comprehensive integrated environmental enforcement mechanism is needed to guarantee the sustainability of the environment. Moreover, the Kenyan government needs to develop a strategy that supports environmental management through institutional support, funding, capacity building, to information, and community participation in environmental decision-making. The strategy ought to pay attention to providing ecological justice through the implementation of current laws and policies in the application of environmental rights. Likewise, there must be the political will to implement environmental rights both at the national and county levels of government to instill ecological stewardship in Kenya.

The study clearly shows that current land use practices in the TRD have serious negative effects for various stakeholder groups where the losers are the local residents and the environment. The study helped to identify several critical aspects that deserve further and serious thought before implementing the proposed development projects in the delta. For instance, the rice project has had adverse effects downstream, such preventing flood pulse and loss of pasturelands. These effects outweigh the positive effects of rice project upstream. The outcome of the study do not imply that developments should not take place at all in the TRD, but instead calls for the establishment of an operational legal and policy framework. It is the view of the researcher that such as framework could guarantee sustainable developments and wise use of the TRD wetland resources and services. The study is an important first step towards that goal.

5.2.Recommendations

The research proposes various recommendations categorized as short term; medium term and long term

In the short-term the Government needs to undertake an audit of all the land uses in the Tana Delta Wetland and make a decision on which of the land uses endanger the ecology of wetland that should be stopped.

There is need to clearly identify, demarcate and gazette the Tana River Wetland boundaries to ensure its conservation. Clear mapping of the wetland and providing regulations on integrated development master plan of the wetland is also of paramount importance.

In the medium term the Government should appoint specific regulatory agency to manage wetlands in Kenya and enhance the capacity of such regulatory agency by giving it the power to control land use development and redress environmental breaches. There is need to consolidate the legal and policy framework on wetlands management in Kenya. The National Wetland Policy should be adopted and implemented.

In the Long-term, the Government in collaboration with wetland conservation proponents should design and implement education programs that sensitize the communities living in wetland areas and investors on development activities that are not in conflict with wise use of wetlands resources.

The research recommends further study on the implication of the newly enacted Community Land Act, No. 27 of 2016 that provides for adjudication and registration of all community land to clans or individual community members. Since the land in the Tana Delta Wetland is community land what impact will such adjudication of the land to community groups and individuals have on the management and conservation of the Wetland.

Bibliography

1. CBD. *History of the Convention*. 2015. <https://www.cbd.int/history/> (Accessed November 19, 2016).
2. Csaba, Juhász, and Szöllösi Nikolett. *Environmental management. Chapter 11. Life cycle management*. Hungary: University of Debrecen, 2008.
3. Dinçer, Ibrahim, and Marc Rosen. *Exergy: Energy, Environment, and Sustainable Development*. Amsterdam: Elsevier, 2007, p. 60.
4. Duvail, et al. The Tana Delta Case Study. *Water Alternatives* 5, no. 2 (2012): 322-343.
5. FAO. *Foreign Land Investments in Developing Countries. Contribution or Threat to Sustainable Development?* Publication series, no 7, Sweden: FAO, February 2011.
6. FAO. *Land degradation assessment*. 2016. <http://www.fao.org/nr/land/degradation/en/> (Accessed November 19, 2016).
7. FIAN. *Land Grabbing Large scale rural transformation*. Heidelberg, Germany: Food First Information and Action Network, 2010.
8. Finlayson, C. Max, Nick Davidson, Dave Pritchard, G. Randy Milton, and Heather MacKay. 2011. "The Ramsar Convention and Ecosystem-Based Approaches to the Wise Use and Sustainable Development of Wetlands." *Journal of International Wildlife Law & Policy* 14 (3-4): 176-198.
9. Gebreslassie, Hagos, Temesgen Gashaw, and Abraham Mehari. 2014. "Wetland Degradation in Ethiopia: Causes, Consequences and Remedies." *Journal of Environment and Earth Science* 4 (11): Online.
10. GRID-Arendal. *Impacts on Environmental Degradation on Yield and Area*. 2014. <http://www.grida.no/publications/rr/food-crisis/page/3567.aspx> (accessed November 19, 2016).
11. Groot, Rudolf de, Mishka Stuip, Max Finlayson, and Nick Davidson. *Valuing wetlands Guidance for valuing the benefits driven from wetland ecosystem services*. Ramsar Technical Report No. 3, Gland, Switzerland: Ramsar Convention Secretariat, 2006.
12. Kabukuru, W. 2015. "Tana: The delta of Discontent." *New African* no. 555: 46-49.
13. Kansime, F. M., Saunders, J., and Loiselle, S. A. "Functioning and dynamics of wetland vegetation of Lake Victoria: An overview." *Wetlands Ecology and Management* 15, no. 2 (2007): 443-451.

14. Kecha, Aron, Griffins Ochieng, Paul Lekapana, and Geoffrey Macharia. "Status of Wetlands in Kenya and Implications for Sustainable Development." In *Environment and Sustainable Development*, 193-208. School of Environmental Studies and Human Science, Kenyatta University, 2007.
15. Kenya Wetlands Forum. *Threats and Challenges to Wetlands*. 2010.
http://www.kenyawetlandsforum.org/index.php?option=com_content&view=article&id=24:threats-and-challenges-to-wetlands (Accessed March 23, 2016).
16. Kenya Wildlife Service. "National Report on the Implementation of the Ramsar Convention on Wetlands." *Ramsar COP12 of the Conference of the Contracting Parties*. Uruguay: Ramsar, 2015. 1-29.
17. Kiai, S.P.M., and G.M. Mailu. *Kenya country paper. Wetland classification for agricultural development in Eastern and Southern Africa*. n.d.
<http://www.fao.org/docrep/003/x6611e/x6611e02a.htm>.
18. Kooij, P. van der, and E.L. Voermans. *Integrated Water Resources Management in the Tana Delta, Kenya*. 2013.
19. Kruchek, B.L. "Extending Wetlands Protection under the Ramsar Treaty's Wise Use Obligation." *Arizona Journal of International and Comparative Law* 20, no. 2 (2003): 409-442.
20. Maltby, Edward. *Waterlogged Wealth: Why Waste the World's Wet Places?* New York: Routledge, 2013.
21. Matiku, Paul. *Tana River Delta. Conservation and Development Plan. Draft for discussion*. London: The Darwin Initiative, 2009.
22. McCartney, Matthew, Lisa-Maria Rebelo, Sonali Senaratna Sellamuttu, and Sanjiv de Silva. *Wetlands, agriculture and poverty reduction*. Colombo, Sri Lanka: IWMI, 2008.
23. McCartney, Matthew, Max Finlayson, Sanjiv de Silva, Priyanie Amerasinghe, and Vladimir Smakhtin. *On Target for People and Planet: Setting and Achieving Water-related Sustainable Development Goals*. Institute for Land, Water and Society, Charles Sturt University, n. d, 28-32.
24. Ministry of Environment, Water and Natural Resources. "Draft National Wetlands Conservation and Management Policy." Nairobi: Republic of Kenya, November 2013.

25. Mwacharo, Mshenga. "State must pre-empt threat to our life-sustaining wetlands." *The Daily Nation*, February 1, 2014: Online.
26. National Environmental Tribunal. *About Us*. 2011.
http://net.or.ke/index.php?option=com_content&view=article&id=51&Itemid=57
 (accessed March 25, 24).
27. NEMA. *National Environment Management Authority*. 2016.
<http://www.environment.go.ke/?cat=28> (Accessed March 23, 2016).
28. Neville, Kate J. "The Contentious Political Economy of Biofuels." *Global Environmental Politics* 15, no. 1 (2015): 21-40 (Accessed March 23, 2016).
29. Nunow, Abdirizak Arale. "The Dynamics of Land Deals in the Tana Delta, Kenya." *LDPI*, 2011: 1-27.
30. Nuttall, Nick. *Kenya Aims to Tackle Growing Degradation of Spectacular and Vital Wetlands*. 2013.
<http://www.unep.org/newscentre/default.aspx?DocumentID=2723&ArticleID=9583>
 (Accessed November 19, 2016).
31. Odote, C., Ochieng, B., and Makoloo, O. "The Implications of Property Rights for Wetlands Management in Kenya." *Institute for Law and Environmental Governance*, 2008: 1-20.
32. Odote, Collins. "Wise Use and Sustainable Management of Wetlands in Kenya." In *Environmental Governance in Kenya: Implementing the Framework Law*, by C. O. Okidi, 335-354. Nairobi: East African Educational Publishers, 2008.
33. Ongugo, Paul O, et al. *A review of Kenya's national policies relevant to climate change adaptation and mitigation: Insights from Mount Elgon*. Vol. 155. CIFOR Working Paper, 2014.
34. Ramsar Convention Secretariat. *History of the Ramsar Convention*. 2014.
<http://www.ramsar.org/about/history-of-the-ramsar-convention> (Accessed November 19, 2016).
35. Ramsar Convention Secretariat. "Resolution VIII.34. Agriculture, wetlands and water resource management." *8th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971)*. Valencia, Spain: The Ramsar Convention Secretariat, 2002. 1-4.

36. Ramsar Convention Secretariat. *Wise use of Wetlands*. 4th. Vol. Handbook 1. Gland, Switzerland: Ramsar Convention Secretariat, 2010.
37. Republic of Kenya. "Draft National Wetlands Conservation and Management Policy." Nairobi: Republic of Kenya, June 2013.
38. Republic of Kenya. "National Environment Policy, 2013." Nairobi: Ministry of Environment and Mineral Resources.
39. Republic of Kenya. "Sessional Paper No. 3 of 2009 on National Land Policy." Nairobi: Ministry of Lands, Kenya, 2009.
40. Republic of Kenya. *Final Draft Sessional Paper on National Wetlands Conservation and Management*. Nairobi: Republic Of Kenya, 2008.
41. Secretariat of the Convention on Biological Diversity. "CBD Guidelines. The Ecosystem Approach." Montreal, Canada: Secretariat of the Convention on Biological Diversity, 2004.
42. Springate-Baginski, O., Allen, D. and Darwall, W. "An Integrated Wetland Assessment Toolkit." 2009. Gland, Switzerland: IUCN and Cambridge, UK: IUCN Species Programme.
43. Terer, Taita, George G. Ndiritu, and Nathan N. Gichuki. "Socio-economic values and traditional strategies of managing wetland resources in Lower Tana River, Kenya." *Hydrobiologia* 527, no. 1-3 (2004): 3-15.
44. The Ramsar Convention Secretariat. *The Wise Use of wetlands*. 2014.
<http://www.ramsar.org/about/the-wise-use-of-wetlands> (Accessed March 23, 2016).
45. Ulmer, Vanessa M., Adrienne R. Rathert, and Donald Rose. "Understanding Policy Enactment." *American Journal of Preventive Medicine* 43, no. 3, Supplement 2 (2012): S116–S122.
46. UNEP. "Land Degradation." 2009.
http://na.unep.net/atlas/datlases/sites/default/files/unepsiouxfalls/atlasbook_1135/Kenya_Screen_Chapter4b.pdf (Accessed November 19, 2016).
47. UNEP. *Kenya Aims to Tackle Growing Degradation of Spectacular and Vital Wetlands*. 2013.
<http://www.unep.org/newscentre/default.aspx?DocumentID=2723&ArticleID=9583>.

48. United Nations. *Progress of goal 15*. 2015. <https://sustainabledevelopment.un.org/sdg15>. (Accessed November 19, 2016).
49. Verhoeven, Jos T.A., Merel B. Soons, Ron Janssen, and Nancy Omtzigt. "An Operational Landscape Unit Approach for Identifying Key Landscape Connections in Wetland Restoration." *Journal of Applied Ecology* 45, no. 5 (2008): 1496-503.
50. Wasuna, Brian. "Court stops firm's rice project in Tana Delta tender row." *Business Daily*, December 16, 2014: Online.
51. Weru, Ann. *Livelihood concerns as Kenya kicks off regional infrastructure project*. 2013. <http://www.irinnews.org/report/98908/livelihood-concerns-kenya-kicks-regional-infrastructure-project> (accessed November 19, 2016).
52. Wolvekamp, Paul, Christa Nooy, Nathalie van Haren, Silas Kpanan' Ayoung Siak, and Tom Lomax. *Governance, agricultural development, nature conservation and land and water distribution in Africa*. Amsterdam, the Netherlands: Both ENDS, 2015.

Appendix : Questionnaire